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The United States MILLER

Published by E. HARRISON CAWKER. { Vol. 12, No. 1. } MILWAUKEE, NOVEMBER, 1881. { Terms: \$1.00 a Year in Advance. Single Copies, 10 Cents. }

ESTABLISHED 1850.
WILLIAM BRYCE & CO.,
 36 MARK LANE,
LONDON (England.)
 40 ST. ENOCH SQUARE,
GLASGOW (Scotland.)
 TELEGRAMS:
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Flour Merchants,
BRISTOL, ENGLAND.

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BROKERS & FACTORS,
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 American correspondence solicited.

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IN FLOUR,
BRISTOL, ENGLAND.

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 We are the first introducers of the Chilled Iron Rollers for milling purposes, and hold Letters patent for the United States of America. For full particulars address as above.
 [Mention this paper when you write us.]

Important Notice
 For Mills about to purchase Roller Mills. We take this method of informing our friends that we have made arrangements for the exclusive manufacture of the
STEVENS ROLLER MILLS,
 UNDER THE PATENTS ISSUED TO JNO. STEVENS.
 The work done by the Mills is far superior to that of any other machine known in this country or Europe.
 License to use the machine and process will be issued by the patentee for each mill furnished to us.
 Old rolls, or those with inferior dress, recut with the Stevens dress at reasonable prices.
JOHN T. NOYE & SONS, Buffalo, N. Y.
 [Mention this paper when you write us.]

James Leffel's Improved WATER WHEEL.
 NEW PRICE LIST FOR 1881.
 The "OLD RELIABLE" with Improvements, making it the Most Perfect Turbine now in Use, comprising the Largest and the Smallest Wheels, under both the Highest and Lowest Heads used in this country. Our new Pocket Wheel Book for 1881 and 1882 sent free to those using water power. Address
JAMES LEFFEL & Co., Springfield, Ohio,
 and 109 Liberty Street N. Y. City.
 [Mention this paper when you write us.]

ROLLS! ROLLS! ROLLS!
 For the Entire Reduction of Wheat to Flour,
GRADUAL REDUCTION HAS COME TO STAY.
C. MILLER, of Mansfield, Ohio, representing John T. Noye & Sons, is prepared to furnish Roller Mills complete of any desired capacity.
The Stevens System of Gradual Reduction a Success Everywhere.
 Plans furnished when desired. Correspondence Solicited.
C. F. MILLER, Mansfield, Ohio.

GOODYEAR RUBBER CO.
JAMES SUYDAM, Agent.
RUBBER GOODS
Cape Ann Oil Clothing,
LEATHER { BELTING AND LACING, | TABLE AND CARRIAGE } OIL CLOTHS.
372 & 374 East Water St.,
 Branch of **GOODYEAR RUBBER CO., NEW YORK.**
MILWAUKEE.

HOWES, BABCOCK, & EWELL.
 LATE HOWES, BABCOCK & CO.,
Silver Creek, - - New York.
No. 16 Mark Lane, London, Eng.
THOS. TYSON, Melbourne, Victoria,
 General Agent for the Australian Colonies and New Zealand.
 Sole proprietors and manufacturers of EUREKA Wheat Cleaning Machinery, consisting of "Smut Machines," "Brush Machines," Separators for mills and warehouses, and Flour Packers.
 Also the Magnetic Separator for removing substances from grain automatically, and dealers in the genuine Defour & Co. and Dutch Anchor brands Bolting Cloth, and mill furnishings generally.
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John W. Rogers,
 MANUFACTURER AND DRESSER OF
MILL PICKS
313 Cedar St., St. Louis, Mo.

30 or 60 days' trial to any responsible miller in the United States or Canada, and if the picks are not finer and thinner than anything they ever used, there will be no charge for the same, and I will refund all express charges both to and from St. Louis, Mo. When ordering these picks state weight and kind. Send for prices before buying. References from every State and Territory in the United States.
 P. S.—No Mill Pick manufacturer who does poor work can get such letters as the following:
 Office of James Leffel & Co., Springfield, Ohio, September 9, 1880.
 John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: We herewith inclose draft \$21.85, to pay your invoice of August 9th. Please acknowledge. Yours respectfully,
 JAMES LEFFEL & CO.
 Office of James Leffel & Co., Springfield, Ohio, November 6, 1880.
 John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: Enclosed find bill of lading covering a shipment of mill picks made you today. Please dress the blades on one end and return to us at your very earliest convenience. The last lot of blades sent are giving good satisfaction. Yours truly,
 JAMES LEFFEL & CO.
 Office of the Williams & Orton Mfg. Co., Sterling, Ill., October 7th, 1880.
 John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: Inclosed find Chicago draft No. 85,669, amount \$41.00, in full account. Please acknowledge receipt and oblige. Yours respectfully,
 WILLIAMS & ORTON MFG. CO., G. M. Robinson, Secretary.
 The Nordyke & Marmou Mill Works, Indianapolis, Ind., September 10, 1880.
 John W. Rogers, St. Louis, Mo.—Dear Sir: We inclose our New York check No. 334 for \$72.25, in full of our account. You will please acknowledge receipt of same, and oblige us, Yours respectfully,
 NORDYKE & MARMON CO.
 Alsey Mills, Scott Co., Ill.
 John W. Rogers, St. Louis, Mo.—Gents: Please find enclosed order on T. C. Taylor & Co., St. Louis, in pay for the Mill Picks, with thanks for your liberal offer to try which we have done, and take pleasure in saying that we find them a superior Pick to any we have had from Chicago or St. Louis, and will add that I have had 35 years' experience in milling.
 J. J. HAYCRAFT.
 [Mention this paper when you write us.]

JOHN C. HIGGINS,
 Manufacturer and Dresser of
Mill Picks,
No. 169 W. Kinzie Street,
CHICAGO, - ILLINOIS.

Picks will be sent on 30 or 60 days' trial to any responsible miller in the United States or Canada, and if not superior in every respect to any other pick made in this or any other country, there will be no charge, and I will pay all express charges to and from Chicago. All my picks are made of a special steel, which is manufactured expressly for me at Sheffield, England. My customers can thus be assured of a good article, and share with me the profits of direct importation. References furnished from every State and Territory in the United States and Canada. Send the Circular and Price List.
 [Mention this paper when you write us.]

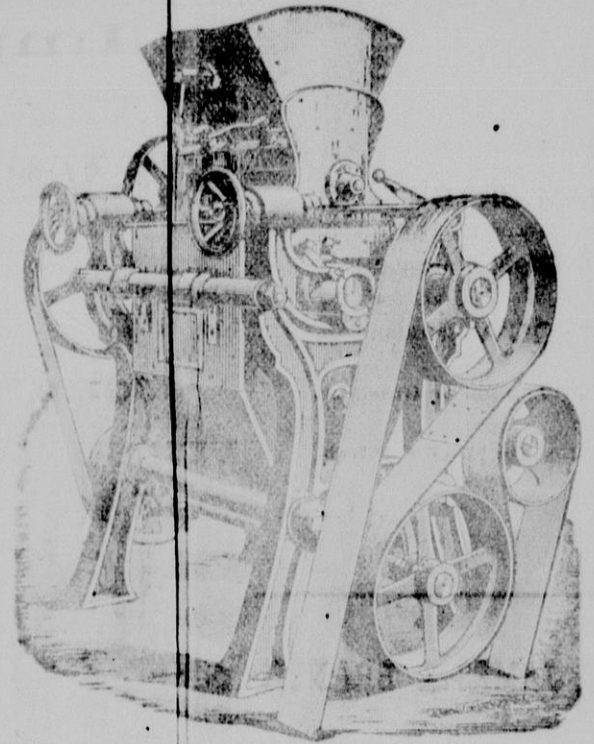
The "Nonpareil" Mill Pick Company,
 Manufacturers of
MILL PICKS.
O'CONNELL & MAHONEY,
 3 Dunn Street, CHICAGO, ILL.
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GRAY'S PATENT NOISELESS ROLLER



DOUBLE MACHINE.

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SINGLE MACHINE.

WITH

CORRUGATED CHILLED IRON ROLLS.

CORRUGATIONS CUT OF ALL DESCRIPTIONS.

OVER 5,000 IN USE.

First Premium Awarded at Millers' International Exhibition.

These Machines require little power, are perfectly noiseless, being driven entirely by belt, are simple in construction; strong and durable; perfect in every adjustment; adapted to both soft and hard wheats.

We refer to the following prominent millers who are each using from 50 to 150 of the machines:

Winona Mill Co., Winona, Minn.
C. A. Pillsbury & Co. Minneapolis, Minn.
C. C. Washburn.
Washburn, Crosby & Co., "
W. D. Washburn & Co., "
Sibley, Fletcher, Holmes & Co., "
E. M. White & Co., "
John Glenn, Glasgow, Scotland.
Jones & Co., New York City.
Geo. V. Hecker, New York City.
Becker & Underwood, Dixon, Ill.
Schurmeier & Smith, St. Paul, Minn.
E. T. Archibald & Co., Dundas, Minn.

Jesse Ames' Sons, Northfield, Minn.
J. B. A. Kern, Milwaukee, Wis.
Edw. Sanderson, "
Daisy Roller Mill, "
C. E. Manegold & Sons, Milwaukee, Wis.
Commins & Allen, Akron, Ohio.
L. H. Gibson & Co., Indianapolis, Ind.
L. H. Lanier & Co., Nashville, Tenn.
LaGrange Mill Co., Red Wing, Minn.
Waggoner & Gat, Independence, Mo.
Horace Davis & Co., San Francisco, Cal.
And Hundreds of others.

To all parties purchasing our Rolls we give full information regarding the system of Roller Milling.

ADDRESS:

EDW. P. ALLIS & CO.,

Mention this Paper when you write us.

MILWAUKEE, WIS.

The United States MILLER

Published by
E. HARRISON CAWKER. { Vol. 12, No. 1 }

MILWAUKEE, NOVEMBER, 1881.

{ Terms: \$1.00 a Year in Advance.
Single Copies, 10 Cents.

The Pillsbury "A" Mill at Minneapolis.

We have the pleasure of presenting to our readers herewith an illustration and description of the Pillsbury "A" mill, in Minneapolis, Minn. This is the largest flour mill in the world and is able to produce sufficient flour to feed a great city like New York. Mr. C. A. Pillsbury, of the firm of Chas. A. Pillsbury & Co., proprietors of the "A" mill and four others in Minneapolis has been identified with the milling interests of Minneapolis since 1869, and has adopted the most improved and best adapted machinery and processes to be found in America or Europe in the mill here described. Immediately after Mr. Pillsbury returned from a business visit to Europe in 1880, the general plan of the structure was agreed upon and the site was selected on the east side of the river about 150 yards below the Falls of St. Anthony. The ground was broken and the building commenced in the early spring of 1880 from plans drawn by L. S. Buffington, of Minneapolis.

The structure is built of Trenton limestone, rock faced and laid in courses. Its length is 180 feet, its width 115 feet, and the height 137 feet, divided into seven stories and cupola. The foundation side walls are eight feet and a half thick, and the end walls seven feet and a half. The walls taper from a thickness of five and a half feet below the grinding floor to a thickness of two and a half feet in the three highest stories. The basement story, which is twenty feet high, is laid in Louisville cement, and the coping, window sills and two belting courses are of hammer dressed granite. The words "Pillsbury A" are of marble, the letters in "Pillsbury" being four feet high and the "A" ten feet. It took 125 men six months to construct the masonry.

The forebay, in the basement, is 125 feet long and 15 feet wide, built of stone laid in hydraulic cement. The wheel-pits were dug in the solid rock, are 53 feet deep and walled in. The iron pits, inside the flumes, are 12 feet in diameter. They are made of 3/8 inch boiler iron. Two 55 inch Victor turbines made by the Stilwell & Bierce Manufacturing Co., of Dayton, O., furnish 240 horse-power, which is the largest yield of power ever yet given by two wheels. Water is led to the mill by a canal 650 feet long, 16 wide and 16 deep dug in the solid rock and afterwards walled.

The bulkhead is 30 feet by 30, containing two gates, one on each side of the central pier. A stone arch beneath the basement admits the water to the mill. The canal cost \$100,000. The discharge from the wheels is by means of two tunnels, each 150 feet long, running from the river to the mill, directly under the wheels, and the tunnels empty into a tail race, several hundred feet long which empties into the river.

A bevel gear at the top of each water-wheel shaft transmits the power to a horizontal shaft eight inches in diameter, 145 feet long, tapering to six inches at the end, which rests on a solid arch work of masonry inside of the forebay. On this line-shaft are the driving pulleys, each weighing 6 1/2 tons, on which run two 48-inch double belts, each 126 feet long. From the line-shaft the power is taken by 30-inch belts to drive the different machinery in the mill. The power at present is taken from but one of these shafts, as the mill is really a double mill and only one-half is now in operation.

From this shaft one 30-inch double belt drives the bolting and elevating machinery; two similar belts drive the rolls and purifiers, a third drives the cleaning machinery and an-

other drives the electric machine which requires from twelve to fifteen horse power. The mill is so arranged that if one wheel breaks, the other wheel can run the whole mill, or the power of both wheels can be used together on each or both sides.

In addition to the driving mechanism which is found on the first or basement floor, there is also a wheat bin capable of holding 35,000 bushels of wheat, extending up through the grinding floor. Here are also the hurst frames for the millstone on the floor above. The second story is the reducing floor, and here when the mill is completed there will be over 400 sets of roller mills arranged in twelve lines. As stated above, only half of the machinery has been placed. So far 101 Gray Roller Mills have been furnished by E. P. Allis & Co., of Milwaukee, Wis. All of these machines are double, with rollers 9x18 inches in size; and comprise 64 corrugated machines, 27 smooth roller machines, and 10 porcelain machines. There are 125 of Stevens' Roller Mills furnished by Jno. T. Noye & Sons, of Buffalo, N. Y. There will be twenty pairs of millstones in the whole mill, which will be

each 14 feet long. On this floor there are 23 No. 2 Smith Purifiers, furnished by the Geo. T. Smith Purifier Co., of Jackson, Mich. Besides this machinery, there are bins over the flour packers on the floor below, made out of boiler iron six feet in diameter and extending through two stories. In the end of this story set apart for wheat cleaning, like the floor below, there are four Richmond Brush Machines, furnished by the Richmond Manufacturing Co., of Lockport, N. Y., and two large size Kurth Cackle Separators, furnished by the Cackle Separator Manufacturing Co., of Milwaukee. On this floor there are also four Niagara Bran Dusters, furnished by the Richmond Manufacturing Co., of Lockport, N. Y.

On the fifth floor, besides the continuation of the bolting chests, there are four Richmond Brush Machines, four Barnard & Leas Separators, and two centrifugal flour bolts.

On the sixth floor there are four centrifugal flour bolts, furnished by John Fiechter, Son & Co., of Minneapolis; four Niagara Bran Dusters, four Victor Smutters, furnished by the Barnard & Leas Manufacturing Co., and four Richmond Brush Machines. The continuation

Paul, and the Chicago, St. Paul, Minneapolis & Omaha railways. The facilities are such that eight cars of wheat per hour can easily be unloaded. As feeders to the "Pillsbury Mills" may be counted thirty-six elevators in different parts of the state, operated by Messrs. Pillsbury & Hurlbut, and having an aggregate capacity of 2,173,000 bushels. The capital invested in conducting this part of the business will readily be seen to be immense.

The mill is supplied with an elevator for passengers and freight, and is lighted with a Brush electric light, of 32,000 candle power. Steam for heating the building is supplied by two steel boilers placed in a fire-proof building separate from the mill. Electric call bells are on every floor, and the mill has telephone connection with Minneapolis, St. Paul, and Stillwater. Among other features of the mill may be noticed, is the central stairway, which is spiral, and is built of iron. The interior of the mill is painted white, with red trimmings, while the roller mills, stairways and scales are also red.

The half of the mill now completed is capable of turning out over 2,500 barrels per day, having recently made 47 barrels more than that amount. This will give the completed mill a capacity of 5,000 barrels per day, making it the largest mill in the world."



THE PILLSBURY "A" MILL AT MINNEAPOLIS.

used on middlings. The millstones are arranged in one line along the north wall of this story and are handsomely fitted up in black walnut and ash, and are all provided with Behrns' Patent High Pressure Millstone Ventilation, furnished by Brehmer Bros., of Philadelphia. On this floor there is a weighing hopper and scales, the hopper holding 800 bushels, and a line shaft 120 feet long, from which power is transmitted to drive the flour packers on the floor above.

The third floor is the packing-room where, on each side of the mill, will be placed when the second half of the mill is finished, twelve Eureka Flour Packers, making twenty-four in all, furnished by the Barnard & Leas Manufacturing Co., of Moline, Ill. One end of this floor is partitioned off for a cleaning room, deriving its power from a separate belt. The greater part of this floor is taken up with storage bins, and plenty of room is left for handling the flour after it is packed.

On the fourth floor the bolting chests begin and run up to the attic. In the eastern half of the mill now running, there are eight double and four single chests, which on the three floors above contain 40 reels each, and on the fourth floor above 22 reels, making 142 reels in all,

of the bolting chests extends through this story and the next, and on all these floors are more Smith Purifiers, making 100 in all. When the whole mill is completed it will contain 200 of these machines. The Hardenbergh Dust Catcher is used on the purifiers.

On the seventh floor are three lines of shafting from which are driven the elevators and bolts. The wheat cleaning machinery of the mill was furnished by the Barnard & Leas Manufacturing Co., of Moline, Ill., the Richmond Manufacturing Co., of Lockport, N. Y., and the Cackle Separator Co., of Milwaukee.

Mr. W. F. Gunn, of Gunn, Cross & Co., Minneapolis, furnished the plans for the mill, which were made under his direct supervision, and he also acted as superintending millwright of the mill. The Pray Manufacturing Co., of Minneapolis, furnished the machinery.

The mill has the most ample facilities for receiving grain and shipping flour. Indeed, this is absolutely necessary, when we consider that the mill, when the western half is completed, will use 25,000 bushels of wheat every day it runs. There are two tracks in front and three in the rear of the mill, affording connection with the St. Paul, Minneapolis & Manitoba, the Chicago, Milwaukee & St.

fire-arm that he was anxious to patent. When he obtained his patrimony he went to France to improve his implement. His was the experience of nearly all inventors. His money was soon exhausted, and at times he was reduced to the greatest extremity. But he never lost faith in his rifle. Finally he interested some capitalist, and the implement was carried to perfection. In due time the French government was induced to adopt the repeater for the army. The British government has just done the same thing, and the Toledo inventor is prepared to roll in wealth. His arm is said to be the most magnificent repeating rifle in the world.

A mill pick maker advises that in grinding picks the pressure be not too great, and that sufficient water be used so that heating, which always injures the temper, be prevented. It should be borne in mind that cracking picks should not be used for furrowing, and no pick should be used after its edges are worn too blunt. When picks are blunt grind them to a straight bevel, one-eighth or three eighths long.

President Garfield's picture is to be placed upon the five cent international postal letter stamp. A fine engraving for the new stamp is being executed for that purpose by the bank note engraving company.

UNITED STATES MILLER.

PUBLISHED MONTHLY.
OFFICE NO. 118 GRAND AVENUE, MILWAUKEE, WIS.
Subscription Price.....\$1 per year in advance.
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ANNOUNCEMENT:

WM. DUNHAM, Editor of "The Miller," 69 Mark Lane, and HENRY F. GILLING & Co., 449 Strand, London, England, are authorized to receive subscriptions for the UNITED STATES MILLER.

MILWAUKEE, NOVEMBER, 1881.

We send out monthly a large number of sample copies of the UNITED STATES MILLER to millers who are not subscribers. We wish them to consider the receipt of a sample copy as a cordial invitation to them to become regular subscribers. Send us One Dollar in money or stamps, and we will send THE UNITED STATES MILLER to you for one year.

SINCE the Bostonians have about given up the World's Fair enterprise the New Yorkers are again talking seriously of reorganizing and carrying out the project.

A KANSAS farmer who claims to have tried it says that salt sprinkled on ground sowed with wheat at the rate of a half bushel to the acre will prevent the ravages of chinch bugs.

Dr. SAMUEL SEXTON, of Philadelphia, after years of observation and experiment has expressed the opinion that defective teeth are very often the cause of deafness and troubles of the eyes in children.

MARRIED—September 29, 1881, at Chicago, Ill., Mr. D. H. Ranck, editor of the *Millstone* of Indianapolis, Ind., to Miss Alice Rowley, daughter of C. M. Rowley, Esq., of Chicago. We congratulate Bro. Ranck on his good fortune and wish him and his bride a life of happiness and prosperity.

TIMELY AND EXCELLENT.—We have received from H. H. Warner & Co., of Rochester, N. Y., Safe Kidney and Liver Cure manufacturers, a handsome large, colored lithograph of the late "President Garfield and Cabinet," to the inspection of which we cordially invite our subscribers. It is a fine picture and well worth preservation.

PIPE-LINES for conveying oil have been in use for some time, and now one for conveying the brine from East Tawas, Mich., to Oscoda, is being built, and will be shortly completed. The pipe is of 9 inch bore, is laid 3 feet under ground, and will be 12½ miles long. It will convey enough brine to make 2,000 barrels of salt per day.

ELECTRICITY has been applied for the transmission of power in a French mine. By this means a ventilating fan 2.63 feet in diameter was propelled 1640 feet below the surface, the power being transmitted from an engine above ground. Two Gramme dynamo-electric machines were used. This is said to be the first time electricity for transmitting power for practical use has been employed.

MARRIED.—Wednesday, September 28, 1881 at La Crosse, Wis., Charles M. Palmer, business manager and assistant editor of the *Northwestern Miller* of Minneapolis, to Miss Mamie Sill, daughter of Hon. W. R. Sill of La Crosse, Wis. The ceremony took place in Christ Church, La Crosse, in the presence of a throng of friends of the contracting parties. We wish the couple a long life of unalloyed happiness.

THE Agricultural Returns show that the total acreage of the United Kingdom of Great Britain, including the Channel Islands and the Isle of Man, is 77,828,948, of which 47,586,700 are returned as under "crops, bare fallow, and grass." The corn crops cover 10,672,086 acres, the green crops 4,746,298. Clover and grass under rotation amount to 6,389,225 acres, and the permanent pasture, exclusive of heath or mountain land is not less than 24,717,092 acres. Orchards have 180,000, and market s 44,000. 2,409,000 acres are devoted to woods and plantations. In the

ten years between 1870 and 1880, nearly 591,000 acres have ceased to be used for wheat growing. In the same period there has been an increase of nearly two and a half millions of permanent pasture.

OUR sanctum was illuminated for a brief half hour during the early part of October by the presence of Clifford F. Hall, editor of the *Grain Cleaner*, of Moline, Ill. We are gratified to make Brother Hall's acquaintance and hope he may soon be able to make us and our fair city a longer visit. Mr. Hall has but recently become a member of the milling editorial fraternity but he shows great aptness for the field he has dared to enter.

MESSRS. SECK BROS., of Bockenheim, Germany, are meeting with considerable success in introducing their roller-mills, granulating and scalping machines, and other milling machinery in Great Britain. This firm is known as being the pioneer in automatic roller milling in Belgium and France, where they erected the first Belgian roller mill, at Tournai, and are just now, besides others, fitting up a large roller mill at Roubaix, France, and their system seems to be also making progress in this country, as quite a number of their machines have been imported by American millers.

BRADSTREET'S *Commercial Agency* reports the total number of failures in the United States for the nine months ending September 30 at 4,387 with liabilities amounting to \$47,700,494. Canadian failures for the same period were 459 in number with liabilities of \$5,172,207.

DUN'S *Commercial Agency*, reports the total number of failures in the United States for the 9 months ending Sept. 30 at 3890 with liabilities of \$51,059,010 and Canada for the same period with 479 failures with liabilities amounting to \$5,880,511. An exceptionally good condition of commercial affairs is reported in Canada.

The Soy or Soya Bean.

The Soy bean a native of Japan and China has been successfully introduced in various portions of Europe and has been pronounced by good judges to be superior to ordinary grains for feeding cattle. The Chinese who cultivate it extensively make a kind of cheese and various excellent dishes from it for table use. The roasted seeds make a good substitute for coffee. M. Roman a well-known French savant says that the cultivation of this plant has greatly increased in Hungary, France and Italy in late years and thinks it will pay better than potatoes. The beans sell for 12 cents per pound in London. We think it would be well for American farmers to introduce the Soy beans as they would undoubtedly grow well in this country.

Sacks Instead of Barrels for Flour for the New England Trade.

Sacks have already taken the place of barrels in the export trade to a very great extent, and give entire satisfaction to all parties concerned, and in local trade paper sacks for flour are used very extensively, but the New England trade so far has demanded the old fashioned wooden flour barrel. Barrels are yearly increasing in price, both from the enhanced value of the material used in their construction, and from the very high price asked by coopers for making them. We have conversed with several well-known millers on the subject, and they all earnestly hope that the New Englanders will soon be satisfied with sacks instead of barrels. They believe when they have become accustomed to it that they will prefer the sacks, as an empty sack is always useful, and when not in use occupies but little room, while the flour barrels, as soon as emptied, are, in nine cases out of ten, converted into kindling wood. A prominent Eastern dealer says that the matter is almost entirely in the

hands of the Western millers, and that if a dozen of the large mills in Minnesota and Wisconsin that have a large New England trade would refuse to ship in barrels, that it would be but a short time before sacked flour would be accepted without a murmur. We would like to hear from millers and Eastern flour dealers on this subject, and if the matter is thoroughly discussed in the press it may lead to an important change in the trade in a very short time.

Patent Corn Malt for English Brewers.

English brewers have for some time been using roasted corn (maize) malt for coloring purposes. A Dublin firm (Messrs. Plunkett & Co.) are engaged in the preparation of this article, and find but little difficulty in selling it to take the place of roasted barley malt on account of its comparative cheapness. Formerly some difficulty was experienced in crushing or grinding it, but the manufacturers have overcome all troubles and now furnish it to brewers either granulated or finely powdered. Corn is used to a considerable extent now by American and foreign brewers.

A series of letters on Milling written expressly for the UNITED STATES MILLER.

Birkholz on Milling.

BY R. BIRKHOLZ, M. E.

No. I.

Nine years ago the millwright, laying out the plans for a new mill, had a great deal easier job than he has to-day. After the outlines of the building were drawn, the stones were located in the most convenient place, twelve feet off the line shaft—the quarter-twists, tighteners, husk frames and spindles all went on paper "like lightning," as if made by a templet—the bolting chests were placed in upper stories, a few elevators added, and the great deed was done. Oh, wonderful time! Why is it gone? Why could we not have ended our existence as mill designers, before the present epoch, and have retired upon our laurels already won? If we millwrights could have gone out of business nine years ago, we would have tried to make an honest living during this period of gradual revolution, complication and conglomeration, by cutting coupons. But we did not have the right kind of shears to do the cutting with, and as patient as lambs being driven to the shambles, we were compelled to move on with the spirit of the times.

First came the news that more lucrative milling could be done by not grinding the wheat all down at once, but by two grindings; and in connection with that idea the middlings purifier became known, was introduced and found to be an absolute necessity. Then the designing millwright had to place them in addition to bolting reels, and provide for more elevators. Some stones were grinding wheat, some middlings, some tailings, and some were regrinding the bran—and all needed elevators and conveyers, and more reels and spouts became necessary. A grinding diagram, although simple in comparison with the ones of to-day, was required.

Later, rolls were introduced. First, smooth ones for cleaning the wheat, thereby opening the berries, (degerminating them in a measure) and the dirt flour having lodged in the crease was eliminated by rolling wire screens before the wheat was entered in the stones. Subsequently rolls were used for grinding tailings, then smooth iron rolls were tried for grinding out bran, then porcelain rolls were used for the same purpose, and also to grind tailings and middlings with. The wheat was ground and separated into its component parts, which again were treated separately on either purifiers, rolls, or stones, thus rendering the milling diagram—the illustrated *modus operandi*—the guide of the designing millwright still more complicated and hard to construe.

Then the first corrugated iron rolls came into use. They were used at first exclusively for cleaning bran, but only for a short time, when at once, the system of gradual reduction or corrugated iron rolls was introduced, and called for. Now and then some mill owners or experts tried to prove that five or six reductions could be made with far better results with a system of six pairs of stones, grinding wheat very high on the first run of stones—bolting off the flour and middlings—reducing the tailings off the scalping reel on the second stone, and so on.

Some one thought he had "struck it rich" when he used smooth rolls for first or last re-

duction, or ground his bran out on stone, making actually his sixth or last reduction on stone. Some got up mills on the coffee-mill plan, to effect the gradual reduction of wheat, some knocked the wheat to atoms by passing it in between disks provided with intercepting steel pins. All these inventors strove to decrease the production of flour during the granulation process, and to use little power and save a large outlay of money. In many cases these accomplishments have been illusive, the manufacturers of the machines being the only ones profiting materially by their sales.

Meantime, the middlings were ground by some millers with great economy, on porcelain rolls, by others on smooth iron rolls, and still by others on stones. First, second, third, fourth, hard, soft, coarse, firm, dusty middlings—first and second returns—first, second and third, low grade stuff—all were terms or expressions which sprang into existence by the mode of grinding for percentage—that is, grinding the stuff over and over again lightly, like the boy eating sandy currants. When his gums got sore from having already masticated a considerable quantity, he was asked why he made up such a face and chewed so carefully. He replied that he was "working on the high grinding plan, which was a slow but a good one."

In some instances, millers reduced their coarse middlings four to six times, always squeezing them lightly and then bolting off, overdoing their work undoubtedly.

The time of gradual revolution has now passed its climax, for which we should feel thankful. Milling experts need no longer talk themselves hoarse in demonstrating the superiority of rolls. The system speaks for itself, and the millers of the United States are progressing more rapidly than in any other country. They do not mind the expense of visiting other mills, to see how the roller system is working, and to study its results. Rolls are undoubtedly a success, but the builders of roller mills and milling machinery want a further chance to "feel" in the pockets of millers; they want their harvest time to last as long as possible. They are now brooding over new constructions of roller mills, stone rolls, purifiers, dust rooms, centrifugal flour reels, etc.

Millers of this glorious Republic, you have a friend in every one of them; every one is trying hard to better your condition. It is not entirely your money that they are seeking. When one tells you that his machine is the best, use your own judgment, for he only wants to benefit you. The world moves, and it takes money to keep up with the times. It is the miller's money that pays for the experiments, and after a while he may get a perfect machine, which in its more embryotic state was sold to him a short time ago for about the same price. It is remarkable how complicated the roller mills begin to look. They begin to be a collection of adjustments with some rollers laid in. They begin to look like a soldier on dress parade, covered with gold lace and gilt buttons. Adjustments are needed, I admit, but they should be concealed, and make as little show as possible. Plainness is a merit. The constructing experts of the world seem to be all let loose on milling implements, and we are reminded of the old saying, "too many cooks spoil the broth." Corrugating machines and roller grinding machines will, I predict, be soon upon the market. They will be useful machines for millers, as the rolls in many places are already becoming rather dull, and not round. A cheap machine for corrugating and grinding will meet with a brisk demand. But then, the millers using dull rolls to grind with, do not have use for a corrugating machine. Oh, no; they will make their "high percentage" of "patent" flour right along, in spite of corrugating tools—perhaps they might get too sharp, and need dulling.

Coming back to the work of the designing millwright of to-day—he indeed has hard work of it earning his livelihood for the most economical work is demanded by the enterprising miller—the higher percentage of good flour he wants to produce, the more intricate the milling diagram becomes, and even the plan of the mill itself.

The building is generally full of rolls, reels, conveyers, elevators and other machinery, and the discovery that there is "room for one more" is the only refreshing consolation and stimulant for the mill designer, and he often wonders himself when he has completed his work how he did get all the machinery placed. A perfect maze of spouts run through the different apartments to the infinite disgust of corpulent millers.

The head millers of to-day have passed their

palmist days. Now they have a multitude of spouts, elevators, reels, etc., etc., to keep in mind; the grinding being done differently, they have now to look after 15 to 20 different stuffs where before they had but two or three.

These aggregations of incumbering machinery referred to are noticed mostly in mills where competitors demand the increase of percentage. For mills grinding little or no export flour, but depending on local trade, or mills in the far west or south, it would not pay to have them furnished with such complicated machinery and such an intricate system of handling the products. It really seems as if mill construction has been carried to unwarrantable extremes and a cry is being heard from all parts of the country for simplification of roller-mills, milling machinery in general, and especially of the internal milling arrangements.

In Budapest, Hungary, roller mills are now being built, cheaply and efficaciously, and every means is being employed to simplify milling for the benefit of the smaller millers who cannot afford to make such numerous divisions of their products.

The *Ungarische Mueller Zeitung*, of Sept. 1, 1881, has an article on the subject of "Low Grinding Roller-mills," of which the following is a liberal translation:

"As long as Ganz & Co. (of Budapest, Austria-Hungary) have been engaged in building roller-mills, every year shows improvements they have made upon them. Last year they placed on the market a low-grinding roller-mill, having two sets of rolls, in pairs above each other, each set being driven by a separate belt. This machine has met with an astonishingly large sale to the owners of small mills, who are naturally opposed to incurring great expenses in changing their mills. The excellent resulting products, the economy of room and power, such important items to the small mill owner, proved that it paid to purchase these low-grinding roller-mills, and to-day we find them in almost every small mill in Hungary. This year, Messrs. Ganz & Co. have placed upon the market three more improved roller-mills—the low-grinding roller machine No. 21, the portable complete low-grinding roller-mill and the Buchholz-Mechwart low-grinding roller-machine. In the low-grinding roller-mill No. 21, the upper pair of rolls reduces the wheat almost completely; (the product is of course scalped) the tailings are passed to the lower set of rolls in the machine and here the bran is ground out and finished. The machine is eminently fit for working on rye and still better for corn. When we discover the great amount of power consumed by a millstone grinding corn, it is surprising indeed to the miller to find how much easier and better this work is done by this machine. There is hardly any corn flour produced that would not pass through No. 8 silk. The meal is elegant. The rolls require from 4½ to 5 horse-power and grind easily 500 to 600 pounds of corn per hour.

Ganz & Co.'s portable roller-mill is built on the platform of a heavy wagon so constructed that it can move easily on the common highways. A speculative miller may drive this portable mill around to the farmers, grind their wheat at their doors and thus save them the trouble of carting their grain to mill and the product back again. The mill itself consists of a low-grinding roller-mill (No. 21) a corrugated roller-mill (No. 11 a) a centrifugal reel and three elevators, booting below platform. The corn, wheat or rye to be ground is emptied into a hopper connected with one elevator, by which it is thrown either into roll No. 21 or No. 11 a. The product of No. 21 is taken up by a second elevator emptying either into centrifugal reel or if Graham flour is wanted, into a flour box. The product of rolls 11 a is elevated into a second flour box from which it can be filled into sacks." (*Translator's remark.* I must say that the above description seems rather mixed, for I cannot understand why two heavy roller-mills are placed on the wagon when one is enough. In this country we would have one roller-mill with two pairs of rolls and two small centrifugal reels, taking tailings into second pair, bolt second break and tail off the bran.)

The Low-grinding Buchholz-Mechwart Patent roller-machine has met with a rapid sale in England and Germany. This machine contains three corrugated rolls and is built like the famous Ring-Roller-mill. The upper and middle rolls combined, effect the first reduction—the product drops on shaker sieves which are kept clean by a traveling brush. The machine is noiseless and does not shake the mill like the Buchholz-Mechwart high-grinding roller-mill is likely to do, judging by the illustrations and descriptions I have seen.

In a late number of the *Ungar. Mueller Zeitung* I find a report of the Portable roller-mill described heretofore. The mill was driven by a portable six or seven horse-power engine. The report says:

"We have to add to our former description that the sides of the wagon are made to lower down to level, forming an enlarged grinding floor. The double roller-mill No. 21 ground wheat at first until about 11 o'clock; then rye. The roll 11 a first ground wheat and afterward corn. The product of No. 21 passed into centrifugal reel, which delivered, including bran, five sorts of flour of which

the one, taken off near the head, could be called very fine flour."

Now, in regard to building well-paying mills in this country on the new process, spending as little money thereon as possible, it would be advisable to proceed as I shall hereafter describe.

TO BE CONTINUED IN DECEMBER NUMBER.

Flour and Grain Trade Notes.

From 3,000 written answers in response to inquiries sent out, *Bradstreet* estimates the wheat output in the United States for 1881 as follows:

	Bushels.
Western states.....	248,137,000
Pacific coast.....	33,325,000
Colorado and territories.....	12,000,000
New England.....	1,000,000
Middle states.....	34,500,000
Southern states.....	40,000,000
Total.....	368,992,000

Bradstreet also gives the following figures on the corn crop of 1881:

	Bushels.
Western states.....	869,241,000
Southern states.....	247,500,000
Middle states.....	62,400,000
New England states.....	7,000,000
Pacific coast.....	2,500,000
Territories.....	5,000,000
Total.....	1,193,641,000

The above table indicates that the corn crop of the United States for 1881 is short about one-third of the yield, which it was reasonable to expect.

Recent Inventions.

Edgar H. and C. Morgan were granted a patent, Sept. 27, for a feed grinding mill.

James Nolan, of Scranton, Pa., has patented an improved floating grain and coal elevator.

Cornelius S. Hoover, of Lancaster, Pa., has taken out another patent for a millstone dressing machine.

A patent was issued Sept. 27 to Charles R. Fiesler, of Chicago, for an improved elevator bucket.

Christian Abele, of New York City, was granted a patent October 4th, for an improved portable grain grinding mill.

The successful operation of a new machine for extracting ramie fibre, is announced by New Orleans papers.

John W. Frederick, of Indianapolis, Ind., has secured a patent for a press for compressing bran, etc., into bales for shipment.

Edward R. Burns, of Indianapolis, Ind., patented a hominy mill October 4th. He has assigned a half interest to S. Davis & Co.

Charles Kaestner has recently patented an elevating apparatus for mills, elevators, etc., which is said to be a very valuable invention.

September 27, patents were granted to S. C. Schofield, of Freeport, Ill., for a corn sheller, and to Adam Schultz, of Cincinnati, O., for a grain cleaning machine.

W. D. Gray, M. E., of Milwaukee, has recently patented a new feeding device for roller mills which is very simple and yet guarantees a positive even feed and is especially useful in feeding bran and soft stuffs to the rollers.

An improvement in steam grain driers has been patented by Mr. Henry Cutler, of North Wilbraham, Mass. The invention consists in a shaft made hollow at one end to receive the inlet steam, and with perforations at the other end to discharge the water of condensation, the head cast in one piece with one or more chambers, receiving steam through the conduction pipes connected with the cavity of the shaft and distributing the steam to the circulation pipes forming the heating surfaces, the return bends connecting the circulation pipes in pairs to induce circulation.

The Louisiana *Sugar Bowl* describes an invention operating upon an entirely new principle in rice-milling. This invention, according to the journal in question, consists in substituting for the vertical movement in common use, whereby rice is decorticated by a species of pounding, a rotary motion under which the grains of rough rice are decorticated and polished through simple friction with each other. The object sought is to avoid the breakage of grains and the pulverization of the husks which has cost so much time in winnowing, and separation of the broken from unbroken grains. It is claimed for this invention that it will convert in a short

time the rough rice into polished rice, in which comparatively few broken grains are found, and expels the husks equally unbroken.

A PATENT to utilize sawdust has been granted to W. Grossman, of Petersburg, Va., to make railroad ties, fence posts, paving and building blocks, etc. This artificial wood, it is claimed, can be made fire and waterproof, and no insect will attack it. It will take polish, and will stand higher pressure than ordinary wood. It also can be cut and sawed, and allow nails to be driven into it. As the process of making it is very simple and cheap, it may be destined to bring a revolution in the sawmill business; at least it will relieve the sawmill men of much trouble concerning the accumulation of sawdust.

Wheat Countries—Crops and Consumption.

Wheat is raised in nearly all parts of the world. While most wheat-growing countries ordinarily produce enough for home wants, few have a surplus for export. The United States is the largest wheat producing, wheat consuming, and wheat exporting country in the world. It has yielded as high as 480,000,000 bushels. Allowing five bushels per capita for consumption, this would leave 230,000,000 bushels for export, less the amount required for seed. During the fiscal year ending June 30, 1880, the United States exported 153,752,800 bushels wheat and 6,011,400 barrels wheat flour. This flour was equal to 30,570,000 bushels wheat, and added to the wheat gives a total of 183,809,800 bushels. We have not the figures at hand for the last fiscal year, but they were probably nearer 200,000,000 bushels. California raised at least one-ninth of the wheat produced in the United States in 1880.

Of foreign countries, France leads with a crop of 300,000,000 bushels in good years. France is, therefore, generally relied upon to supply less favored countries, and in some years can spare 100,000,000 bushels for export. Russia follows hard upon France, and has yielded as much as 240,000,000 bushels. Germany, Spain, Italy, Austria-Hungary, and the United Kingdom are the next heaviest producers. The maximum crop in these countries is about the same, and may be stated at from 10,000,000 to 120,000,000 bushels per annum. Most of these countries import more or less wheat, and the United Kingdom is invariably a heavy buyer of foreign wheat. She imports principally from the United States, Russia, France, and Germany, the leading competitors in the supply being the first named two. For the decades ending with 1870 and 1880, the proportions of wheat imported into the United Kingdom from the United States, Russia, and Germany, are reported to have been as follows:

	1870.	1880.
United States, per cent.....	27.1	47.8
Russia.....	26.6	20.4
Germany.....	20.5	7.5
Other sources.....	25.5	44.3
Totals.....	100.0	100.0

The authority from which we quote the above percentages gives only three countries. It is fair to assume that most of the wheat received into the United Kingdom in the two decades from other sources came from France. In 1861 to 1864, both years inclusive, the United States contributed from 34 to 39 per cent. of the foreign wheat received into the United Kingdom. In 1865 the quantity suddenly dropped to 5.5 per cent., and in 1866 it was less than 3 per cent. It then steadily rose from 12 per cent in 1867 to 40 per cent. in 1870. In 1871 it fell to 34, and in 1872 to 21 per cent. But the quantity for 1873 was over double that of 1872, and for the last eight years it has been from 40 to 65.4 per cent., actually reaching 55.4 per cent. in 1880, while Russia contributed only 5.25 per cent. in 1880, and never more than 42 per cent., and that was in 1872.

As will be seen, the United States has grave responsibilities in the matter of the supply of bread, as well as fine opportunities for wealth in the cultivation of wheat. We have not only our own 50,000,000 people to feed, but we are exclusively feeding with bread from 30,000,000 to 40,000,000 of other nations. The fact that we can raise wheat cheaper than other countries has a twofold influence. It opens foreign markets to us, and it attracts tillers of foreign soil to our shores. The maximum product of wheat in the United States has not been reached by a long way. It is within the possibilities of the future to double the yield. California and Oregon suffer the disadvantage of being the most remote States from the chief source of demand, but the agencies are at work to overcome this

obstacle. Probably the true solution of this inconvenience will be solved when we ship more flour and less wheat to Europe. This involves a saving of about one-third in the cost of transporting the crop, and at the same time it would develop a milling interest here of great importance.—*New York Shipping List.*

LEGAL MATTERS.

DOWNTON VS. ALLIS.

In the above entitled action a decree of the U. S. District Court for the Eastern District of Wisconsin, was entered in favor of the plaintiff. The following shows the proceedings in Court:

UNITED STATES OF AMERICA, } ss.
EASTERN DISTRICT OF WISCONSIN. }

At a stated term of the Circuit Court of the United States of America, for the Eastern District of Wisconsin, begun and held according to law, at the city of Milwaukee, in said District, on the first Monday (being the third day) of October, A. D. 1881, present and presiding the Honorable Charles E. Dyer, District Judge.

On the sixth day of the said term, to-wit: on the eighth day of October, A. D. 1881, the following proceedings were held to-wit:

Robert L. Downton, }
vs. } *In Equity—Original Bill.*
Edward P. Allis. }
Edward P. Allis, }
vs. } *Cross Bill.*
Robert L. Downton. }

This day came the parties by their counsel, and these causes having been heretofore heard upon the pleadings and proofs, on consideration thereof and the arguments of counsel thereon, it is ordered, adjudged and decreed by the court, that Edward P. Allis, during the year 1876, was doing business under the firm name of Edward P. Allis & Co., and that the paper writing executed by Robert L. Downton, dated the third day of January, 1876, in the words and figures following, to-wit:

"For and in consideration of the sum of one hundred and twenty-five dollars to me in hand paid by Edward P. Allis & Co., of Milwaukee, Wisconsin, I hereby sell, assign and set over to said Allis & Co., their successors and assigns, the exclusive right to manufacture and sell rolls for crushing grain or middlings or other substances, which right or process is secured to me under United States Patent, number 162,157, dated April 20th, 1875, for the full life of such patent and any reissues, extensions and improvements thereon, except that a shop right to manufacture and sell the same in the State of Minnesota, but not elsewhere is granted to O. A. Pray, of Minneapolis, said Allis & Co. having an equal right to sell in said State of Minnesota. Dated at Milwaukee, Wis., this third day of January, A. D. 1876," and duly recorded in the Patent Office of the United States on the 27th day of January, 1876, does not assign to Edward P. Allis any title whatever in and to Letters Patent No. 162,157, dated April 20, 1875, granted to said Downton, but that the right and title thereto still remain in said Downton, and so far as it is claimed by said Allis, that said paper writing assigned to him any title in and to said patent, the same is void and of no effect.

And it is further ordered, adjudged and decreed by the court, that the said Edward P. Allis, his agents and employes, be and hereby are enjoined and restrained from claiming in any manner any title to said patent, or from authorizing or licensing any person whatever to use the process covered by said patent by virtue of said paper writing.

And it is further ordered adjudged and decreed by the court that the cross bill of Edward P. Allis filed herein, be and the same is hereby dismissed at the costs of said Allis, and that the said Robert L. Downton have his costs herein both in the original and cross bill, to be recovered of said Edward P. Allis, for which execution as to me shall issue.

CHAS. E. DYER, Judge.

UNITED STATES OF AMERICA, } ss.
EASTERN DISTRICT OF WISCONSIN. }

I, Edward Kurtz, Clerk of the Circuit Court of the United States of America, for the Eastern District of Wisconsin, do hereby certify that I have compared the foregoing with its original now on file and of record in my office, and that the same is a true and correct copy of the final decree in the suit of Robert L. Downton vs. Edward P. Allis, (original bill) and Edward P. Allis vs. Robert L. Downton (cross bill)

In testimony whereof, I have hereunto set my hand, and duly affixed the seal of the said court at the City of Milwaukee, in said District, this 18th day of October in the year of our Lord, one thousand eight hundred and eighty one, and of the Independence of the United States, the 106th.

[SEAL.] EDWARD KURTZ, Clerk.

CHILLED IRON ROLLER MILLS.—A Vienna paper states that eight hundred of Ganz's roller mills are at present at work in the Budapest mills, distributed among them as follows: First Ofen Pesth Mill; 160, Pannonia, 120; Concordia, 80. Millers' and Bakers, 60; Union, 60; Elizabeth, 70; Gizella, 60; Louise, 40; Pesth Roller Mills, 20; and Hagenmacher's 60.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

PUBLISHED MONTHLY.

OFFICE, No. 118 GRAND AVENUE, MILWAUKEE, WIS.
SUBSCRIPTION PRICE.—PER YEAR, IN ADVANCE.

To American subscribers, postage prepaid.....\$1 00
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For estimates for advertising, address the UNITED STATES MILLER.

[Entered at the Post Office at Milwaukee, Wis., as second class matter.]

MILWAUKEE, NOVEMBER, 1881.

MARKET REVIEW.

Prepared expressly for the "United States Miller," by Messrs. E. P. Bacon & Co., of Milwaukee, Wis.

Wheat has ruled comparatively steady for the past few weeks, with a general feeling, however, that prices must recede further, to correspond with those ruling at seaboard and foreign markets. The demand to cover short sales, together with continued rainy weather, which has retarded the threshing and marketing of grain in the country, as well as having damaged the grain in the stock seriously, has held the downward tendency in check. The latter influence, however, seems to have spent its force, and during the past two days short sellers have taken fresh courage, and, aided by large "hedging" sales by millers here and elsewhere, have effected a decline of three to four cents per bushel. The mills throughout the Northwest have been running at nearly their full capacity for the past two months, and have overstocked the markets both in this country and Great Britain with flour and are now forced to stand still for a while, until the consumption measurably overtakes the production. This will probably have the effect to bring considerable wheat upon the market here from localities where the supply has hitherto been absorbed by mills, which will tend to produce further depression and equalize values in home and foreign markets. The export movement during the past month has been only half what it was the preceding month, and notwithstanding light receipts at all points, stocks in store are accumulating and the "visible supply" in this country shows an increase of 1,205,700 bushels during the month. The quantity afloat for Great Britain and the continent shows an increase of 3,890,000 bushels during the same period. Prices are nevertheless controlled more by speculative than natural influences, which often operate in opposite directions. It is thought that this market is largely over-sold for December and January delivery, and with the vicissitudes of the weather at this season of the year, any bold operator of sufficient resources might give the market a severe "twist." It may be an open question, also, whether prices have not receded far enough, their intrinsic merits alone considered. The latest estimates of the Agricultural Department at Washington, just made up, place the aggregate yield of wheat for the entire country at 117,000,000 bushels less than last year. We exported from the previous crop in wheat, and flour equivalent to wheat, about 180,000,000 bushels. The increased requirements of this country for the present crop year, for bread and seed, with the large immigration together with the natural increase in population, will probably be not less than 13,000,000 bushels. This would leave us only 45,000,000 bushels for export, plus whatever excess of old wheat has been carried over this year as compared with last. This is a very uncertain quantity and variously estimated at from 25,000,000 to 50,000,000 bushels. We have already exported nearly 40,000,000 bushels from the Atlantic coast since the 1st of July, the date on which the winter wheat crop commences to move, in addition to those from the Pacific coast. How much more have we to spare, with the large deficiency existing in other articles of food? The potato crop alone shows a deficiency of 20 per cent. as compared with last year, according to the Agricultural Department estimates, or 64,000,000 bushels.

The market this morning opened depressed, with sales at \$1.33½ for December, which is the principal delivery now dealt in, rallied

later to \$1.34½, but weakened again and closes unsettled at 1:00 P. M. at \$1.33. Transactions in cash wheat or for November delivery are very light at 2c under December.

E. P. BACON & Co.,
Commission Merchants.

Oct. 31, 1881.

DURING the eleven months ending with September, \$111,219,723 worth of provisions (breadstuffs excluded), tallow and dairy products were exported.

DURING the eight months ending August 1881, there were exported from this country 317,039,651 gallons of petroleum and petroleum products valued at \$30,187,250.

THE membership fee of the Milwaukee Chamber of Commerce has been increased from \$350 to \$1000. Thirty-two new members were admitted just before the raise.

FIFTY EIGHT thousand, four hundred and fifty-four immigrants arrived in the United States during the month of September, against 53,874 for the same month in 1880.

DURING the month of September our exports of breadstuffs were of the value of \$19,947,144; for the nine months ending Sept. 30, \$177,452,349 against \$209,204,277 for corresponding period last year.

In a letter recently received from Messrs. Charles B. Slater & Co., of Blanchester, O., they state that they are crowded with business. Slater's bolting reels are in great demand.

RELIABLE statistics show that the wheat acreage in this country is spreading in advance of the rate of increase of population. It follows therefore that year by year we will have more wheat available for export.

OUR readers who are intending to put in rolls, will find it to their advantage to write to C. N. Miller, at Mansfield, O. He is agent for the Stevens rolls, and also for several brands of bolting cloths. Read his two new advertisements in this issue.

WE desire every flour mill owner receiving a copy of this paper, to answer the questions asked in our advertisement in regard to Flour Mill Directory, which they will find in this issue. It is certainly worth the trouble to you to answer our request fully and promptly.

THE annual consumption of eggs in the United States is stated at 100,600,000 barrels, while the poultry consumed amounts to 680,000,000 pounds worth \$380,000,000 annually.—*Western Manufacturer.*

The population of the United States is about 50,000,000. The above estimate gives two barrels of eggs to every man, woman and child in the country! The *Western Manufacturer* is either "a little off" or else we are "h—ll on eggs."

COL. JOHN W. COLLINS, of Chicago, spent a few days in Milwaukee lately, and "took in" our great Exposition. He expressed himself highly pleased with the display at the Exposition, and also with the magnificent Exchange Room of our Chamber of Commerce. The Garden City Mill Furnishing Co., of which Col. Collins is President, had their purifier and wheat brush machine in operation in the milling department of the Milwaukee Exposition.

A Word to Advertisers.

The advertising columns of the UNITED STATES MILLER are of great value to all desiring to reach the milling and grain trade. It is sent to all millers in the United States and Canada at intervals (whether subscribers or not), whose names and addresses we have been able to obtain. It is on file in the offices of the United States Consuls in all parts of the world, and also in the principal Chambers of Commerce in America and Europe. Our foreign subscription list is constantly increasing, as is also, we are glad to note, our foreign advertising patronage. We have received many letters of high approval of the UNITED STATES MILLER from subscribers and advertisers. Parties desiring further particulars in regard to amount of circulation, rates, etc., will be

promptly supplied with information by addressing us.

WE acknowledge the receipt of a copy of James Henderson's Business Directory of Manitoba, published at Winnipeg; price, \$4.00. We commend this publication to all classes of business men who desire to extend their trade across our northern boundary. Manitoba is one of the finest wheat countries in the world, and its resources are rapidly developing, and it will undoubtedly pay to make reasonable efforts to extend trade in that direction.

The Atlanta Exposition.

This first industrial exhibition of great proportions in the South opened October 5th, and was in every way more extensive and successful than its most sanguine friends had dared to expect. It is a great thing for the South. It draws to the South the attention of the whole country and will be the means of securing the investment of millions of Northern and European capital permanently in Southern enterprises. Every inch of available space is occupied, and the exhibition in some respects is of more interest than any previous one. Cotton and sugar machinery of course form the most interesting features of the exhibit.

The United States Miller.

The office of this paper has been removed from the Grand Opera House, to No. 118 Grand Avenue, directly opposite the Plankinton House, where we shall be pleased, in the future to meet our friends. This paper has now entered upon its twelfth volume and is recognized far and near as an able and reliable journal, published in the interests of the milling industry. We take this occasion to thank our advertising patrons and subscribers for their favors, and pledge ourselves to use the best of our ability to serve their interests. We cordially invite those connected with the trade to call on us when visiting Milwaukee, one of the great milling centers of the world.

Our Visitors.

During the month of October we were favored with calls from the following named gentlemen interested in the milling industry: Mr. Mann, representing the George T. Smith Middlings Purifier Co., of Jackson, Mich.

Mr. Case, of the Case Manufacturing Co., of Columbus, Ohio.

Mr. Vandercok, representing the Electric Middlings Purifier Co., of New York City, Clifford F. Hall, Esq., editor of the *Grain Cleaner*, of Moline, Ill.

Col. John W. Collins, of the Garden City Mill Furnishing Co., of Chicago.

W. McLean, representing the Richmond Manufacturing Co., of Lockport, N. Y.

T. Reidl, M. E., of Budapest, Hungary, an eminent millwright.

Mr. Thornburg, of the firm of Thornburg & Glessner, manufacturers, Chicago, Ill.

James D. Warner, Esq., custom house broker and forwarder, New York City, N. Y.

Judge Jameson on "Corners."

Judge Jameson recently delivered an emphatic address to the grand jury in Chicago, calling their attention to that part of the Illinois statutes which makes it an offense punishable by fine and imprisonment to "contract to have or give the option to sell or buy at a future time any grain or other commodity, stock of any railroad or other corporation, or gold, or forestall the market by spreading false rumors to influence the price of the commodities therein, or corner the market, or try to do so, in relation to any of such commodities."

Judge Jameson said, in commenting on this law, that the fact that property sold to be delivered at a future day does not make the contract illegal although it is not at the time possessed or owned by the seller, or that the time of its delivery is left within fixed limits, optional with buyer or seller, though, in one sense, any such sale

is the sale of an option, apparently within the statute. What makes it a gambling contract is the intent of the parties that there shall not be a delivery of the commodity sold, but a payment of the differences by the party losing upon the rise or fall of the market. He concluded his remarks by saying: "The course of business instead of proceeding quietly and healthily, will become broken by fits of fever and panic; unlawful gains will be preferred to the slow profits of legitimate trade; our farmers, partaking of the prevalent spirit, will hold back their crops in expectation of corner processes, borrowing money on mortgage to carry on their operations, instead of realizing by the sale of farm products."

Chicago grain gamblers do not like the present aspect of affairs and are keeping pretty quiet while the grand jury is sitting.

C. C. N. writes us wishing to know where may be found a 48 inch single leather belt running 6200 feet per minute—such as referred to (on page 132) in Abernethy's "Practical Hints on Mill-building," as giving off 342 32 horse-power with 180° arc of contact.

Mr. Abernethy claims to be eminently a practical man and of course he draws his conclusions from his own experience in mill-building and belt running. A letter addressed to him in care of *The Grain Cleaner*, Moline, Ill. may bring a detailed reply or perhaps Mr. Abernethy will choose to answer the query in our columns.

AVOIDANCE of vibrations with machinery was instanced with a Carr disintegrator, which, being mounted in a pit lined with bituminous concrete, was worked at 500 revolutions per minute without sensible tremor, whereas with the former wooden mountings on an ordinary concrete base, the vibration was excessive, and extended over a radius of twenty-five yards. In the Paris Exhibition of 1878 there was shown a block of bituminous concrete weighing forty-five tons, forming the foundation of a Carr disintegrator used as a flouring mill, 1,400 revolutions a minute, a speed which would have been impracticable on an ordinary foundation.

Items of Interest.

The Arctic Mill in Minneapolis is being changed to the complete roller system.

Asmuth & Kraus, of Milwaukee, have imported a cargo of Canadian barley on which they paid the government duty to the amount of \$3200. The lot, one of 2,100 bushels, will be consumed by local brewers.

The capacity of the steel works of the world is estimated at about 3,000,000 tons a year. The Bessemer works in England contribute about 800,000 tons; the United States 750,000 tons more; Germany about 500,000; France about 275,000; Belgium, 150,000; Austria, 250,000 and Russia and Sweden about 150,000 tons.

In 1390, some friars in Switzerland wished to build a wind mill to save the labor of grinding corn by hand; but a neighboring landlord, who had bought the country around, forbade them, because, he said, he owned the winds. The bishop was appealed to, who said that the winds belonged to the church and could not be used.

The *Glasgow Herald* notes that a company for lending corn sacks to merchants and agriculturists has just been established in Bucharest, under the auspices of the Roumanian Railway Company. Roumanian wheat is often of good quality, but, owing to the slovenly way in which it has been harvested and packed for sale, has not been able to command full prices.

The *Minneapolis Tribune* says that the shipments of flour from that city for the week ending October 15, were the largest on record in the history of the city as a flour-producing point, and aggregated 76,593 barrels for the seven days. It took 853 cars or more than forty-two trains of twenty car-loads each to transport this immense amount of flour to the eastern market. Something of the extent of the manufacture of the product here may be appreciated from these figures.

The United States Consuls in various parts of the world who receive this paper, will please oblige the publishers and manufacturers advertising therein, by placing it in their offices where it can be seen by those parties seeking such information as it may contain. We shall be highly gratified to receive communications for publication from Consuls or Consular Agents everywhere, and we believe that such letters will be read with interest, and will be highly appreciated.

The Fire Hazard of Flour Mills.

A PRIZE ESSAY BY ERNEST C. JOHNSON.

Read before the Northwestern Underwriters' Association, Chicago, Sept. 14.

SECOND.

"The Most Thorough Statement of the Fire Hazard of the Several Methods, in Detail."

It is highly probable that more is already known concerning the inherent hazards of flour mills, than is to be, or will be, discovered in future; therefore, new ideas and theories regarding this subject are not so important, as that what is said, be based on such good authority and so tersely stated, as to be reasonably accepted by, have an influence with, and therefore be of practical benefit to millers and mill underwriters.

A treatise on mill hazards in a general way, aided by universal experience, and by the results of others' able and exhaustive research, is easy; but to state, in detail, the hazards of specific devices minutely, or even approximate the per cent. which each contributes to the whole, calls for a more elaborate knowledge and exhaustive research, than has yet centered in any one man. This requirement of the proposition is commendable for the aims to compute the fire rate by a fixed principle, but it will be a matter which more extended research, inquiry and comparison must settle, if ever conclusively determined, in a manner satisfactory to the majority concerned. However much easier it might be to generalize on this point, the proposition requires us to specify "in detail."

This entirely new treatment of the subject, together with the multiplicity of variations and combinations, and the limited time afforded an active field man for research, causes at least one, who thought he knew, to hesitate before going on record.

The causality of all fires is either the incendiary physical, the incendiary accidental, the incendiary inimical, or the incendiary speculative.

This proposition properly contemplates the consideration of the agencies physical and accidental only. Really, this not only includes the predominating causes of flour mill fires, but also is the only source capable of practical demonstration; and yet, the accidental and inimical, if not the speculative, must be taken into the rate account.

Treating these devices in detail, it will be more concise to consider the physical and accidental in conjunction, rather than specifically.

In most new, and especially remodeled mills, there is an objectionable tendency to build high. The space required for the additional machinery of gradual milling is too often obtained by adding one or more stories in height, instead of covering more ground. The necessary volume of machinery in the remodeled mill does not so often require additional space as the effort to increase the old mill's capacity or output, which is almost invariably sought for at the same time.

Increasing the capacity of old mills, when remodeling, by additional height, is so common and objectionable as to merit notice. Few mills are built strong enough to withstand the weight and strain of added stories, together with the increased load of machinery incident to modern milling. Competent judges say that the quantity and weight of machinery necessary to maintain the old mill's output, when changed to high milling, is fully doubled. Such mills have greatly increased their fire contingency, and should enlist the closest attention of the owner against accident, and the insurers of such should see that proper discriminations are made in fixing the rate.

The *Iron Age* gives the following in regard to high mills generally:

"It is a fact that, in mills of ordinary construction, a safe form for stability, and for low rate of fire destructibility, is two stories high, extending over sufficient space to give the room required. It is safe to assume that equal cubic content, with double the base area, has but one-half the fire loss liability of the double altitude, with conditions otherwise equal. Add to the fire results of difference in height the effect of the greater vibration of the higher structure, and the hazard of the higher structure is yet further augmented."

The chief aim in building high is to avoid re-elevating and spouting, by being able to feed down, from floor to floor; but the hazard of altitude more than offsets the simplicity secured, and should be so discriminated against by insurers, as to render low building an economy. It is extremely doubtful whether any economy is secured by building high, when the extra time and labor of supervision are duly computed. High mills are more exposed to accidental causes, such as lightning, sparks from remote fires, and, if frame, are liable to be racked by storms, so that the load of machinery and grain, for they all have more or less stock in mill, produces dangerous friction from trembling. The proper

supervision of machinery is more apt to be neglected, when it requires so much climbing up and down. Increased length of elevators produces heavy draft on pulleys, and their sensitive tendency to frictional fires, at the pulley-head, is greatly increased. Once on fire, they are almost sure to baffle the best facilities, and be referred to the adjuster.

The foundations of a flour mill should be such as will permanently resist the weight and workings of the machinery, and a weight of stock that might fill it to its utmost capacity. Central piers, though not exposed to frost, with independent and less substantial foundations, will not answer. They, and the chimneys, if any, must rest on solid masonry.

A separate building for grain and flour storage is unquestionably best and cheapest, because it lessens the value exposed to the mill fire rate; but the reduction it would secure in the mill rate, would depend on the relative strength of the mill building for its work, as the chief result would be the removal of weight. Such a storage building should be as nearly fire-proof as possible, should be strictly for storage and shipping, should have as little machinery in it as will handle its contents, and should have the power transferred to it from the mill, in order to reduce the fire rate to the lowest minimum possible.

Cleaning machinery should never be placed in such warehouses. It is less convenient for proper supervision; it adds greatly to the fire rate of the values you have sought to remove from danger; and the mill is a more proper place for it. By this arrangement, the mill, containing all of the hazardous operations, is reduced to a machine, through, and out of which, values pass from its fire reach, instead of accumulating and being subjected to its hazards and augmenting its combustibility. A part of the mill building, cut off by thorough fire wall, is the next best method of storing grain and flour; but there is no place where you can afford to be so extravagant, as in making that wall so heavy and so independent as to be accepted by insurers, as a real cut-off of mill hazards.

Wooden roofs are especially bad for flour mills, where so much dust of various kinds is liable to increase the sensitiveness to sparks from any source. Eave-spouting should be so arranged that the igniting of the dust, which often fills them, will not set fire to wooden cornice, roof-boards, or be drawn into the mill between the rafters.

A larger number of steam mills burn from faulty boiler houses and defective stacks than should. It is quite as important that the boiler house roof be fire-proof inside as outside. It is comparatively inexpensive to cut off the boiler room by a brick wall with iron-clad doors, and render it nearly fire-proof. As a matter of economy, the fine working parts of the engine should be not less thoroughly protected from the rapid injury of furnace room dust, and also dust from the mill. Place the engine room between the mill and furnace room, with a brick wall and heavy iron-clad doors on the mill side, as well as on the boiler room side.

Iron stacks soon become defective, if they are not so in some respects, when erected, and should pay more than the usual half of one per cent. extra, because, in permanent improvements they almost invariably indicate less safe and thorough construction generally.

Water as a motor has only four noticeably objectionable features. 1. Too much of it overflowing the fore-bay, starting the mill unattended, and burning it from frictional fire. 2. Too little of it to sustain a profitable running season. 3. Litigation as to the use of and abuse of the privilege, as affecting others' rights and interests. 4. A recently suggested probability of its producing, in this connection hydrogen gas, or fire damp, rendering the mill atmosphere more explosive, and explosions more destructive. A good mill site does not, necessarily, make a good site for a mill; and a profitable site is not always found by a dam site.

Wind engines have only been the direct cause of loss from unexpected force and speed, causing fire from friction.

In steam mills heating by other means than steam is inexcusable, because it is inexpensive; with pipes, properly secured, it lessens the hazard, and it can be easily arranged so that, from the boiler room, in case of fire, it may be utilized through the same pipes, as an effective fire smotherer. In water mills, where the heat may be necessary to warm the grain for grinding, and for heating, place the boiler stove in office, where it will do double service during most of the season. Heating by stoves if indispensable, must have all the safeguards usual and useful.

Lights in a mill, properly arranged for even distribution of daylight, for general purposes, can be stationary globe lamps, of approved style, taking their ventilation from outside the mill,

and discharging the heated air through a series of alternating perforated plates, at least eight inches above the flame. The danger of a lamp is not so great at its top, as there is an upward current; but the draft must be thoroughly protected with a series of perforated plates or Davy gauze. Movable lights must be inclosed in protected globes, and be ventilated by a series of perforated plates, or Davy gauze, at bottom and top, and supplied with lard oil only.

Among the incendiaries physical, the chief source of ignition in flour mills is from frictional heat. Incipient fires are more often discovered and extinguished in flour mills than is generally known by underwriters. This research has brought out many instances of miniature explosions, friction fires, and peculiar starters, which were not only extinguished without special damage, but which, for the good of the milling cause, not less than for the serenity of insurers, were hidden under a bushel. We enjoin millers not to let their lights shine, which, figuratively, is superfluous, and, practically, is now seconded by a motive of self-preservation.

Millers are exceedingly non-committal in such matters, as well as to all causes and effects incident to their pursuit. This peculiarity of millers has developed two erroneous conclusions among insurers; first, that the origin of mill fires is mysteriously unascertainable; and second, that nearly all ignitions prove fatal.

It is the opinion of the experienced authority quoted above, that there is no line of manufacturing, in which so many ignitions occur from various sources, as in flour mills. That the number of ignitions which prove fatal, or are disastrous enough to give publicity, compared with the number which actually occur in all classes of mills, and are suppressed without damage, does not exceed ten per cent.

The degree of danger from frictional heat depends: 1. On the specific gravity of the speed rate. 2. On the weight of the running parts, and of the material carried by them. 3. On the evenness or variation of this draft on the working parts. 4. On the adaptation and adjustment of the boxes for the speed rate intended. 5. On the ventilation of the bearings, or confinement in contact with heated or heat-producing material. 6. On the character and frequency of supervision while running. 7. On the character and quality of lubricants used. 8. On conditions which can neither be guarded against nor detected afterward; a source which cannot be accounted for by the machine, or its connections and surroundings. 9. On the condition in which the bearings are left when the mill closes for the day.

Two mills burned from like cause in Europe last year. The one had not been running two years; the other, mostly frame, had been in operation over two hundred years.

The degree of care in the supervision of machinery is a vital element in the longevity of flour mills. Regardless of speed rate, there are few devices in the flour mill that do not, in some degree, add to the fire contingency. Even hand tools may be displaced, and become the fire producing means of some attending cause.

The engine should be carefully regulated by a fly-wheel, of such weight as will store up power enough to carry it past the dead points with perfect smoothness. No line of manufacture requires as even transmission of power as the millstone system. A light balance wheel has often been the chief cause of one mill doing much less satisfactory work than another. The jerking motion of an improperly balanced motor is damaging to machinery, and produce unnatural and dangerous friction.

The main shaft from the motor, usually in basement, makes from 70 to 160 revolutions per minute. In large mills these vary from 5 to 8 inches in diameter, and by length of mill. There is an immense strain on the shaft, and its bearings need watching. Power, from the main shaft to line shafting, and machinery on upper floors in modern mills, is now being generally transferred by belt. Upright power shafts were bad in old mills, but with the increased shafting required in gradual milling, such are exceedingly objectionable, because of liability to get out of trim, bind, and generate frictional heat. Especially so when connections are by bevel gear.

The shafting of modern mills is not only largely increased, but the speed is higher, and requires more careful supervision. A shaft in perfect alignment, at rest, may be deflected by the various strains on it at work, by vibrations caused by weight on the floors, and result in dangerous frictional heat.

Journals will run for months without heating, and again, with the same care, perfect lubrication, and every discernible feature in perfect order, will rapidly heat, and no mechanic can tell the cause. These cooled and started, may run again for months without re-occurring. This feature of friction heating has not yet found explanation. A journal that heats regu-

larly has some attending cause discernible; sometimes lengthening of the bearing will prevent it, but heating of bearings cannot be certainly prevented, and none of them, no matter how long they have run coolly, can be safely overlooked in supervision. This important feature of mill hazard comes from the experienced mechanics and millers quoted above.

The boxes must be carefully protected by caps, to keep the oil from being absorbed and hardened by dust, and to keep dust from the bearings; and the formation of congealed oil and dust must be removed from the boxes and shafting, otherwise the grit will work into the bearings, and naturally produce dangerous friction. There must be drip cups under bearings of all machines.

Only a high grade of lard oil, sperm oil, and tallow, should be used for lubricating. It is not safe to depend on getting a reliable mineral oil. There is so much compounding of the same, that it is difficult to distinguish good from bad. Recently fire commenced flying in every direction from a power pulley on line shaft; the machinery was stopped, and, on examination, the bearing was not heated. The display was caused by flashing of poor quality of black oil. In flour mills a great mistake is made in employing men of inferior ability to oil machinery. The oiler should be a man of system, and understand all indications of improperly working gear, and of deficient oil. He should be a judge of oil from its actions in use.

Good authority on lubricating gives the following: "A great difficulty with all tyros, in the use of machinery, is the wasting of oil by its too profuse use. It often happens that a bearing will heat when supplied with too much oil that will run cool when supplied with the proper quantity. The reason is, that when the lubricator is partly worn, it becomes sticky; it resists removal; it remains tenaciously between the shaft and its bearings; whereas, too much of it, usually thin and limpid, serves to 'wash the bearing,' and let the parts into closer contact. For steel surfaces, lubricated with best sperm oil, moving slowly, 1,000 pounds pressure per square inch of bearing surface has been found permissible; for iron journals, 800 pounds per square inch should not be exceeded. The oil, which allows the greatest heat to accumulate with the fewest revolutions, must be a bad lubricant."

Bevel gears are bad in a number of ways; they do not give as smooth action, and are liable to get out of mesh, and the least binding will not only produce dangerous frictional heat, but the slowest mill motion, in this condition, is sufficient to throw off friction sparks. Bevel gear on an upright shaft of not over 40 turns per minute, in an old mill at Westville, Ind., struck off sparks which ignited the dust on a beam in top of mill, and, when discovered, it had burned a space the size of a hat, although the frictional heat had not dangerously increased.

Belt gearing has been so perfected as to give a more steady and uniform transmission of power. Driving by reel belt is very much preferable to that of bevel gear. It gives a more steady and substantial action, and better facilities for starting and stopping any or all machinery.

Belt rests and tighteners are bad in a number of ways. Undue pressure of the belt causes the pulley to stop, and the rubbing of the belt against it rapidly produces frictional heat, which, however, usually burns off the belt before any other damage is done.

Metal boxes and iron pulleys are more reliable, and safer, for all places and speeds. Wooden boxes should never be used in flouring mills, for speeds over 80.

Cotton belting should never be used in flour mills, because of its liability to stretch and shrink, and to fray out at the edges, in running against the belt fork, and in various ways. It is not only more liable to clog in elevators, but when clogged, will ignite from friction of the running pulley, and act as a fire conductor. Good leather belting is the best for mill purposes, and, if used with grain side to the pulley, will give more satisfactory action and drive nearly one-third more than with the flesh side.

[TO BE CONTINUED.]

The superiority of electricity over steam convincingly demonstrated: "Yes, sir, we have entered upon an era of electricity, and steam will be done away with forever—replaced everywhere by the electrical machine." "How are they run—those electrical machines?" "I don't ever remember seeing one." "By steam power."

"What is a debt of honor?" asked "one of the boys" last night, as he leaned against a C. street bar. His venerable companion, who has drank free whisky on the Comstock ever since he got broke in the collapse which followed the Yellow Jacket fire, changed the position of his cigar, and expectorating, reflectively said: "I am not sure, but I believe a debt of honor is generally a debt which has been contracted in some dishonorable way."

MODERN SCIENTIFIC MILLING.

THE IMPROVEMENTS THAT ARE BEING INTRODUCED
IN THE NEW YORK CITY ROLLER FLOUR
MILLS—THE FINEST IN THE STATE.

For hundreds, or rather for thousands, of years, the grinding of wheat was conducted in primitive style and but few improvements were ever suggested or introduced. It was not until within the present century that even in Europe any great progress was made. But for a long time past the millers of Hungary have enjoyed a high reputation, based upon their thorough-going methods and the excellence of the results arrived at. In the United States, great attention has of late years been paid to milling from a scientific point of view, and various patent and other processes have from time to time been brought out. Yet it is found that the old Hungarian method is, after all, by long odds, the best. It was first introduced to this country by Mr. W. D. Gray, who had a long experience in the milling districts of Hungary. Messrs. Jones, proprietors of the New York City Roller Flour Mill, have availed themselves of his experience and inventions, embracing his patent noiseless roller machine in the rebuilding of their old and well-known establishment at Broome and Lewis streets. Mr. Gray is now connected with E. P. Allis & Co., of Milwaukee, and he has full charge of the entire improvements. It is no news to the milling profession to say that he is the most eminent mill builder of either this or any other country. He built many of the principal mills in the West, and his work is beyond all successful rivalry.

A Review reporter called a day or two ago at the premises at the above address and was courteously conducted through the greater part of the establishment by one of the members of the firm. The building is a grand structure, fronting 125 feet on Broome street and 125 on Lewis, and the height is six stories with basement. The walls are remarkably heavy, being three feet in thickness. A splendid 700 horse-power Corliss engine drives the entire machinery, the equipment of which is probably the finest to be found in any mill in the country. The milling capacity will be from 1,100 to 1,300 barrels of flour daily, or from 350,000 to 500,000 barrels per annum. The storage capacity is equal to 25,000 barrels of flour and about 50,000 barrels of wheat and feed.

The reporter jotted down a few particulars regarding each story of the mammoth building, which may be presented here in anticipation of the opening of the mills for business, when an elaborate account will be given.

On the first floor are the offices, fitted up in oak and cherry. Back of here is the roller floor, where are sixty-four of Gray's patent noiseless roller machines. Formerly stones were used but there are none at all in the new building as machinery. The second is the packing floor. The third, fourth, fifth and sixth floors are fitted up with a vast array of the most improved machinery yet introduced. Some 50,000 feet of belting will be needed, and the main belt will be 140 feet long and 40 inches wide. Work is now going on with great rapidity in anticipation of the opening of the mills for business, which will be about December 1st. Altogether this establishment will be acknowledged by all who see it to be the finest in the country.—*New York Mercantile Review.*

AMERICAN MILLING METHODS.

The following paper was read before the meeting of the Pennsylvania State Millers' Association, at Pittsburg, Pa., by Albert Hoppin:

To speak of the wonderful strides which the art of milling has taken during the past decade has become exceedingly trite. This progress, patent to the most casual observer, is a marked example of the power inherent in man to overcome natural obstacles. Had the climatic conditions of the Northwest allowed the raising of as good winter wheat as that raised in winter wheat sections generally, I doubt if we should hear so much to-day of new processes and gradual reduction systems. So long as the great bulk of our supply of breadstuffs came from the winter wheat fields, progress was very slow, the mills of 1860, and I may even say of 1870, being but little in advance so far as processes were concerned, of those built half a century earlier. The reason for this lack of progress may be found in the ease with which winter wheat could be made into good, white merchantable flour. That this flour was inferior to the flour turned out by winter wheat mills now is proven by the old recipe for telling good flour from that which was bad, viz: To throw a handful against the side of the barrel, if it stuck there it was good, the color being of a yellowish cast. What good winter wheat patent to-day will do this? Still the old time winter wheat

flour was the best there was, and it had no competitor. The settling up of the Northwest, which could not produce winter wheat at all, but which did produce a most superior article of hard spring wheat, was a new factor in the milling problem. The first mills built in the spring wheat states tried to make flour on the old system, and made a most lamentable failure of it. I can remember when the farmer in Wisconsin, who liked a good loaf of bread, thought it necessary to raise a little patch of winter wheat for his own use. He oftener failed than succeeded, and most frequently gave it up as a bad job. Spring wheat was hard, with a very tender, brittle bran. If ground fine enough to make a good yield, a good share of the bran went into the flour, making it dark and specky. If not so finely ground the flour was whiter, but the large percentage of middlings made the yield per bushel ruinously small. These middlings contained the choicest part of the flour-producing part of the berry, but owing to the dirt, germ and other impurities mixed with them, it was impossible to regrind them except for a low grade flour. Merchant milling of spring wheat was impossible wherever the flour came in competition with winter wheat flours. At Minneapolis, where the millers had an almost unlimited water power, and wheat at the lowest price, merchant milling was almost given up as impracticable. It was certainly unprofitable. To the apparently insurmountable obstacles in the way of milling spring wheat successfully, we may ascribe the progress of modern milling. Had it been as easy to raise good winter wheat in Wisconsin and Minnesota as in Pennsylvania and Ohio, or as easy to make white flour from spring as from winter wheat, we should not have heard of purifiers and roller mills for years to come.

The first step in advance was the introduction of a machine to purify middlings. It was found that the flour made from these purified middlings was whiter than the flour from the first grinding, and brought a better price than even winter wheat flours. Then the aim was to make as many middlings as possible. To do this and still clean the bran so as to make a reasonable yield, the dress of the burrs was more carefully attended to, the old-fashioned cracks were left out, the faces and furrows made smooth, true, and uniform, self-adjusting drivers introduced, and the driving gear better fitted. Spring wheat patents rapidly rose to the first place in the market, and winter wheat millers waked up to find their vantage ground occupied by their hitherto contemned rivals. To their credit it may be said that they have not been slow in taking up the gauntlet, and through the competition of the millers of the two climatically divided sections of this country with each other and among themselves, the onward march of milling progress has been constantly accelerated. Where it will end, no man can tell, and the chief anxiety of every progressive miller, whether he lives in Pennsylvania or Minnesota, is not to be left behind in the race.

The millers of the more eastern winter wheat states have a two-fold question to solve. First, how to make a flour as good as can be found in the market, and second, how to meet western competition, which, through cheap raw material and discriminating freight rates, is making serious inroads upon the local markets. Whether the latter trouble can be remedied by legislation, either state or national, or not, remains to be proven by actual trial. That you can solve the first part of the problem satisfactorily to yourselves depends upon your readiness to adopt new ideas and the means you have at hand to carry them out. It is manifestly impossible to make as good a flour out of soft, starchy wheat as out of that which is harder and more glutinous. It is equally impossible for the small mill, poorly provided with machinery, to cope successfully with the large merchant mill fully equipped with every appliance that American ingenuity can suggest and money can buy. I believe, however, that a mill of moderate size can make flour equally as good as the large mill, though, perhaps, not as economically in regard to yield and cost of manufacture.

The different modes of milling at present in use may be generally divided into three distinct processes, which, for want of any better names, I will distinguish as old style, new process and gradual reduction. Perhaps the German division of low milling, half high milling and high milling is better. Old style milling was that in general use in this country up to 1870, and which is still followed in the great majority of small custom or grist mills. It is very simple, consisting in grinding the wheat as fine as possible at the first grinding and separating the meal into flour, superfine or extra, middlings, shorts and bran. Given a pair of mill stones and a reel long enough, and the wheat could be made into flour by passing through the two. Because spring wheat was so poorly adapted to

this crude process, it had to be improved and elaborated, resulting in the new process. At first this merely consisted of purifying and re-grinding the middlings made in the old way. In its perfected state it may be said to be half way between the old style and gradual reduction, and is in use now in many mills. In it millstones are used to make the reductions, which are only two in number, in the first of which the aim of the miller is to make as many middlings as he can while cleaning the bran reasonably well, and in the second to make the purified middlings into flour. In the most advanced mills which use the new process, the bran is reground and the tailings from the coarse middlings containing germ and large middlings with pieces of bran attached are crushed between two rolls. These can hardly be counted as reductions, as they are simply the finishing touches, put on to aid in working the stuff up clean, and to permit of a little higher grinding at first. Regarding both old style and new process milling, you are already posted. Gradual reduction is newer, much more extensive, and merits a much more thorough explanation. Before entering upon this I will call your attention to one or two points which every miller should understand.

The two essential qualities of a good marketable flour are color and strength. It should be sharply granular and not feel flat and soft to the touch. A wheat which has an abundance of starch, but is poor in gluten, cannot make a strong flour. This is the trouble with all soft wheats, both winter and spring. A wheat which is rich in gluten is hard, and in the case of our hard Minnesota wheat has a very tender bran. It is comparatively easy to make a strong flour, but it requires very careful milling to make a flour of good color from it. Probably the wheat which combines the most desirable qualities for flour making purposes is the Red Mediterranean, which has plenty of gluten and a tough bran, though claimed by some to have too much coloring matter while the body of the berry is white. By poor milling a good wheat can be made into flour deficient both in strength and color, and by careful milling a wheat naturally deficient in strength may be made into flour, having all the strength there was in the wheat originally and of good color. Good milling is indispensable, no matter what the quality of the wheat may be.

The idea of gradual reduction milling was borrowed by our millers from the Hungarian mills. There is, however, this difference between the Hungarian system and gradual reduction, as applied in this country, that in the former when fully carried out, the products of the different breaks are kept separate to the end, and a large number of different grades of flour made while in the system, as applied in this country, the separators are combined at different stages and usually only three different grades of flour made, viz: patent, bakers', or as it is termed in Minnesota, clear flour, and low grade or red dog. In the largest mills the patent is often subdivided into first and second, and they make different grades of bakers' flour, these mills approaching much nearer to the Hungarian system, though modifying it to American methods and machinery. In mills of from three to five hundred barrels daily capacity, it is hardly possible or profitable to go to this subdivision of grades, owing to the excessive amount of machinery necessary to handling the stuff in its different stages of completion. The Hungarian system has, therefore, been greatly modified by American millers and milling engineers to adapt it to the requirements of mills of average capacity. This modified Hungarian system we call gradual reduction. It can be profitably employed in any mill large enough to run at all on merchant work. So far, it has not been found practical to use it in mills of less than one hundred and twenty-five to one hundred and fifty barrels' capacity in twenty-four hours, and it is better to have the mill of at least double this capacity.

Gradual reduction, as its name implies, consists in reducing the wheat to flour, shorts to bran, by several successive operations or reductions, technically called breaks, the process going on gradually, each break leaving the material a little finer than the preceding one. Usually five reductions or breaks are made, though six or seven may be used. The larger the number of breaks the more complicated the system becomes, and it is preferable to keep it as simple as possible, for even at its simplest it requires a good, wide-awake, thinking miller to handle it successfully. When it is thoroughly and systematically carried out in the mill it is without question as much in advance of the new process as that is ahead of the old style of milling.

In order that I may convey to you as clear an idea of gradual milling reduction as possible, I will give as fully as possible the programme of a mill of 150 barrels maximum daily capacity designed to work on mixed hard and soft spring wheat, and which probably will come much

nearer to meeting the conditions under which you have to mill than any other I have found readily obtainable. I have chosen a mill of this size, first, because following out the programme of a larger one would require too much time and too great a repetition of details and not give you any clearer idea of the main principles involved, and secondly, because I thought it would come nearer meeting the average requirements of the members of your association. Your worthy secretary cautioned me that I must remember that I was going to talk to winter wheat millers. The main principles and methods of gradual reduction are the same, whether applied to spring or winter wheat; the details may have to be varied to suit the varying conditions under which different mills are operated. For this programme I am indebted to James Pye, of Minneapolis, who is rapidly gaining an enviable and well deserved reputation as a milling engineer, and one who has given much study to the practical planning and working of gradual reduction mills.

And right here let me say that no miller should undertake to build a gradual reduction mill, or to change over his mill to the gradual reduction system, until he has consulted with some good milling engineer (the term millwright means very little nowadays), and obtained from him a programme which shall fit the size of the mill, the stock upon which it has to work, and the grade of flour which it is to make. This programme is to the miller what a chart is to the sailor. It shows him the course he must pursue, how the stuff must be handled, and where it must go. Without it he will be "going it blind," or at best only feeling his way in the dark. A gradual reduction mill, to be successful, must have a well-defined system, the miller must have a definite plan to work by. But to go on with my programme.

After the wheat is cleaned, it is by the first break or reduction split or cut open, in order to liberate the germ and crease impurities. As whatever of dirt is liberated by this break becomes mixed in with the flour it is desirable to keep the amount of the latter as small as possible. Indeed, in all the reductions, the object is to make as little flour and as many middlings as possible, for the reason that the latter can be purified while the former cannot, at least by any means at present in use. After the first break the cracked wheat goes to a scalping reel covered with No. 22 wire cloth. The flour, middlings, etc., go through the cloth and the cracked wheat goes over the tail of the reel to the second machine, which breaks it still finer. After this break the flour and middlings are scalped out on a reel covered with No. 22 wire cloth. The tailings go to the third machine and are still further reduced, then through a reel covered with No. 24 wire cloth. The tailings go to the fourth machine, which makes them still finer, then through a fourth scalping reel the same as the third. The tailings from this reel are mostly bran with some middlings adhering, and go to the fifth machine, which cleanses the bran. From this break the material passes to a reel covered with bolting cloth varying in fineness from No. 10 at the head to No. 00 at the tail. What goes over the tail of the reel is sent to the bran bin, and that which goes through next to the tail of the reel, goes to the shorts bin. The middlings from this reel go to a middlings purifier, which I call No. 1, or a bran middlings purifier. The flour which comes from this reel is sent to a chop reel covered at the head with say No. 9 with about No. 5 in the middle and No. 0 at the tail. You will remember that after each reduction the flour and middlings were taken out by the scalping reels. This chop, as it is now called, also goes to the same reel I have just mentioned. The coarse middlings which go over the tail of this reel go to a middlings purifier, which I will designate as No. 2. Those which go through the No. 0 cloth at the tail of the reel go to purifier No. 3; those which go through No. 5 cloth go to purifier No. 4; while all that goes through No. 9 cloth at the head of the reel is dropped to a second reel clothed with Nos. 12 to 15 cloth with two feet of No. 10 at the tail. The flour from this reel goes to the bakers' flour packer; that which drops through the No. 10 is sent to the middlings stone, while that which goes over the tail of the reel goes to purifier No. 4. We have now disposed of all the immediate products of the first five breaks, tracing them successively to the bran and shorts bins, to the bakers' flour packer and the middlings purifiers, a very small portion going to the middlings stone without going through the purifiers.

The middlings are handled as follows on the purifiers. From the No. 1 machine which takes the middlings from the 5th break, the tailings go to the shorts bin, the middlings which are sufficiently well purified go to the middlings stone, while those from near the tail of the machine which contain a little germ and bran specks, go to the second germ rolls, these being

a pair of smooth rolls which flatten out the germ and crush the middlings, loosening adhering particles from the bran specks. From the second germ rolls the material goes to a reel where it is separated into flour which goes into the bakers' grade, fine middlings which are returned to the second germ rolls at once, some still coarser which go to a pair of finely corrugated iron rolls for red dog, and what goes over the tail of the reel goes to the shorts bin. The No. 2 purifier takes the coarse middlings from the tail of the first or chop reel as already stated. The tailings from this machine go to the shorts bin, some few middlings from next the tail of the machine are returned to the head of the same machine, while the remainder are sent to the first germ rolls. The reason for returning is more to enable the miller to keep a regular feed on the purifiers than otherwise. The No. 3 purifier takes the middlings from the 0 cloth on the chop reel. From purifier No. 3 they drop to purifier No. 5. A small portion that are not sufficiently well purified are returned to the head of No. 3, while those from the head of the machine, which are well purified are sent to the middlings stones. The remainder, which contain a great deal of the germ, are taken to the first germ rolls, in passing which they are crushed lightly to flatten the germ without making any more flour than necessary. The No. 4 purifier takes the middlings from No. 2 and also from No. 5 cloth on the chop reel and from the No. 10 on the tail of the bakers' reel. The middlings from the head of this machine go to the middlings stones, and the remainder to purifier No. 6. The tailings from Nos. 3, 4, 5 and 6 go to the red dog rolls. A small portion not sufficiently well purified are returned from No. 6 to the head of No. 4, while the cleaned middlings go to the middling stones.

The portions of the material which have not been traced either to the bakers' flour or the bran and shorts bins are the middlings which have gone to the middling stones, the gummy middlings which have gone to the first germ rolls and the tailings from purifiers Nos. 3, 4, 5 and 6, and some little stuff not quite poor enough for shorts from the reel following the second germ rolls. Taking these *seriatim*, the middlings, after passing through the middling stones, go to the first patent reel covered with eleven feet of No. 13 and four feet of No. 8. The flour from the head of the reel goes to the patent packer, that from the remainder of the reel is dropped to another reel, while the tailings go to the No. 4 purifier. The lower patent reel is covered with No. 14 and two feet of No. 10 cloth; from the head of the reel the flour goes to the patent packer, the remainder that passes through the No. 10 cloth which will not do to go into the patent, being returned to the middlings stones, while the tailings are sent to the No. 4 purifier.

[TO BE CONTINUED.]

How we Raise Wheat in America.

AN ITEM OF INTEREST FOR THE EUROPEAN AGRICULTURIST.

The great wheat field of California lies in Colusa county, which also contains one of the largest farms in the world. The county comprises a large part of the extensive Sacramento valley, and is sixty miles in length and on the average forty-five miles in width. It has an area of about 1,800,000 acres, of which 1,000,000 grows wheat. Of this vast tract 477,000 acres are owned by 129 men. One owns 55,000 acres; one, 24,000; one, 20,000; three, 16,000; one, 15,000; three, 14,000; six, 10,000; one, 8,000; two, 7,000; six, 6,000; three, 5,000; eight, 4,000; five, 3,000; eighteen, 2,000; three, 1,500; thirty-six, 1,000, and twenty-nine, 500. The result has been to debar immigration and choke out tradesmen and mechanics.

The largest land-owner in Colusa county is Dr. Hugh J. Glenn. His farm contains 55,000 acres, and has a river frontage of sixteen and a half miles, and is enclosed by 150 miles of fence. Wheat is grown on 45,000 acres. The labor force employed is composed of 715 men—225 in seeding and 490 in harvesting. Eight hundred horses are required. The yield of wheat from this farm will average 1,000,000 bushels a year.

Dr. Glenn was born in Virginia in 1824, and graduated at the Medical University in Missouri in 1846. Shortly afterward he married and commenced life with a capital of \$110. With that he purchased an ox team and crossed the plains to California. He engaged in mining and was successful. In 1850 he returned to Missouri with \$5,000, and bought and drove horses to California and Mexico. He made his first purchase of land in 1857, buying 70,000 acres at \$1.60 per acre, and a short time afterwards purchased 7,000 acres more at about the same price. Since then he has been absorbing the land on either side at varying prices.

Grain and Flour Trade Notes.

The South Carolina rice fields are showing the disastrous results of the late gale, and the new crop is arriving at Charleston very slowly. The receipts to September 27 were but 901 tierces, against 1,578 tierces for the same period last year. The passage of the equinox without the recurrence of the usual storm has had a good effect, and hopes are now entertained of an escape from the usual September gale entirely. Should this be the case, the rice crop will not be as bad as we feared a fortnight ago.

The wheat crop of 1881, in the United Kingdom is estimated by divisions, as follows, by the London Miller:

Quarters	Quarters
The home counties.....1,060,000	East England.....2,861,250
Southern England.....1,015,000	Scotland.....225,000
Western England.....1,290,000	Ireland.....475,060
Wales.....1,113,000	Islands.....25,000
Northern England.....1,680,000	Total.....9,844,250

The Miller adds: "In 1867 the wheat crop was very deficient, but then the area was 3,640,000 acres; in 1872, another very poor year, the area under wheat was 3,840,000 acres. The crop of 1873 was estimated at 10,390,000 quarters, and 10,110,000 quarters in 1872. In 1875 the wheat crop was estimated at 19,124,000 quarters from 3,514,000 acres. The yield of 1879 did not probably exceed 7,000,000 quarters. The crop of 1881, with every allowance for a wet and cold harvest period, is decidedly superior to 1875 and 1879. Had the acreage remained unchanged from 1872, the crop, instead of being some 3,000,000 quarters smaller than then, would have been 11,840,000 quarters, against 10,110,000 quarters.

ST. LOUIS, Iowa, is becoming quite a grain centre. One firm of grain buyers there have handled over 700,000 bushels of wheat during the past year.

CANADA has reason to be happy. Its grain crops this year have turned out well. The yields of wheat, oats and barley are reported to be much above the average of past years.

The inner kernels of wheat spikelets are always smaller than the outer ones, and they are later in ripening. In establishing any new variety of wheat from cross-breeding, the outer kernels should alone be saved for seed.

The flaxseed crop for the current year is estimated at 7,500,000 bushels, against 8,750,000 bushels in 1880. The threshing shows a yield of from four to eight bushels per acre, where ten or twelve bushels were anticipated before harvest.

FRANCE appropriates for agriculture this year in round numbers \$780,000. This grant includes agricultural education, expenses for breeding studs and keeping up 2,500 stallions, inspection of woods and forests, and prizes to regional forests.

The grain available for export from Austro-Hungary this year has been estimated in value at 100,000,000 florins. This is with one exception the largest on record. Excessive rains during the last few weeks have, however, entirely destroyed the crops in the districts of Laiback and Carinthia, and damaged them in many other places.

ACCORDING to the last report of the Commissioner of Agriculture it appears that 7,600,000 persons in the United States are engaged in agricultural pursuits. The total value of farms and farm implements is \$13,461,203,433, or two thirds of the productive wealth of the nation.

No Chinese farmer ever sows a seed of grain before it has been soaked in liquid manure diluted with water, and has begun to germinate; and experience has taught him that this operation not only tends to promote the growth, and development of the plant but also to protect the seeds from the insects hidden in the ground.

A GRAIN of wheat never produced a grain of chess, or "cheat," as farmers persist in calling it. These two plants, wheat and chess, belong to different varieties of the grass family, the chess being a bromus (*B. secalinus*), the wheat a Triticum. As well might we grow an apple tree from a plum pit as chess from wheat, and a careful study of the two plants will show us why we often find chess where we have sown only wheat.

THERE are twenty immense glucose factories in this country. Already a capital of over \$2,000,000 is invested in the business. The daily consumption of corn for the manufacture of glucose is about 35,000 bushels, and the annual amount about 11,000,000. All these factories have sprung up in the last twelve years.

THE Secretary of the Illinois State Board of Agriculture in his latest report, in regard to the wheat crop, concludes as follows: The 1881 wheat crop in point of yield is the smallest on record during the past twenty-one years, and it is doubtful if the quality has ever graded as low. The causes affecting the crop have heretofore been stated to be the severe protracted winter-

the drouth in many sections of the state and the unusual number of chinch bugs which have damaged the crop in nearly every wheat county in the state. The wheat crop (spring and winter) for 1881 is only 22,374,136 bushels, against 56,508,303 bushels last year, a decrease of 34,134,146 bushels as compared with the previous year. If the same wheat acreage is seeded for the next crop as for the crop just harvested there will still be a surplus from the 1881 crop, after deducting the quantity of seed and consumption for the coming year, of over six millions (6,002,883) bushels, to say nothing of the large supply of old wheat still in first hands. The rye crop was the largest ever produced in the state. The oat crop was the largest ever produced except in 1875.

The English Movement Against Free Trade.

The very strong sentiment against Free Trade which is now rapidly growing in England is finding expression in vigorously written pamphlets that are being printed and distributed there by tradesmen and others who feel that they are being hurt and who have the sense to know what it is that hurts them. Mr. Henry Carey Baird, of Philadelphia, has recently received a copy of one of these pamphlets, entitled *Official Agricultural Returns for Twelve Years, from 1869 to 1880*, containing very strong English arguments against Free Trade, which, however, are more local than general in their application, and are chiefly valuable to our Protective cause from the fact that they are put forth by Englishmen and are directed against English Free Trade. Valuable statistics are printed in the pamphlet to show how English Agriculture has been effected by Free Trade from which we take the following statement, setting forth the rapid growth of the imports of farm produce by Great Britain in the past twelve years:

Year.	Farm produce imported.	Three years' average.
1869.....	£ 59,968,313	£ 60,678,352
1870.....	54,805,629	
1871.....	67,266,115	
1872.....	76,253,903	80,870,757
1873.....	83,028,134	
1874.....	83,330,239	
1875.....	89,046,917	94,182,725
1876.....	91,220,671	
1877.....	102,310,228	
1878.....	10,187,719	106,350,952
1879.....	103,513,931	
1880.....	114,351,667	

Observations on Improving Mill-Seats.

[Extract from Oliver Evans' "Mill-wright Guide," published in 1840.]

I may end this part with a few observations on improving mill-seats. The improvement of a mill seat at a great expense is an undertaking worthy of mature deliberation, as wrong steps may increase at 10 per centum, and the improvement be incomplete; whereas, right steps may reduce it 10 per centum and render them perfect.

Strange as it may appear, it is yet a real fact, that those who have least experience in the milling business, frequently build the best and most complete mills. The reasons are evident—

The professional man is bound to old systems, and relies on his own judgment in laying all his plans; whereas, the inexperienced man, being conscious of his deficiency, is perfectly free from all prejudice, and is disposed to call on all his experienced friends, and to collect all the improvements that are extant.

A merchant who knows but little of the miller's art, or of the structure or mechanism of mills, is naturally led to the following steps, namely:

He calls several of the most experienced millers and mill-wrights, to view these seats separately, and point out the spot for the mill-house, dam, etc., and notes their reasonings. The first, perhaps, fixes on a pretty level spot for the mill-house, and a certain rock, that nature seems to have prepared to support the breast of the dam, an easy place to dig the race, mill-seat, etc.

The second passes by these places without noticing them; explores the stream to the boundary line; fixes on another place, the only one he thinks appointed by nature for building a lasting dam, the foundation a solid rock, that cannot be undermined by the tumbling water; fixing on a rugged spot for the seat of the house; assigning for his reasons, that the whole fall must be taken in, that all may be right at a future day. He is then informed of the opinion of the other, against which he gives substantial reasons.

The mill-wright, carpenter, and mason, who are to undertake the building, are now called together to view the seat, fix on the spot for the house, dam, &c. After their opinion and reasons are heard, they are informed of the opinions and reasons of the others; all are joined together, and the places are fixed on. They are then desired to make out a complete draught of the plan for the house, &c., and to spare no pains but to alter and improve on paper, till all appear to meet right, in the simplest and most convenient manner, (a week may be thus well spent,) making out complete bills of every piece of

timber, the quantity of boards, stone, lime, &c., a bill of iron work the number of wheels, their diameters, number of cogs, &c., &c., and everything else required in the whole work. Each person can then make out his charge, and the costs can be very nearly counted. Every species of materials may be contracted for, to be delivered in due time; the work then goes on regularly without disappointment; and when done, the improvements are complete, and a considerable sum of money saved.

Gratiot's New System of Gradual Reduction.

There is certainly a practical limit to the percentage of flour which can be extracted from a given quantity of wheat, but invention, it is asserted, has not yet reached that limit. The latest device for the purpose is that of Gratiot, who claims from eighty to eighty-five per cent of "patent," and about five to eight per cent. of "low grade" attainable in every case by his system.

Gratiot's, in contradistinction to many other systems, makes only three breaks on wheat. The first reduction, made on a vertical roller mill of peculiar construction, takes out few middlings and no flour, but it is said to work efficiently in thoroughly removing the germ and the seam impurities. This machine is so arranged that the wheat is broken as it enters the upper part, the germ and seam impurities being thoroughly scoured away in the lower longer portion of the machine, where it undergoes a sufficiently extended operation. This is a distinctive feature said to be found in no other system.

The second break, also, takes out no flour, but all middlings.

The third break produces about one-third flour and two-thirds middlings; while the bran machine, also of special construction, gives about one-third middlings and two-thirds low-grade flour.

The germs removed in this process are noticeably whole, no broken particles being found among the middlings.

The middlings produced are said to be very sharp and regular; and Gratiot asserts that his machine will grind these middlings better than any burr mill extant.

Now, if the system will do what is claimed for it, and it should, as it makes nothing but the finest middlings, 80 per cent. of the finest patent flour is not an improbable claim. At the rate claimed, to make 125 to 150 barrels of such flour per day, it will require only three machines to reduce the wheat, one to clean the bran and two to grind middlings—a notable economy in plant at the outset.

A heavy stock company is forming for the manufacture of these machines, which will be ready for the trade in a few weeks. Meanwhile, those interested can address the Gratiot Manufacturing Company, 79 Dearborn Street, Chicago.

St. Louis Elevators and their Capacities.

	Capacity for Bulk Grain.
St. Louis.....	2,000,000
East St. Louis.....	900,000
Venice.....	450,000
Central "A".....	700,000
Central "B".....	900,000
St. Louis Warehouse.....	200,000
Advance.....	500,000
Union.....	750,000
Northern.....	500,000

Total Capacity.....6,900,000

The St. Louis Grain Elevator Company is building a new elevator which will adjoin the East St. Louis Elevator and be known as East St. Louis "B." The new elevator will have a capacity of 900,000 bushels, and will be pushed forward to completion as rapidly as possible.

The Union Elevator Company has a capacity in Union Elevator of 750,000 bushels. In constructing the elevator the machinery was so arranged that a capacity of 1,500,000 bushels could be had. The company propose building at once such additions as will give it that amount of storage room.

The Advance Elevator Company is building a new elevator which will have a capacity of 1,000,000 bushels. It will be known as Advance "B," and will be connected with Advance "A." This new building will be completed by the latter part of December.

The Missouri Pacific Elevator, now in course of construction, will have a capacity of 800,000 bushels.

When all the above mentioned new elevators are completed, St. Louis will have a total capacity for storing bulk grain of 10,350,000 bushels.—*Grain Review, (St. Louis.)*

"La, me," sighed Mrs. Partington, "here I've been suffering the bigamies of death for three mortal weeks. First I was seized with bleeding phrenology of the left hemisphere of the brain, which was exceeded by a stoppage of the left ventilator of the heart. This gave me an inflammation of the borax, and now I'm sick with the cloveform merbus. There is no blessing like that of health, especially when you're sick."

SECRET CIPHERS.

A SYSTEM TO CHEAPEN OCEAN TELEGRAPHY AND INSURE SECRECY.

Cable rates to England are now 25 cents a word, but they have been as high as \$100 for a ten-word message. Notwithstanding the great reductions that have been made in the cost of ocean telegraphy since the Atlantic cables were first laid, rates to points in Asia or to South America run up to several dollars a word. There are houses whose business requires frequent telegraphic communication with such distant points, and methods of obtaining brevity of expression are hence of very great value. Telegraph code-makers supply such methods.

"Code-making as a business has grown up within the last five or six years," says J. C. Hartfield, who makes it a specialty. "It has the advantages of both economy and secrecy. The use of codes for ordinary business purposes dates from the beginning of ocean telegraphy, but people at first got up their own codes. It is a very easy thing to do apparently. All you have to do is to make a list of phrases which you have frequently to use in your business and represent them by a corresponding list of single words. But people found that words are apt to be changed in telegraphic transmission into words whose telegraphic notation is similar. The result has sometimes been disastrous. Code-makers make avoidance of such liability to error a special study. Then, too, code-makers can attain a condensation of expressions that makes their work far cheaper than any simple code such as a business man might get up for himself. Hence, large houses are willing to pay well for having codes made for them. There are houses spending as much as \$30,000 a year for telegraphic advices, and a system which will put their messages into few words effects a very great saving for them. I have made a combination code for one house here by which the entire state of the Japanese tea market can be put into seven words. These seven words will convey to them the dates of steamers sailing, the state of the market for nine grades of tea, the rates of freight by six routes, the amount of purchases for Europe and the United States, the grades upon which the demand is running, the principal buyers, rates of exchange, the number of packages sent in the day's shipments, and the points to which they are consigned. I have made a code by which the amount of sales of flour, butter and cheese, the state of market for each, and the amount of money paid into bank are sent daily to a house in this city by its branch at Liverpool, the whole message being put into two words."

"Can codes be gotten up for the use of any house in the same line of business, or do houses prefer to have their own special codes?"

"Large houses prefer to have their own codes. One large banking house for whom I prepared a code had a printing establishment set up inside the bank building so as to make certain of receiving all the copies of the code that were printed. Some of the codes used by large houses are very voluminous. Brown Brothers & Co. have a code of 64,000 words; Thomas & Co., 67,000; Moske Bros. 60,000; Drexel, Morgan & Co., about 45,000 words. We have to ransack all languages to get so many words which shall all be telegraphically dissimilar."

"How much do codes cost?"

"From \$30 to \$6,000, according to the amount of labor required."

"Are secret ciphers used to any extent in telegraphing?"

"Some stock operators make use of cryptograms, and get them up themselves. A method used a good deal is to have a simple code, in which the words denoting the phrases to be conveyed are numbered, and simply the numerals are sent. Such a code can be used so as to conceal messages from a person getting hold of the code, for numerals may be sent which only the person will understand to differ by a certain amount from the numerals denoting the phrases really conveyed. I knew one in use in which the rule was to add the date of the month to the numerals of messages from a branch house. Thus, if the figure five came on the 20th, they would look for the meaning of 25 in the code book. The use of codes and ciphers is very large, but the use of the highly-condensed codes, where not only words but their combinations convey means, is not so wide as would be expected from its great economy. It takes some time and trouble to learn to use such codes with facility, and this retards their introduction, but they are coming more and more into use every year."

Code-makers keep the details of their work secret but the principal upon which codes are constructed is easily understood. The range of all staple business transactions has limits, and as a rule, closely confined limits. The aim of the code maker is to classify phrases which shall

express the constantly recurring details of the market for any staple, and to denote each of its phases by a word. Another object is to use one word so as to convey several meanings. This is done by arranging market details above the tops of columns of words and prices, quantities or any other information along the side. A word in the table expresses the phrase at the top of its column, and also the phrase at its side. The compilation of a code is a very laborious task but its value as an aid to business communications is indisputable.

Sometimes queer sentences result from the chance grouping of code words. Not long since a tea house got this: "Unboiled babies detested."—*New York Sun.*

The Second Suez Canal Project.

The *Levant Herald* has the following concerning the project for constructing a second canal through the isthmus of Suez: "Startling as the idea may at first seem, it will appear less so on further examination; and it is by no means clear that such an enterprise would not be as profitable to the promoters as it would be beneficial to the commerce of the world. At all events, the subject is worthy of consideration, and, if found feasible, at the present, when money is plentiful and the shares of the existing canal company are at a premium of nearly 400 per cent., would strike one as opportune for launching such a scheme. Its promoters would have many advantages over those who, twenty-three years ago, joined with M. de Lesseps in his great and, as it then appeared, financially speaking, hazardous undertaking. They would, in the first place, have no political obstacles thrown in their way. They would, in the next, be able to obtain their capital on far easier terms than their predecessors, of whose experience they would reap all the benefit and advantage. Added to these favorable circumstances, they would turn to account all the improvements of modern machinery. In this way an enormous saving, both in time and money, might be effected. The advantage to commerce of a second canal can hardly be disputed. The delays and stoppages in the existing canal are a serious obstacle and source of trouble, even with the present amount of traffic. In another seven years (by which time the new canal might be completed) it will be incalculably worse."

Steam Wagons.

The *Colusa Sun* says: "After all his experiments, Captain Roberts, of the San Joaquin Company, is still an enthusiast about his steam wagon enterprise. We had a conversation with him some time ago, and he thinks that roads suitable for his wagon can be built very cheaply. While the wagons run and pull very heavy loads on common roads, he thinks of digging two small graded ditches and filling with gravel, which will pack as hard as iron, and give a solid road for each of the broad wheels, and for the wagon wheels that follow with the loads. The *Chico Enterprise* has an item to the effect that this steam wagon has been thoroughly overhauled and improved at the Union Iron Works, Sacramento, and on a recent trial worked satisfactorily. Its weight is 16 or 18 tons, and it is calculated to haul 50 tons of grain at each trip. It will be taken to the Upper Sacramento valley in a day or two, and will engage in grain hauling between Riceville and McIntosh's Landing."

"Capt. Roberts will, if this one shall prove the success he anticipates, put on wagons to run to all the principal landings on the river, and thus cross-section the entire Sacramento valley from foothill to river, every eight or ten miles. We sincerely hope that the wagons may prove successful, as it would be one of the grandest things for the Sacramento valley that could be imagined; that is, always provided we can keep the river navigation from being destroyed."

River Transportation Companies.

As intimated in our September issue, the consolidation of the Mississippi Valley and the St. Louis and New Orleans Transportation Company is an accomplished fact, the corporate name of the new combination being the St. Louis and Mississippi Valley Transportation Co., officers as follows:

President, Henry C. Haarstick; Vice-President, Henry Lourey; Secretary, Henry P. Wyman; Treasurer, Austin R. Moore. The equipment of the company consists of thirteen tow boats, ninety-eight first-class barges, together with floating and stationary grain elevators at Cairo, Belmont and New Orleans. With an ample stage of water, allowing 22 days for the round trip, the companies can now carry to New Orleans very nearly four millions of bushels of grain per month, while it is an easy matter, on account of its immense capital, to increase its

tonnage proportionate to the demands of our rapidly increasing commerce. The company can, with an assured depth of channel and a large movement, transport grain to New Orleans, a distance of nearly 1,300 miles by water, at the rate of four cents per bushel.

In addition to the above named Company, we note the American Transportation Company, capacity 500,000 bushels, and the Mound City Transportation Co., capacity 500,000 bushels, giving us a total monthly barge tonnage aggregating four millions bushels of grain.—*Grain Review (St. Louis.)*

Items of Interest.

ACCORDING to the census report during the census year of 1879-80 the iron mines of the United States produced 7,066,417 tons of ore, of which Pennsylvania contributed 2,173,415 tons; Michigan, 1,834,712; New York, 1,239,959; New Jersey, 799,545; and Ohio, 604,241 tons. There are 801 iron mines in the United States, which Professor Pumpelly, of the Census Bureau, estimates as being capable of an output of 13,365,233 tons annually.

A BUSHEL of corn makes four gallons of whiskey. Certain distilleries in Peoria, Ill., make 54,160 gallons in one day, consuming 13,540 bushels of corn. To grow that day's supply of the grain requires 310 acres, yielding an average of 50 bushels to an acre.

THE old style miller who to-day mounts his husk-frame and bids defiance to the spirit of improvement that is everywhere asserting itself, presents a picture similar to that of a certain somewhat verdant antediluvian defying the floods. Before he knows it he will be surrounded by the great wave of progress and struggling to get astride the ridge-pole of the gradual reduction ark.—*Grain Cleaner.*

A New York company has tendered a casket of sheet bronze with gold trimmings in which to place President Garfield's remains, and it has been accepted. A crypt will probably be erected in Lake View cemetery, in which the casket will be exposed to view.

Funnygrats.

Little Lottie to her friend: "I have so many cares. Yesterday a little baby sister arrived and papa is on a journey. It was such a piece of luck that mamma was at home to take care of it."

A chap being asked to explain a paradox or how it was possible for a lazy man to attain so much education, answered: "I didn't attain it, I—just—heard—it—here—and—there, and was too lazy to forget it."

Tourist: "Where is Block Island?" Polite American: "In Rhode Island." Tourist: "But how can you put one island in another island?" Polite American: "G, that's nothing—we accomplish anything in this country."

An officer of the union army relates that upon one occasion after a charge upon the enemy's works, a fierce encounter and a fall back for re-enforcement, a bright young Irish soldier was found to have a rebel flag captured from the foe. Approaching him he said—"I'll send that to the rear as one of our trophies; give me the flag." "Sure, I'll not give it to ye," said Pat; "if ye are wanting one, there's plinty av 'em behind that ridge over beyant where I got this; sure ye can go and get one for yerself."—*Boston Commercial Bulletin.*

A solemn looking man recently walked into the office of the *Petaluma Pavine*, and handed a paper over to the advertising clerk and said: "I will pay you your top advertising rates to have that printed in your 'Answers to Correspondents' column every other week during the summer." The advertisement read:

"Amateur Sailor—The quickest way to bail out a boat while sailing is to pull out the plug in the bottom."

"I'm afraid we can't do it," said the clerk regretfully, upon which the solemn party folded up the paper and walked out with a deep sigh.

"Who is that?" asked the editor, looking up.

"It's the new coroner."—*San Francisco Post.*

A New York girl married a Zulu prince. However, if the prince retains his native costume, she will have the best of most girls who marry foreign title. The Monday's washing will be lighter.

Instead of complaining that the rose has thorns I congratulate myself that the thorn is surmounted by roses.

"Smith," said Brown, "there's a fortune in that mine!" "I know," said Smith, "I've put my fortune in it."

The Chicago Board of Trade to Mr. Handy, of Cincinnati: "Och! och! Let me up; take a man of your size!"

There must be something wrong about the family government when a four-year-old boy is overheard praying: "O Lord, take all the naughty out of Johnny, and all the sould out of papa, and all the punish out of mamma. Amen." No doubt the little fellow fell asleep after that in a blissful confidence that life was going to be brighter for him.

"BEST IN THE WORLD."

GARDEN CITY WHEAT BRUSH!



Gathmann's patent "inclined bristles" prevents all clogging when the brushes are run close together. This is the

ONLY DOUBLE BRUSH

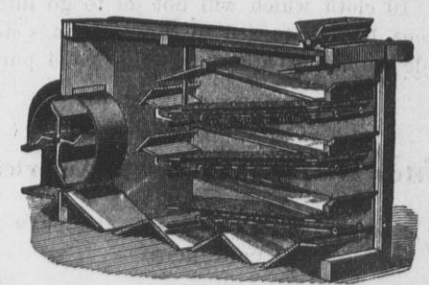
Which can be set up close so that it will

Thoroughly Brush Wheat.

It don't break or scratch the grain. Removes all the dust. Very light running. Send for circular and prices.

GARDEN CITY MIDDINGS

PURIFIER!



Travelling Cloth Cleaners.

Our improved Purifier has every device requisite to make it perfect, and every one in use is giving the greatest satisfaction to the users. The Cloth Cleaners are guaranteed to clean the cloth better than is done on any other purifier. Send for our new circular.

We are agents for the

BODMER

BOLTING CLOTH,

Which has long been acknowledged as the best made, and which has lately been further improved, making it now beyond competition. We make it up in the best style at short notice. Send for prices and samples.

Garden City Mill Furnishing Company,
CHICAGO, ILL.

(Mention this paper when you write us.)

Dust Explosions.

The recent violent explosion of dust in the malt elevator of one of the largest breweries in New York, calls for special mention, since it is a source of danger that is frequently overlooked, or very much underrated. There are so many manufacturing processes in operation which involve the production of combustible substances in highly comminuted form, capable, unless great precautions are taken to prevent it, of causing violent and disastrous explosions, that the real extent of the danger from this form of accident should be intelligently understood by all. It should be understood that the dust of such combustible substances as coal or grain, when mixed with air, in which it will float, is a dangerous explosive. It is only necessary, in this connection, to recall several notable cases of disastrous accidents happening from this cause, to impress the fact upon every mind. Of these we need only call to mind the explosion and burning of the Washburn, Diamond, & Humboldt Flouring Mills in Minneapolis, which occurred on the 21 day of May, 1878, and which at the time attracted universal attention from its peculiar character and disastrous effects.

These mills were destroyed by the explosion of particles of flour and bran mixed with air, and the violence of the explosion was so great that brick walls six feet thick were thrown down, and portions of the iron roof of one of the mills were thrown upward with such force that they were carried away by the wind to a distance of several miles from the scene of disaster.

There seems to be good reason to believe, in the light of the frequent accidents of this kind that have lately been noticed, that many mysterious explosions and conflagrations may have been caused by the accidental ignition of mixtures of combustible dust and air. This is undoubtedly true of many of the explosions that occur in collieries, and which have been in many cases erroneously attributed to the presence of "fire damp." Of manufacturing establishments, flouring and grinding mills and breweries are the most exposed to this form of accident, and the utmost precaution should be exercised to avoid them that intelligent supervision can devise. In some cases, however, no amount of precaution can avail to avert accidents of this kind, since a pebble or bit of iron, finding its way between the stones or steel grinders, will cause a spark which would, according to circumstances, cause a flash or an explosion in the highly combustible mixture in the exhaust flue. Accidents from these very trifling causes are simply unavoidable, and the fact that such danger is constantly present, should be known and understood.

It may be remarked in connection with the brewery explosion mentioned at the outset of this article, that a similar explosion of malt dust had taken place in the same establishment about a year previously, caused by the accidental pressure of a lucifer match among the malt, which was ignited in the malt mill. Accidents of a similar character are reported to have occurred in two other breweries in this city, and it is probable that they are of common occurrence.

Respecting the character of these and similar dust explosions, Prof. L. W. Peck, who made a careful study of the subject immediately after the notable destruction of the Minneapolis flouring mills, gives the following very practical illustration, which occurs in a lecture delivered on the subject: "If a large log of wood were ignited, it might be a week before it would be entirely consumed. Split it up into cordwood and pile it up loosely, and it would burn in two hours. Split it up into kindling wood, pile it up loosely, and perhaps it would burn in less than one hour. Cut it into shavings and allow a strong wind to throw them in the air, or in any way keep the chips comparatively well separated from each other, and the log would perhaps be consumed in two or three minutes; or, finally, grind it up into a fine dust or powder, blow it in such a manner that each particle is surrounded by air, and it would burn in less than a second."

This illustration explains very clearly why mixtures of combustible dust and air are highly explosive, and therefore specially dangerous. The combustible material is in a very fine state of division and intimately mixed with the supporter of combustion, and the ignition of one set of particles being accomplished, the combustion is carried at once through the entire mass with explosive violence, as though it were an explosive gaseous mixture.—*Manufacturer and Builder.*

The new grist mill at Dallas, Wis., is being built by James Anderson.

Pesth Milling Industry.

Pappenheim's Oesterr.-Ungarische Zeitung says, "the shares of the Buda-Pesth steam mills are going back from day to day, as there are more sellers than buyers in the market. The unremunerative state of the flour trade justifies the retrogression of the shares to a certain extent; the prices of grain have, after the harvest, been driven up so high that the export in grain to foreign markets is quite impossible, and the export in flour is also either not at all possible, or only at prices which leave no profit to the manufacturer. It is clear, however, that the number and power of production of our steam mills, is too large for the demand, and, therefore, at the time when the export of flour is not profitable the situation of our mills becomes rather precarious. The continually increasing American competition gives, with regard to our milling industry, for the future also an unfavorable outlook. In the present year the manufacture is more expensive because Rumania has a bad crop, and the cheap Wallachian wheats, which, during the last few years, played a great part in our markets, and which procured for our mills a cheap and easy supply, are almost wanting. It is lucky for our mills that they have accumulated large reserves, so that they are in a position to get over the unfavorable present state of the trade without endangering their existence."

The Cost of Water-Power.

In connection with the recent decision of the Water-Power Company of Holyoke, Mass., to demand payment for all of its surplus water used by the mills, late estimates of the relative cost of water and steam power are of interest. H. F. Mills, engineer of the Water-Power Company of Lawrence, Mass., testified in suits of that company against the city of Boston that \$12 per day for water privilege was cheaper for the mills at Lawrence than to start their engines and use steam power. It is estimated from actual comparison at Lawrence, where great quantities of power are used, that a horse-power produced by steam would cost about \$50 per year more than a horse-power produced by water. At Minneapolis, Minn., the cost of a mill privilege is only about \$2.50 per day or \$750 per year. The theoretical power of a privilege is seventy-five horse-power. This gives a capacity of 135 barrels of flour per day. The cost per barrel at this rate is a little less than two cents per barrel, being a great saving upon the cost of grinding by steam power.

For the United States Miller.

The Tariff.

"COMING EVENTS CAST THEIR SHADOWS BEFORE."

By John W. Hinton, of Milwaukee.

It is very gratifying to every American protectionist to witness the change that is taking place in the minds of many of the leading democrats of the country on the question of protection to American industry, i. e., giving to American labor a preference over foreign labor. Notably there are two instances, Senator Pendleton and that prominent war horse of the democracy, Daniel Voorhees. The latter is a gentleman of singular ability, of remarkable power and eloquence and of commanding influence, particularly with his party, of which he has for so long a time been an able champion.

It is not for us to say that those two gentle-

men are influenced by any but the most upright motives, or that they are guided by other aims than their country's good. Patriotism often moves in a mysterious way its wonders to perform. Messrs. Pendleton and Voorhees have no doubt seen wherein they were wrong, and, having seen it, are candidly correcting their errors.

"True patriots we, and be it understood, We left our party for our country's good."

Senator Conkling, in his able speech at Utica last fall, on the Tariff, in referring to the first act of Congress ever passed, alluding to the broad patriotism that moved the statesmen of those days, describing the unanimity with which they acted, quoted the distich:

"Then all were for the country, And none were for the state; Then the rich man loved the poor man, And the poor man loved the great."

Parties forgot their lines, they realized that in union there was strength; that when the deepest of all interests to the country, that which could alone develop its resources, build it up through its own industries, to a state of independence of other countries; that to bring about as rapidly as possible that most desirable position it was necessary to forget party squabbles, to harmonize party differences and to act in concert for the promotion of so great an interest. Hence, republicans and democrats unitedly worked in harmony and brought about the passage of the first act of Congress "to encourage American manufactures, etc."

Now what right have we to question the motives of such men as Senators Pendleton and Voorhees in their recent action? Are men to be abused for a change of belief? Are they to be denounced for having the candor and the manliness to admit that they were mistaken in the past—to acknowledge that "they are wiser to-day than they were yesterday?" To denounce such men, to accuse them of mercenary motives because they say to their former opponents, you were right and we were wrong—is to be guilty of sycophantic cowardice. Have not those gentlemen a right to review their former opinions, to test their wisdom or their folly, to determine the right or the wrong of their former beliefs? There can only be an affirmative answer to the questions. A fool, it is said, never changes his mind or his opinions; wise men often change. Do we wish to deny to our political opponents the right of confirming the correctness of our views by furnishing to the world publicly, the evidence of their own mistaken ones, and that voluntarily? Yet that is about the course that is being pursued by a great many republican journals (?) in their attacks, particularly on Senator Voorhees, especially for his speech at the Atlanta Exposition! If what was said by Senator Voorhees at that opening was true, and no real republican or advocate of protection to American industries and American labor can deny it, for it was only the doctrine that protectionists have been enunciating ever since the government was founded, why attack it? Refute it they cannot, then why attack it? Are there republicans who are afraid that such men as Pendleton and Voorhees may reclaim the workingmen to their party? Are they afraid that such gentlemen will steal their thunder? Do they realize that the course of several so-called republican journals is alienating the working classes from the republican ranks? These are thoughts worthy of the consideration of your readers, and I embody them solely for that purpose, as I am a republican in and out and believe in the doctrine of protection to American labor "first, last, and all the time."

NEWS.

Everybody Reads This.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

BURNED.—Peter Louck's mill, at Bowman-dale, Pa.

The Zumbro mills, at Zumbro Falls, Minn., burned recently.

James Deubel has purchased the Costello mill at Scio, Mich.

Lewis Korb is about to erect a flouring mill at Sebree City, Ky.

DIED.—Alexander Anderson the miller at Valley Field, Quebec.

David Gates has purchased Elias Gray's flour mill at Osseo, Wis.

W. J. Wallace has sold his mill at Stanville, Texas, to M. P. Wallace.

BURNED.—Abel Godard's flour mills at Richville, N. Y. Loss 21,000.

The new Parker Flouring mills, at Parker, Dakota, will have a capacity of 150 barrels per day.

J. Hoyt & Son's mill at Saline, Mich., burned recently. Loss \$5,000. Insurance \$1,000.

A supposed incendiary fire recently destroyed the Rose City Flour Mills, at Little Rock, Ark. Loss \$65,000.

Charles Esemann & Co's flour mill, in Chicago, was recently damaged by fire. Loss about \$3,500.

A new water power flouring mill outfit is being manufactured for Mr. Jervis Gordon, of Milford, Pa.

Messrs. Wilson & Smith have purchased the mill at East Brady, Clarion County, Pa., and are having it remodeled.

Lindsay Bros., of Rapid City, Dak., have given an order to Nordyke & Marmon Co., for a two-run water power flouring mill.

The Oconto Milling Co., at Oconto, Wis., has just made \$12,000 worth of improvements. They have added Stevens' rolls, purifiers, etc.

E. C. Hoyt, of Beaver Dam, Wis., whose flour mill was recently burned, will, with others, soon build a cotton mill at Beaver Dam.

The heavy rains during October did much damage to water-power mills in many parts of the country, especially in the northwestern states.

The Lake Flouring Mills at Reno, Nev., burned recently. Loss \$38,000. Insurance \$25,000. They will be rebuilt as soon as possible.

A four-run new process flouring mill is now being built at Georgetown, Ill., the proprietors of which are Messrs. Pritchard, Henderson & Co.

The Menonites in Manitoba were blessed with a first-class crop this year. They know how to raise wheat, and how to stack it so that it will keep.

Messrs. Notbohm Bros., of Janesville, Wis., are planning the construction of a cotton mill at that place. Their flour mill was burned a few months ago.

The Jewell Milling Co., of Brooklyn, N. Y., have recently ordered from Edward P. Allis & Co., seven corrugated roller mills and seven porcelain roller mills.

The *Portage Lake Mining Gazette* says: "The only grist-mill on Lak Superior is at Sault Ste. Marie, which is credited with turning out excellent flour.

Gaff, Gent & Thomas, of Columbia, Ind., have just placed another order for an 80 horse power Corliss engine, with the Atlas Engine Works, of Indianapolis, Ind.

The Atlas Engine Works, of Indianapolis, Ind., have been awarded the first premium with gold medal, for the valve engine on exhibition at the Ninth Cincinnati Industrial Exposition.

Nordyke & Marmon Co., the mill furnishers at Indianapolis, Ind., are manufacturing a merchant mill outfit, having a capacity of 50 barrels per day, for Messrs. Still & Nethaway, of Elsie, Mich.

Messrs. Weisel & Vilter, proprietors of the Milwaukee Steam Engine Works report business to be exceedingly good and there are now no visible signs of its abatement. They are crowded with work to their full capacity and will doubtless soon be compelled to enlarge their establishment. They are adding new machinery as fast as it is possible to get it from the manufacturers. They have now

FLOUR MILL OWNERS!

Please answer this advertisement BY LETTER. Do not delay but answer it at once. It will take but a moment and you will thereby serve the trade as well as yourself. It cannot but prove of value to you.

Flour Mill Owners in the United States and Canada

GENTLEMEN: We are preparing the matter for CAWKER'S AMERICAN FLOUR MILL DIRECTORY for 1882 and would beg you to kindly furnish us by return mail with the following information:

1. The name of person or firm operating your mill, with name of your Post-Office, County and State.
2. Capacity in BARRELS of flour, of mill per day of 24 hours. (If you are making improvements and increasing capacity, state what the capacity of your mill will be after your improvements are made.)
3. Do you use water or steam power?
4. If you have any special name for your mill, as, for instance, "Phoenix," "Oriental," "Capital," "Wild Moss," etc., please name it.
5. Are there any other flour mill owners receiving their mail at your Post-office? If so, kindly oblige us by naming ALL of them.

Upon receiving above information we shall duly insert your names with Post-office in our Flour Mill Directory. The Directory is used by the mill-furnishers, flour brokers, commission merchants and trade newspapers in this country and in Europe for the purpose of sending out their circulars, price lists, catalogues and sample papers, which will furnish you with much valuable information, which without your names in this Directory you would not obtain. If you are not already a subscriber to the UNITED STATES MILLER we invite you to subscribe. The subscription price is One Dollar a year. We desire to have the UNITED STATES MILLER a regular visitor in every flour mill in America. Do not fail to answer this advertisement immediately whether you subscribe or not. We want this, our Third Flour Mill Directory, to be as perfect as possible, therefore make your answer full and complete. We wish it distinctly understood that we make no charge for inserting your name in the Directory. ADDRESS

UNITED STATES MILLER, Milwaukee, Wis.

E. P. Bacon & Co.,

Rooms 27 and 28 Chamber of Commerce,

MILWAUKEE.

L. Everingham & Co.,

No. 130 LaSalle Street,

CHICAGO.

COMMISSION MERCHANTS!

GRAIN, SEEDS, PROVISIONS, ETC.

Special Attention given to the Purchase and Shipment of Grain for Milling Purposes.

We have an experienced man in attendance at each elevator constantly, to see to the inspection of grain when loaded into cars for shipment, and the interests of parties ordering through us will be carefully protected in every way.

Orders for Purchase and Sale of Grain for Future Delivery will be Promptly and Carefully Executed.

Mention this paper when you write us.]

in hand eight Corliss engines and several others of various types of slide valve engines and any quantity of other work for millers, brewers, tanners, etc.

George Leggate, formerly of Fletcher, Ohio, has purchased a water power mill site at Milton, Ind., near Richmond, Ind., and has contracted for the machinery for a four-run new process flouring mill.

The Atlas Engine Works, of Indianapolis, Ind., are building two Corliss engines of 100 and 150 horse power for the C., St. P., M. & O. R. R. They are to be placed in their new shops at St. Paul, Minn.

J. R. Evans, formerly of Hersey, Mich., has associated himself with William Burtless, of Midland, Mich., and they will embark in the milling business at the latter place. A first-class three-run new process flouring mill will be built.

The new narrow gauge railroad having been completed to Liberty Center, Ind., the erection of a first-class flour mill will be commenced at that point at once. This enterprise is undertaken by Mr. G. H. King, an old resident of that place.

The International Cotton Exposition at Atlanta, Ga., is attracting a great deal of attention from all parts of the country. The Atlas Engine Works, of Indianapolis, Ind., have just shipped four engines to be placed on exhibition.

A new grain elevator, called "Niagara B," with a capacity of 1,250,000 bushels, has just been completed in Buffalo, N. Y. It is the largest one in Buffalo. The dimensions are as follows: 200 feet long, 120 feet wide and 145 feet high. It is covered with corrugated iron.

Tin has been discovered in great quantities near Pomona, Cal. The yield at present price is assayed at about \$90 per ton. It is to be hoped that the supply will prove sufficient to meet the large and continually increasing demand for the metal, for which we have been in the past obliged to depend on Great Britain.

Bonsack & Kiser, who suffered the loss by fire of their flouring mill at Bonsack, Va., last summer, have now completed arrangements for its re-erection, and have awarded their contract for a first-class new process merchant mill to Nordyke & Marmon Co., of Indianapolis, Ind.

The Atlas Engine Works, of Indianapolis, Ind., are putting in at the present time Corliss engines as follows: 20x48 for J. M. Stewart & Co., Carlyle, Ill.; 18x42 (condensing) for T. M. Sinclair & Co., Cedar Rapids, Iowa; 18x42 New Orleans Electric Light Co.; 19x42 Indianapolis Electric Light Co.; and a 16x42 for Batty Bros. & Boynton, Waverly, Ill.

A gold medal was recently awarded to the W. D. Gray Roller Mills at the Exhibition at Montreal, Canada, the mill on Exhibition being one of 40 now being built for Messrs. A. Ogilvie & Co., by Edw. P. Allis & Co., of Milwaukee, for their new mill at Winnipeg, Manitoba. Messrs. Miller Bros. & Mitchell are the sole manufacturers of the Gray Roller mills for Canada.

Messrs. Hatch & Mitchell, well known millers of Lowell, Mich., have about completed the necessary arrangements for the erection of a fine 150 barrel gradual reduction mill at Grand Rapids, Mich. A large brick building is being erected, and the entire outfit of machinery is being manufactured by Nordyke & Marmon Co., of Indianapolis, Ind. The reductions will be made on Jonathan Mills' machines, the finishing will be

done with smooth and corrugated rolls, while the middlings will be ground on stones.

Flour sells for \$10 per barrel in Boston.

N. Hoople is building a grist-mill at Sauk Center, Minn.

Strickler Bros. are building a 100-barrel mill at Pickerington, Ohio.

No. 2 winter wheat is selling at interior points in Missouri at \$1.25 per bushel.

The George T. Smith Middlings Purifier Co. will build a 1,000-barrel mill at Jackson, Mich. Eau Claire, Wis., flour mills had to shut down most of October, on account of floods.

Burned, October 21, Maj. Edgar Henderson's flouring mill, at Anderson, Ind. Loss \$12,000; well insured.

The Indianapolis Mills at Indianapolis, Ind., were totally destroyed by fire on Saturday. Loss, \$28,000; insured for \$30,465.

A distillery building at Hazelton, Ind., containing 7,000 bushels of wheat, burned October 21. The Atlantic Mills narrowly escaped burning.

Brown & Archer, of Greenville, Miss., are building a new mill for the manufacture of corn meal flour, or cerealine, and other corn goods. A complete apparatus for kiln drying the goods before shipment will form a part of the outfit. All the machinery, including engine, comes from the mill furnishing establishment of Nordyke & Marmon Co., of Indianapolis, Ind.

J. P. Blanton, who has a neat 50-barrel steam power flour mill at Forest City, Ark., writes us from that place that there has been very short crops in that section—only about a quarter crop of wheat was expected of both corn and cotton. The demand for flour is good and it sells for from \$8 to \$10 per barrel. But little wheat was sown last fall.

W. Trow and W. H. Powell, Madison, Ind., having formed a co-partnership under the style of W. Trow & Co., for the purpose of carrying on a merchant milling business, announce that their new mill, now in course of erection, and which is being fitted up with the most improved machinery, will be in operation about January 1. They invite the orders of the trade.

The new Queen Bee Rolling Mill at Sioux Falls, Dakota, owned and controlled by the Sioux Fall Water Power Company, has just been completed. It is said to contain the finest machinery, and is one of the largest mills in the United States. It is seven stories high, built of Sioux quartzite, and has a capacity of 1,500 barrels per day. The cost of these mills is put down at nearly \$500,000. George I. Seney, of Brooklyn, N. Y., is interested in the mills, being the largest stockholder, and Henry P. Reed, of the same city, has been engaged as salesman for the market west of Chicago, Ill.

The Wilmington, Del., Every Evening says that William Lea & Sons' immense new flouring mill, on the north side of the Brandywine is rapidly approaching completion, and is to be in operation about the latter part of December. The building of this mill marks a new era in the flouring business in Delaware. It is a very large four story and attic structure, and the proprietors have availed themselves of the very latest improvements in mill machinery. Nearly the whole machinery of the new mill is designed for the manufacture of high grade flour. There are five runs of stones driven by water power. The rest of the machinery is to be driven by steam. Through an opening on the creek side elevators will deliver flour into or convey grain from vessels moored alongside the mill.

Situation Wanted,

Either in Merchant or Custom Mill—Merchant preferred. Have had two years experience in Custom Mill. Wages not so much an object as learning the trade. Address "M. C.," care United States Miller, Milwaukee, Wis.

I Want to Rent

The whole or half of my Mill at this place. It is a water-power mill, in good condition, with capacity of about 25 barrels per day. No other mill in the township. Address for further particulars,

WILLIAM REDDEN, Greeley, Delaware County, Iowa.

MILL FOR SALE.

Enon Valley Mills, with three run of stones in good running order on the Pittsburgh & Fort Wayne R. R. Shipping facilities good. Address

MILLER & MARSHALL, Enon Valley, Lawrence Co., Pa.

Wanted to Rent or Buy

A half interest in a two or three run Custom Mill, water-power preferred, in a good agricultural locality.

Address by letter, with particulars, B. H. S. Post Office Box No. 51, Gananoque, Leeds Co., Ontario, Canada.

WANTED TO BUY,

A small Mill in a good wheat country. Address D. F. HESS, Dennison, Tuscarawas Co., Ohio.

FOR SALE

We, the undersigned, offer for sale on most favorable terms our Custom, Flouring and Oat Meal Mills, located at Geneva, Walworth County, Wisconsin, together with an unfailing water power from Geneva Lake. All said mills are now in full repair and good working order. Said water power is in complete order and is at all times easily managed and controlled. These mills have a large custom work. The reason for this is the ill health of a proprietor. GILBERT & BARBER, Proprietors, Geneva, Walworth County, Wis.

IMPORTANT NOTICE TO MILLERS

The RICHMOND MILL WORKS, and RICHMOND MILL FURNISHING WORKS are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery, and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to

NORDYKE & MARMON CO., INDIANAPOLIS, IND.

CHOICE BEVELED EDGE

FLOUR BRANDS

For two dollars and upwards. Also RUBBER STAMPS, BURNING BRANDS, SEALS, STEEL NAME STAMPS, LETTERS AND FIGURES, Etc. Orders promptly attended to. CHAS. H. CLARKE, Box 114, 82 Wisconsin St., Milwaukee.

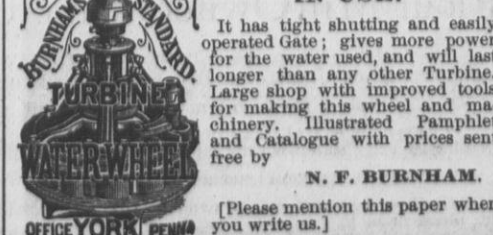
FOR SALE.

A good water power and mill with two run of stone at Stone Bank, Waukesha County, Wis. Mill is doing a good business, which with a moderate amount of improvements, could be largely increased. One half or the whole will be sold to the right party. For full particulars, address, U. S. MILLER, Milwaukee, Wis.



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Over 1,000 of these Turbines IN USE.



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A MONTHLY JOURNAL, published at London, England, devoted to the interest of Millers. For the convenience of Millers in this country, we will receive and forward subscriptions for all who wish. The subscription price is \$1.00 per year, post paid. Address UNITED STATES MILLER, Milwaukee, Wisconsin.

1865. 1881.

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Manufacturers of the Purest and Best

Lubricating and Burning OILS, GREASES, ETC.,

For Flour Mill Machinery, Specialties.

MILLERS'

Castor Machinery Oil.

A compound oil, warranted better than Lard or Sperm Oil for machinery uses, and will last longer. Guaranteed not to heat or gum, and to give satisfaction when used on steps, spindles, etc.

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Warranted free from Petroleum. Burns equal to Lard or Sperm Oil. Will not chill at 32° above zero, and much cheaper than Lard Oil.

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A perfectly natural Oil, just as it comes from the earth. Thoroughly settled and refined of high fire test, and will not congeal at zero. It is the best Black oil produced.

Peerless Mill Doap,

A compound Grease for use on cogs and all heavy gearing. Put up in kegs, half barrels and barrels.

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Manufactured for Steam Cylinders, especially for use in Patent Lubricators. Warranted not to foam, heat or gum, and endorsed by manufacturers of Corliss Engines.

We also have all grades of Sperm and Golden Machinery, Lard, Engine, and several grades of Cylinder and Black Oils, Plumbago, Cotton Waste, etc., etc., which we will offer at prices that defy competition, when quality is considered. Orders and correspondence solicited.

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130 West Water St., Milwaukee, Wis.

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PRACTICAL OPTICIAN (Late of Vienna),

469 EAST WATER ST., MILWAUKEE, WIS. Keeps a large stock of Spectacles, Eye, Opera and Marine Glasses, Microscopes, Telescopes, Barometers, Thermometers, and pays special care to a scientific adjustment of all kinds of glasses to the eye. Any of the above glasses made to order and repaired.

Blanks, by means of which parties residing in the interior of the State may order spectacles as suitable as if they had personally selected them, will be mailed free on application.

Millers in need of magnifying glasses for any purpose can have their wants supplied at a reasonable price. Address as above.

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Made entirely of STEEL. ONE MAN with it can easily move a loaded car. Will not slip on ice or grease.

Manufactured by E. P. DWIGHT, Dealer in Railroad Supplies, 407 Library St., Philadelphia, Pa.

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PERFECTLY RESTORE THE HEARING and perform the work of the Natural Drum. Always in position, but invisible to others. All conversation, and even whispers heard distinctly. We refer to those using them. Send for descriptive circular and testimonials. Address, H. P. K. PECK & CO., 853 Broadway, New York.

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An elegant pair of Companion Oil Chromes—size 9x11 inches. Life-like portraits of the late-President and his devoted wife. Price \$1.00 for the Pair. Sent prepaid by mail on receipt of price. Liberal discount to Agents and Dealers. CALVERT LITHOGRAPHING CO., Detroit, Michigan.

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General Mill Furnishers

AND MANUFACTURERS OF
IMPROVED COCKLE SEPARATORS,
(Kurth's Patent),
RICHARDSON'S DUSTLESS WHEAT
SEPARATORS.

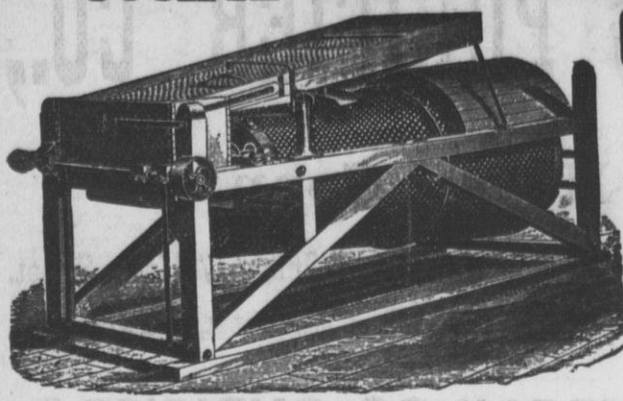
Also built in combination with Cattle
Machine and

Beardslee's Pat. Grain Cleaner.

We will contract to furnish entire Wheat Cleaning
Machinery for mills and guarantee the best results.

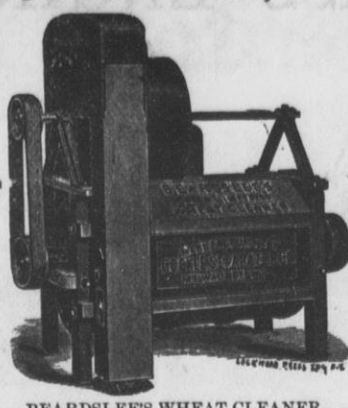
Perforated Zinc at Bottom Figures.
Send for Illustrated Catalogue.

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PLAIN COCKLE MACHINE.

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BEARDSLEE'S WHEAT CLEANER.



We have the BEST GATE in EXISTENCE and by it the Most
Direct and Efficient Application of the Water to the Wheel.

MEDAL & PREMIUM AWARDED TO
T. C. ALCOTT'S
TURBINE WATER WHEELS
Most Perfect Turbine in Use.
ALCOTT'S IMPROVED TURBINE WATER WHEEL.
MANUFACTURED BY
T. C. ALCOTT & SON
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This Wheel is STRONG, DURABLE AND EFFECTIVE.
Unsurpassed in Power at "part gate." Warranted to give full satisfaction.

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Circular Saw Mills, Shafting, Pulleys,
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Sizing Particulars of Stream, &c.
Address: T. C. ALCOTT & SON,
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Manufacturers and Sole Proprietors of the

BECKER BRUSH,

Galt's Combined Smut and Brush Machine.

The Only Practical Cone-Shaped Machines in the Market, and for that
Reason the Best.

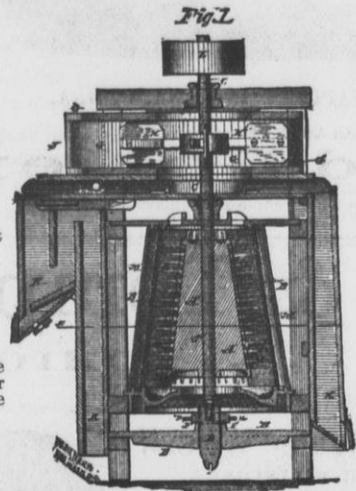
ADJUSTABLE WHILE IN MOTION.

Nearly 1,000 of these Machines in Use.

In the United States and foreign countries, and so far as we know all that use them are
pleased. Millers, millwrights, and milling experts claim the Cone Shape Solid Cylinder
Brush is the true principle to properly clean grain. All machines sent on trial, the
users to be the judges of the work. For price and terms apply to

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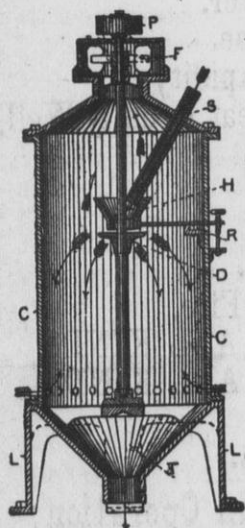


Galt's Combined Brush and Scouter.

Mill Furnishing,
Foundrymen & Machinists.
Established 1861.
MANUFACTURERS
MILL STONES.
Flouring Mill Contractors.
Send for Pamphlet.
Nurdyke & Marmon Co
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Millers, Attention!



You can successfully purify the chop from either
Stone or Rolls with the

Wheat Meal Purifier.

Satisfaction Guaranteed or No Sale.

THIRTY DAYS' TRIAL.

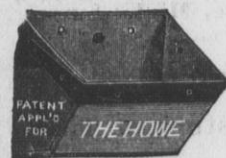
Send for circular and full particulars to

Wheat Meal Purifier Co.,

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ESTABLISHED 1877.



THE HOWE



Mill Elevator Cups.

NEAT, STRONG, DURABLE and CHEAP.

FIN.			IRON.		
BELT.	END.	PRICE.	BELT.	END.	PRICE.
2 1/2	2 1/2	3 Cents.	4 1/2	4 1/2	7 Cents
3	3 1/2	3 1/2 "	5	4 3/4	7 1/2 "
3 1/2	3 1/2	5 "	5 1/2	4 3/4	8 "
4	4	6 "	6	4 3/4	8 1/2 "
4 1/2	4	6 1/2 "	6 1/2	4 3/4	9 "

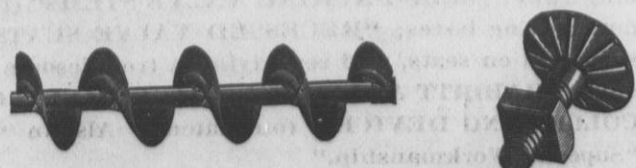
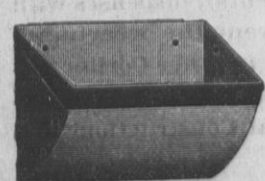
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Successors to N. Hawkins & Co. and Charles & Swenson.



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Elevator Buckets, Elevator Boats, Elevator Bolts, Patent Iron Conveyor, Bolting Cloth, Pulleys,
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MANUFACTURERS OF

**Malleable & Gray
Iron Castings**

OF ANY KIND OR DESCRIPTION,

PORT WASHINGTON, WIS., U. S. A.

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**STEEL
CASTINGS**

FROM 1-4 to 10,000 LBS. WEIGHT.
True to pattern, sound and solid, of unequalled strength, toughness and
durability.
An invaluable substitute for forgings or cast iron requiring threefold
strength.
Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for Loco-
motives, etc.
15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove
its superiority over all other steel castings.
CRANK SHAFTS, CROSS-HEADS and GEARING, specialties.
Circulars and price list free. Address

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Works, CHESTER, PA.
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VOECHTING, SHAPE & CO.,

SOLE BOTTLERS OF

JOSEPH SCHLITZ BREWING COMPANY'S

CELEBRATED MILWAUKEE LAGER BEER,

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BOTTLERS' SUPPLIES CONSTANTLY ON HAND.

[Parties corresponding will please state where they saw this advertisement.]



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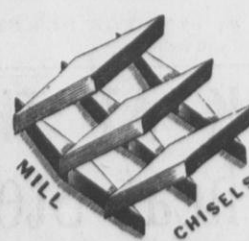
Mill Building.

The Latest, Best and Only Exclusively
Flour Mill Work in Print.

Every Miller, Millwright and Millwright's Apprentice
should have a copy.

Price \$4.00, postage paid. Address,

UNITED STATES MILLER,
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MILL PICKS!

NO. 456 ON THE CANAL,

MILWAUKEE, WIS.

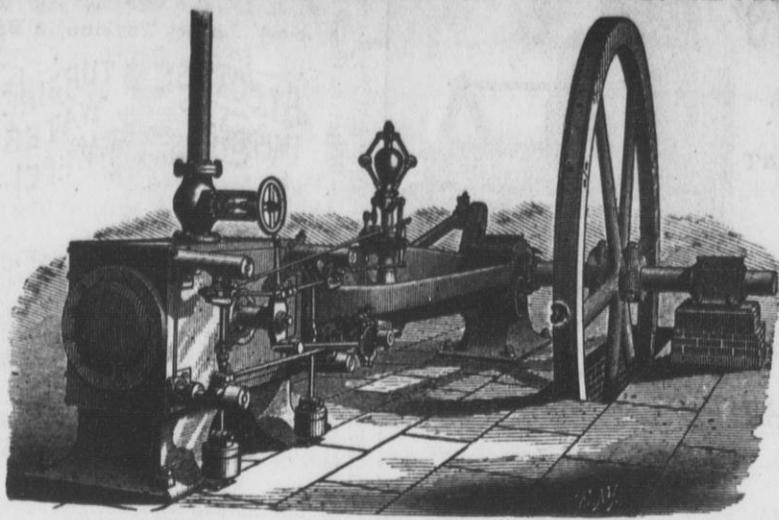
I have had twenty-two years experience in the manu-
facture and dressing of Mill Picks, and can and do make
as fine Mill Picks as can be made by anybody anywhere.
I use only the best imported Steel for the purpose.
My work is known by millers throughout the country,
and is pronounced to be first class by the very best
judges.
We have hundreds of the most gratifying testimonials
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guarantee satisfaction. Address as above.
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Nickle FLOUR TESTERS mailed for 25c.

ATLAS-CORLISS ENGINE.

Will Replace Ordinary Engines Guaranteeing to Save One Third Fuel.



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BUILDERS OF ALL CLASSES OF

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We Build The Best Farm Engines and Small Engines for warehouses and elevators. [Mention this paper when you write us.]

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DAYTON, - - - OHIO.

MANUFACTURERS OF THE

American Turbine Water Wheel,

Best Quality French BURR MILLSTONES.

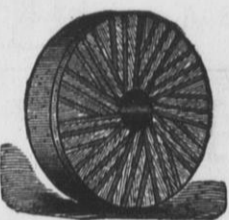
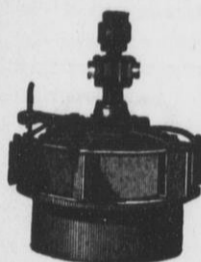
Sole Agents in Dayton for the sale of

DU FOUR & CO'S CELEBRATED BOLTING CLOTHS.

Flour and Paper Mill Machinery, Best Chilled or Porcelain Rolls for Crushing Wheat and Middlings and

GENERAL MILL FURNISHINGS.

The AMERICAN TURBINE, as recently improved, is unequalled in the power utilized from a given quantity of water, and is decidedly the BEST PART GATE Water Wheel ever known. It has also been otherwise greatly improved.



Large Illustrated Catalogue Sent Free on Application.

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Calls your attention to the following REASONS WHY, if about to make a Journey to the GREAT WEST, you should travel over it:

As nearly absolute safety as is possible to be attained. Sure connections in UNION DEPOTS, at all important points. No change of cars between CHICAGO, KANSAS CITY, LEAVENWORTH, ATCHISON or COUNCIL BLUFFS. Quick journeys because carried on Fast Express Trains. Day cars that are not only artistically decorated, but furnished with seats that admit of ease and comfort. Sleeping cars that permit quiet rest in home-like beds. Dining cars that are used only for eating purposes, and in which the best of meals are served for the reasonable sum of seventy-five cents each. A journey that furnishes the finest views of the fertile farms and pretty cities of Illinois, Iowa and Missouri, and is afterwards remembered as one of the pleasant incidents of life. You arrive at destination rested, not weary; clean, not dirty; calm, not angry. In brief, you get the maximum of comfort at a minimum of cost.



That the unremitting care of the Chicago, Rock Island & Pacific Railway for the comfort of its patrons is appreciated, is attested by its constantly increasing business, and the fact that it is the favorite route with delegates and visitors to the great assemblages, political, religious, educational and benevolent, that assemble from time to time in the great cities of the United States, as well as tourists who seek the pleasant lines of travel while en route to behold the wonderful scenes of Colorado, the Yellowstone and Yosemite. To accommodate those who desire to visit Colorado for health, pleasure or business, in the most auspicious time of the year, the Summer season and months of September and October, the Company every year puts on sale, May 1st, at all coupon ticket offices in the United States and Canada, round trip tickets to

DENVER, COLORADO SPRINGS AND PUEBLO,

At reduced rates, good returning, until October 31st. Also to San Francisco, for parties of ten or more, good for ninety days, at great reduction from regular fares.

REMEMBER, this is the most direct route for all points WEST and SOUTHWEST. For further information, time-tables, maps or folders, call upon or address

R. R. CABLE, Vice-Pres't and Gen'l Man'gr, Chicago.

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RICHMOND MANUFACTURING CO.,

LOCKPORT, N. Y.,

Manufacturers of

RICHMOND'S CELEBRATED

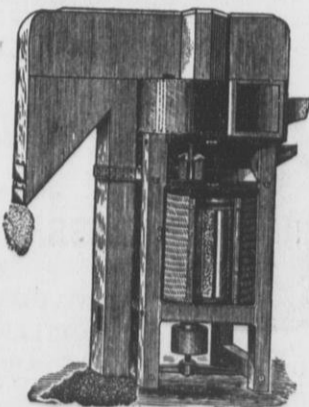
Smut Machines,

Brush Machines,

Grain Separators,

and Bran Dusters.

Nearly Two Hundred of these Machines are now in operation in the city of Minneapolis, Minn., alone, and more than Sixty in the city of Milwaukee, Wis. They are also extensively used in many other sections, both on Winter and Spring Wheat.



Adjustable Brush Smut Machine.

SEND FOR DESCRIPTIVE CATALOGUE.

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Acme Wheat Steamer and Heater.

PRICE \$15. OVER 900 IN USE.

This is the Cheapest and Best Steamer ever offered. It is strongly made, easily regulated, steams and heats evenly and is sold at a price low enough to place it within the reach of all millers.

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G. W. MCNEIL, JR., AKRON, O.: Dear Sir—Yours of 4th inst. at hand, and in reply would say the three steamers purchased of you are working to our entire satisfaction.

G. W. MCNEIL, JR.: Dear Sir—The Acme Wheat Steamer is all that it claims to be, steam being better than hot dry pipes to make good clean bran and white flour, Truly,

G. W. MCNEIL, JR.: Dear Sir—In answer to your inquiry, would say that I have used your Acme Wheat Steamers and Heaters for the last six months, and it does its work well. I create my steam in a small boiler holding twelve gallons, and heated by three gasoline burners. Yours Truly,

SEND FOR CIRCULARS AND TESTIMONIALS.

GEO. MCNEIL JR., No. 113 North Broadway, Akron, Ohio.

ELECTRIC PURIFIER CO.,

—OF—

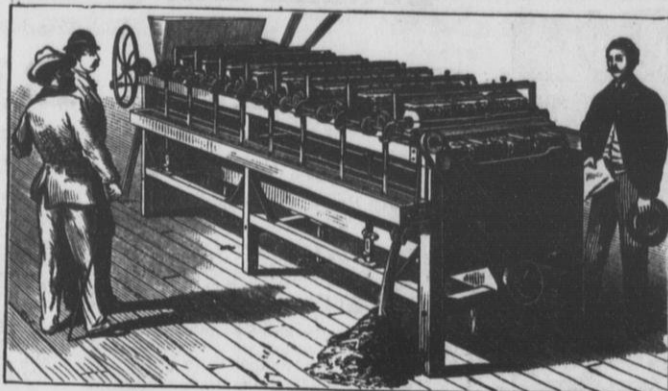
New Haven, Conn.

Factory, New Haven,

New York Office, 17 Moore Street.

This Company was Organized at New Haven on the first of March, 1881, with a Capital of \$300,000.

ELECTRIC MIDDINGS PURIFIERS.



HAVING PURCHASED THE SMITH-OSBORNE PATENTS GRANTED BY THE United States, Great Britain, France, Belgium, Austria and Canada. The first Machine manufactured was put up soon after the United States patent was granted, in February, 1880, in the ATLANTIC MILLS, BROOKLYN, and has been in almost constant practical use since, demonstrating beyond a question that it possesses the following advantages:

- It Purifies Middlings Absolutely Without Waste.
- It Purifies Middlings with Greatly Reduced Power.
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- It Purifies Middlings with Greatly Increased Rapidity.
- It Purifies Middlings from Spring and Winter Wheat Equally Well.
- It Purifies Middlings with the Best Results.
- It Dispenses with the Use of Air Blasts.
- It Dispenses with the Use of all Dust Houses.
- It Dispenses with the Use of all Dust Collectors.
- It Dispenses with the Dangers of Explosion and Fire.
- IT PURIFIES DUST HOUSE MATERIAL OF ALL KINDS.
- IT PURIFIES THE FINEST MIDDINGS OF ALL KINDS.
- It is Remarkably Adapted to Custom Mills.
- It is Excellently Adapted to Manufacture Farina.

Where the Electric Purifiers May Be Seen in Operation:

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SOMETHING NEW!

A Combination Electric Purifier—A Complete System of Three Purifiers in One.

Samples of work will be sent upon application, by mail, and all inquiries answered from the New York office.

Parties contemplating building new mills, or reconstructing old ones, should see the superior working of the ELECTRIC SYSTEM, before making contracts for Purifiers elsewhere.

JOHN RICE,

General Manager.

No. 17 Moore St., NEW YORK.

GUNN, CROSS & CO., MINNEAPOLIS, MINN.,
Manufacturers and Agents for the Northwest.

HARRIS-CORLISS ENGINE.

—BUILT BY—

WM. A. HARRIS, Providence, R. I.

Built under their original patents until their expiration. Improvements since added: "STOP MOTION ON REGULATOR," prevents engine from running away; "SELF-PACKING VALVE STEMS" (two patents), dispenses with four stuffing boxes; "RECESSED VALVE SEATS" prevent the wearing of shoulders on seats, and remedying a troublesome defect in other Corliss Engines; "BABBITT & HARRIS' PISTON PACKING" (two patents). "DRIP COLLECTING DEVICES" (one patent). Also in "General Construction" and "Superior Workmanship."

The BEST and MOST WORKMANLIKE form of the Corliss Engine now in the market, substantially built, of the best materials, and in both Condensing and Non-Condensing forms.

The Condensing Engine will save from 25 to 35 per cent. of fuel, or add a like amount to the power and consume no more fuel. Small parts are made in quantities and inter-changeable, and kept in stock, for the convenience of repairs and to be placed on new work ordered at short notice.

NO OTHER engine builder has authority to state that he can furnish this engine.

The ONLY WORKS where this engine can be obtained are at PROVIDENCE, R. I., no outside parties being licensed.

WM. A. HARRIS, Proprietor.

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WEGMANN'S PATENT

PORCELAIN ROLLS

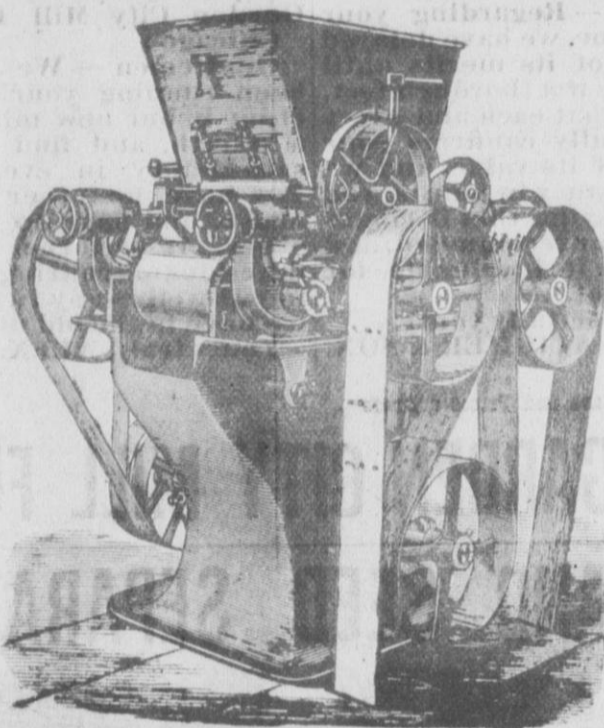
THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!



THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!

"AWARDED SPECIAL PREMIUMS."

OVER 6,000 OF THESE ROLLS IN USE

IN THIS COUNTRY AND EUROPE.

The Superiority of Porcelain over Chilled Iron for Reducing Middlings or Tailings is as under :

CHILLED IRON ROLLS, whether polished at first or scratched with fine grooves, soon become, through wear, smooth and glassy, and will only squeeze instead of grinding.
PORCELAIN presents a continual inherent sharpness, which no art can give to any other material in equal fineness and regularity, which enables it to act upon the smallest particles of flour and to separate them.
CHILLED IRON discolors the flour, by reason of the carbon that exudes from it, and also by its liability to rust.
PORCELAIN does NOT discolor the flour and is entirely indifferent to any and all chemical influences.
CHILLED IRON ROLLS are smooth and "cake" the meal; more especially is this the case on soft material.
PORCELAIN ROLLS possess a certain porosity, and no matter how finely ground, or how long they have been used, still re-

tain this granular and porous texture, and will reduce the middlings without "caking."
CHILLED IRON can be cut with steel.
PORCELAIN can ONLY be cut by the best black diamonds.
CHILLED IRON ROLLS require great power to reduce middlings to the proper fineness on account of their smooth surface.
PORCELAIN ROLLS will do the same amount of work, on account of the slight pressure required, and the gritty nature of the Porcelain, with one-half the power. The flour produced by Porcelain Rolls is sharper, whiter, stronger and more even than that produced by Iron Rolls.
 No remarks need be made as to the superiority of Porcelain Rollers over Millstones, as it is a recognized fact by all. Porcelain Rollers are the only Rollers that will entirely supersede Millstones and Metal Rollers.

THESE MACHINES RECEIVED THE FIRST PREMIUM!

At the late Millers' International Exhibition, Cincinnati.

Gold Medals at Nuremberg, 1876; Paris International Exhibition, 1878; Little International Concours, 1879; First Gold Medal of the State, Berlin International Exhibition of the German Millers' Association, July, 1879; and Gold Medal Le Mans, 1880.

Full Instructions regarding the system of using Rolls in place of Stones given to parties purchasing. Address

EDW. P. ALLIS & CO. Sole Mfr's.
MILWAUKEE, WISCONSIN.

Mention this Paper when you write us.

Guaranteed to Improve the Color of Your Flour.

The GARDEN CITY WHEAT BRUSH is so thorough in its work and has been so fully tested that we can safely offer to any customer who has not already learned the value of cleaning wheat without injuring it, that we will show him a **MARKED IMPROVEMENT IN THE COLOR OF HIS FLOUR AFTER PUTTING IN OUR BRUSH.** The following are selected from a large number of very flattering testimonials which we have received:

From the Superintendent of the largest mill in Chicago.

Star and Crescent Mills, }
Chicago, Sept. 26th, 1881. }

Garden City Mill Furn'g Co.:
Gents:—In reply to your inquiry as to how I am pleased with the two GARDEN CITY BRUSH MACHINES which we have had in use for six months in this mill, I will say that there are no words too strong for me to use in their praise. Thorough cleaning of the wheat without injuring the bran, is, in my opinion, much more important than many millers think it is, and this we certainly accomplish with your machines. In fact, I think that the superior whiteness of our flour is due in a large measure, to the use of the Garden City Brush. You do not claim too much for it.

Yours truly,
HENRY FUNCK, Head Miller.

From the Miller who furnishes Flour to the Royal Family of Great Britain.

Cairo City Mills, }
Cairo, Ill., Sept. 19, 1881. }

Garden City Mill Furn'g Co., Chicago, Ill.:
Gentlemen—Regarding your Brush Machine, we have delayed our opinion of its merits until we could give it a thorough test, and will say that each and every test made fully confirms your statements of its value, and we have no hesitancy in joining you in same, by saying that it comes fully up to your recommend, and we consider it invaluable for cleaning wheat.

Respectfully yours,
CHAS. GALIGHER & SON.

For Circulars and Prices address

From one of the best known Millers in the West.

Victoria Flour Mill Co., Alex. H. Smith, Sec'y, corner of Main and Mound Sts., St. Louis, Sept. 28, 1881.

Garden City Mill Furn'g Co., Chicago:

Gentlemen—We have now been running your Brush Machine in our new mill for about a month, and find it entirely satisfactory in every respect. We have no other scourer or brush, and have no use for any other. It performs the double functions of scouring and brushing as well as any two machines we have in the old mill.

Yours truly, ALEX. H. SMITH.

From the Proprietors of one of the largest mills on the Pacific Coast.

Office of the National Steam Flouring Mills, San Francisco, Cal., March 25, 1881.

Garden City Mill Furn'g Co.:

Gentlemen—* * * We have the Wheat Brush running, and are well pleased with its working. * * * It took but a few minutes for us to learn that the Wheat Brush is the machine that we have needed for a long time. We think that a large number of the Garden City Wheat Brushes can be sold in this State.

Yours respectfully,
MARTENSTEIN & DEMING.

GARDEN CITY MILL FURN'G CO., Chicago, Ill.

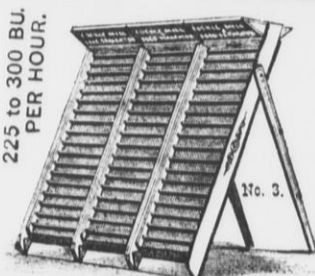
KING COCKLE MILL AND SEED SEPARATOR!



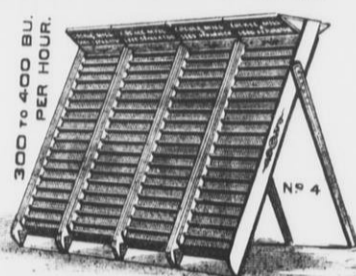
75 to 100 BU. PER HOUR.



150 to 200 BU. PER HOUR.



225 to 300 BU. PER HOUR.



300 to 400 BU. PER HOUR.

Pat. November 9, 1880. Gives 25 Grades of work by Change of Elevation. No change of Screen. Requires no power. When used in Connection with Kurth Cockle Mill your cleaning capacity is more than Doubled. When used alone you have more Merit for the money than in any device yet invented. Write for circulars to La Du & King, Manufacturers, Rochester, Minnesota.

Northwestern Mill Bucket Manufactory
310, 312, and 314 FLORIDA STREET.



Is furnishing Mills and Elevators in all parts of the country with their superior BUCKETS. They are UNEQUALLED for their SHAPE, STRENGTH and CHEAPNESS.

Leather, Rubber, Canvas Belting and Bolts at lowest market rates. We have no traveling agents. Sample Buckets sent on application. Large orders will receive liberal discounts. Send for sample order.

Address all inquiries and orders to
L. J. MUELLER, 197 Reed St., Milwaukee, Wis.

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HENRY SMITH, JR. GEO. G. SMITH. F. A. SMITH.

SMITH BROS., Practical Millwrights.

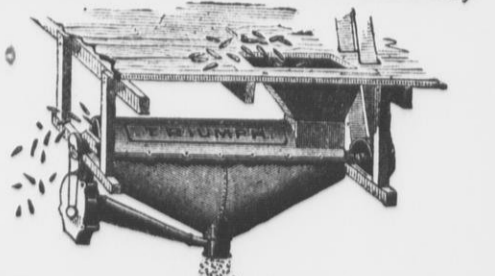
PLANS, SPECIFICATIONS & ESTIMATES
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Flour, Sawmill, Tanners' and Brewers' Machinery, and General Mill Furnishers,

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MILWAUKEE, WISCONSIN.

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Shells and Cleans 2,000 Bushels Ears per Day. The Cheapest, Best, and most Simple Power Corn Sheller in use. Send for Circular and Price List.

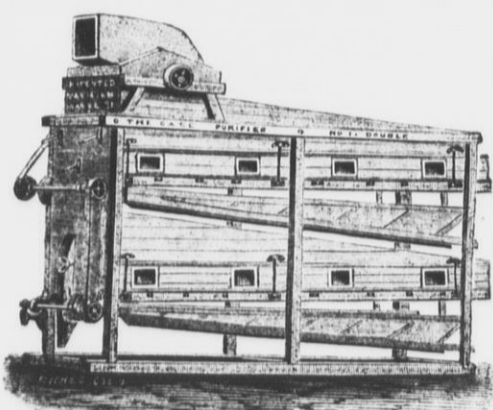
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AT IMPORTERS LOWEST PRICES.
sold by the piece, or cut and made up in any quantity desired. Plans of bolting complete for stone or roller mills. Address,

C. F. MILLEP,
Mansfield, Ohio.



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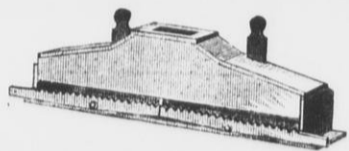
COSTS LESS AND HAS
MORE CAPACITY
—THAN—
ANY in the MARKET.

IT IS THE
KING OF PURIFIERS.

ADDRESS,
CASE MFG CO., Columbus, O.
WM. E. CATLIN & CO.,
68 LAKE STREET, CHICAGO,
Chicago Agents.

[Mention this paper when you write us.]

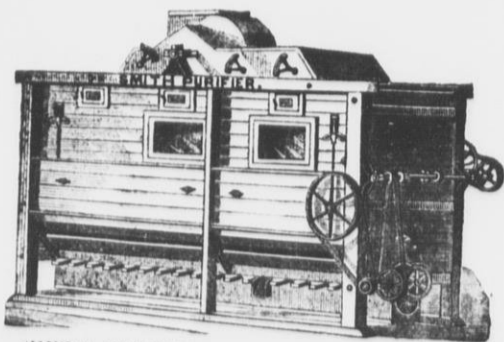
The Perfect Feed Box.



It insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address,

CASE MANUFACTURING CO.,
COLUMBUS, OHIO.
W. E. CATLIN & CO., 68 LAKE ST., CHICAGO, ILL.,
AGENTS.

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SIMPLE, DURABLE, ECONOMICAL. Cheaper than any other of EQUAL CAPACITY. Licensed under all patents owned by Consolidated Middlings Purifier Co. Eight sizes single and three sizes double machines.

THE LOCKWOOD MEDAL. Awarded to the Geo. T. Smith Purifier, as the machine making greatest progress and utility in its application to the grain and mill interests, invented within the last ten years.

Millers' International Exhibition, Cincinnati, Ohio, 1880.



THE GEO. T. SMITH MIDLINGS PURIFIER

Was awarded **THE HIGHEST PRIZE** ever offered for the competition of milling machinery — **THE LOCKWOOD MEDAL** — at the great Exposition. Competition and comparison with every other known Purifier only established it more firmly in the esteem and approval of millers and mill-owners.

It was **UNANIMOUSLY** awarded the **FIRST PREMIUM** in its class by a jury of five of the ablest, most successful and experienced mill-owners in the United States, men who represented the milling of every variety of wheat, and the use of all the latest and most approved methods of new process and gradual reduction milling.

Our sales during the Exposition aggregated **OVER ONE HUNDRED MACHINES**, for every part of the country and for work on all kinds of stock.

We invite particular attention to our **SPECIAL** machines, combining in one all the features of both air and seive Purifiers, perfectly adapted to handle and purify the breaks of roller mills.

Write for descriptive circular and price list to the

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The United States MILLER

Published by
E. HARRISON CAWKER. { Vol. 12, No. 2. }

MILWAUKEE, DECEMBER, 1881.

{ Terms: \$1.00 a Year in Advance.
Single Copies, 10 Cents. }

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36 MARK LANE,
LONDON (England.)

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TELEGRAMS:

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Flour Merchants,

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AMERICAN FLOUR A SPECIALTY.

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We are the first introducers of the Chilled Iron Rollers for milling purposes, and hold Letters patent for the United States of America. For full particulars address as above.

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Important Notice

For Millers about to purchase Roller Mills. We take this method of informing our friends that we have made arrangements for the exclusive manufacture of the

STEVENS ROLLER MILLS,

UNDER THE PATENTS ISSUED TO JNO. STEVENS.

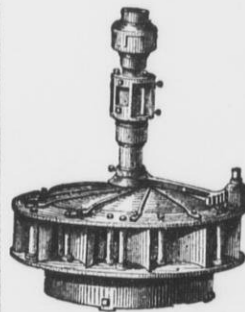
The work done by the Mills is far superior to that of any other machine known in this country or Europe.

License to use the machine and process will be issued by the patentee for each mill furnished by us.

Old rolls, or those with inferior dress, recut with the Stevens dress at reasonable prices.

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James Leffel's Improved WATER WHEEL.

NEW PRICE LIST FOR 1881.

The "OLD RELIABLE" with Improvements, making it the Most Perfect Turbine now in Use, comprising the Largest and the Smallest Wheels, under both the Highest and Lowest Heads used in this country. Our new Pocket Wheel Book for 1881 and 1882 sent free to those using water power. Address

JAMES LEFFEL & Co., Springfield, Ohio,
and 109 Liberty Street N. Y. City.

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ROLLS! ROLLS! ROLLS!

For the Entire Reduction of Wheat to Flour

GRADUAL REDUCTION HAS COME TO STAY.

C. F. MILLER, of Mansfield, Ohio, representing John T. Noye & Sons, is prepared to furnish Roller Mills complete of any desired capacity.

The Stevens System of Gradual Reduction a Success Everywhere.

Plans furnished when desired. Correspondence Solicited.

C. F. MILLER, Mansfield, Ohio.

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JAMES SUYDAM, Agent.

RUBBER GOODS

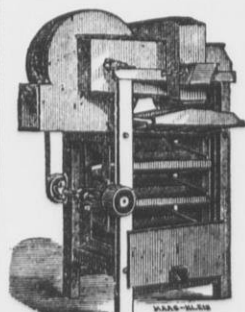
Cape Ann Oil Clothing,

LEATHER { BELTING AND LACING, | TABLE AND CARRIAGE } OIL CLOTHS.

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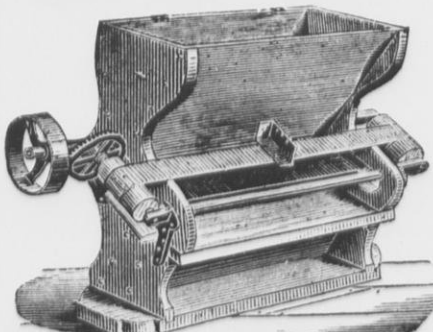
No. 16 Mark Lane, London, Eng.

THOS. TYSON, Melbourne, Victoria,

General Agent for the Australian Colonies and New Zealand.

Sole proprietors and manufacturers of EUREKA Wheat Cleaning Machinery, consisting of "Smut Machines," "Brush Machines," Separators for mills and warehouses, and Flour Packers.

Also the Magnetic Separator for removing substances from grain automatically, and dealers in the genuine Defour & Co. and Dutch Anchor brands Bolting Cloth, and mill furnishings generally.

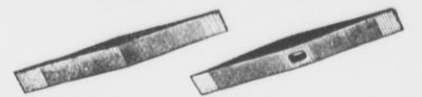


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John W. Rogers,

MANUFACTURER AND DRESSER OF

MILL PICKS



313 Cedar St., St. Louis, Mo.

30 or 60 days' trial to any responsible miller in the United States or Canada, and if the picks are not finer and thinner than anything they ever used, there will be no charge for the same, and I will refund all express charges both to and from St. Louis, Mo. When ordering new picks state weight and kind. Send for prices before buying. References from every State and Territory in the United States.

P. S.—No Mill Pick manufacturer who does poor work can get such letters as the following:

Office of James Leffel & Co., Springfield, Ohio.)
September 9, 1880.

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: We herewith inclose draft, \$21.85, to pay your invoice of August 9th. Please acknowledge. Yours respectfully,
JAMES LEFFEL & CO.

Office of James Leffel & Co., Springfield, Ohio.)
November 26, 1880.

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: Enclosed find bill of lading covering a shipment of mill picks made you to-day. Please dress the blades on one end and return to us at your very earliest convenience. The last lot of blades sent are giving good satisfaction. Yours truly,
JAMES LEFFEL & CO.

Office of the Williams & Orton Mfg. Co.)
Sterling, Ill., October 7th, 1880.

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: Inclosed find Chicago draft No. 85,660, amount \$44.00, in full account. Please acknowledge receipt and oblige. Yours respectfully,
WILLIAMS & ORTON MFG. CO.
G. M. Robinson, Secretary.

The Nordyke & Marmon Mill Works,)
Indianapolis, Ind., September 10, 1880.

John W. Rogers, St. Louis, Mo.—Dear Sir: We inclose our New York check No. 334 for \$72.25, in full of our account. You will please acknowledge receipt of same, and oblige. Yours respectfully,
NORDYKE & MARMON CO.

Alsey Mills, Scott Co., Ill.)
John W. Rogers, St. Louis, Mo.—Gents: Please find enclosed order on T. C. Taylor & Co., St. Louis, in pay for the Mill Picks, with thanks for your liberal offer to try which we have done, and take pleasure in saying that we find them a superior Pick to any we have had from Chicago or St. Louis, and will add that I have had 35 years' experience in milling. J. J. HAYCRAFT.
[Mention this paper when you write us.]

JOHN C. HIGGINS,

Manufacturer and Dresser of

Mill Picks,

No. 169 W. Kinzie Street,

CHICAGO, - ILLINOIS.



Picks will be sent on 30 or 60 days' trial to any responsible miller in the United States or Canada, and if not superior in every respect to any other pick made in this or any other country, there will be no charge, and I will pay all express charges to and from Chicago. All my picks are made of a special steel, which is manufactured expressly for me at Sheffield, England. My customers can thus be assured of a good article, and share with me the profits of direct importation. References furnished from every State and Territory in the United States and Canada. Send for Circular and Price List.

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The "Nonpareil" Mill Pick Company,

Manufacturers and Dressers of

MILL PICKS.



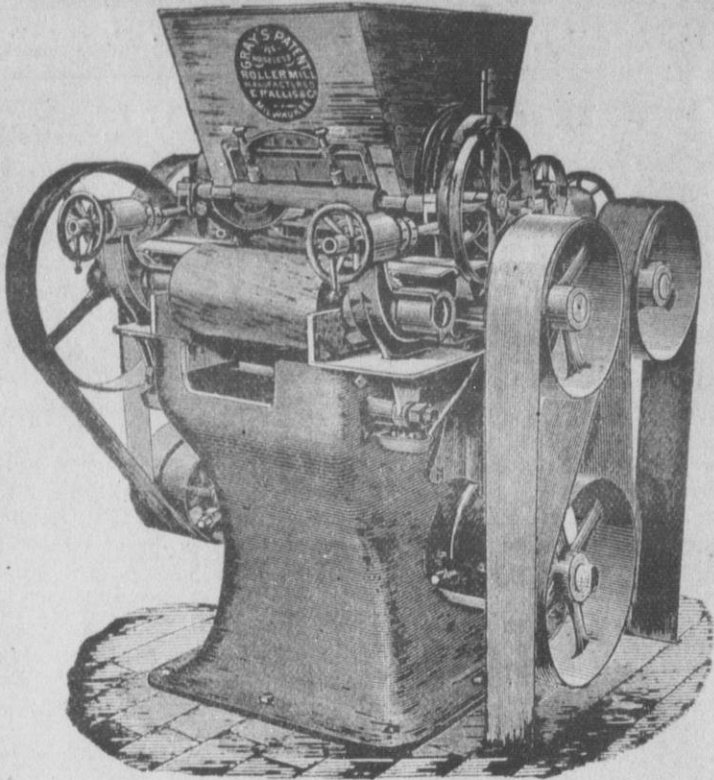
We use the best quality of double-refined English Cast Steel. We have had thirty years' experience and guarantee satisfaction. Our product speaks for itself. Our picks are equal in quality to any made, and are excelled by none. Can furnish testimonials by the hundreds from millers in all parts of the country. To responsible parties we give thirty days' trial, and if we do not give entire satisfaction we will pay express charges to and from Chicago. Send for our latest Circular and Reduced Price List to

O'CONNELL & MAHONEY,

3 Dunn Street, CHICAGO, ILL.

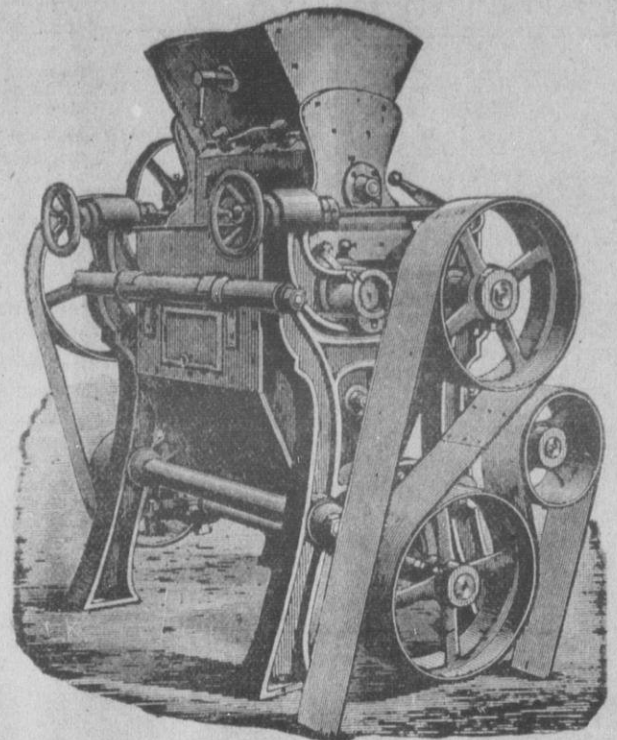
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GRAY'S PATENT NOISELESS ROLLER



DOUBLE MACHINE.

MILLERS



SINGLE MACHINE.

WITH

CORRUGATED CHILLED IRON ROLLS.

CORRUGATIONS CUT OF ALL DESCRIPTIONS.

OVER 5,000 IN USE.

First Premium Awarded at Millers' International Exhibition.

These Machines require little power, are perfectly noiseless, being driven entirely by belt; are simple in construction; strong and durable; perfect in every adjustment; adapted to both soft and hard wheats.

We refer to the following prominent millers who are each using from 50 to 150 of these machines:

Winona Mill Co., Winona, Minn.
 C. A. Pillsbury & Co. Minneapolis, Minn.
 C. C. Washburn, "
 Washburn, Crosby & Co., "
 W. D. Washburn & Co., "
 Sidle, Fletcher, Holmes & Co., "
 E. V. White & Co., "
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 Jones & Co., New York City.
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Jesse Ames' Sons, Northfield, Minn.
 J. B. A. Kern, Milwaukee, Wis.
 Edw. Sanderson, "
 Daisy Roller Mill, "
 C. E. Manegold & Sons, Milwaukee, Wis.
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 L. H. Gibson & Co., Indianapolis, Ind.
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 LaGrange Mill Co., Red Wing, Minn.
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 Horace Davis & Co., San Francisco, Cal.
 And Hundreds of others.

To all parties purchasing our Rolls we give full information regarding the system of Roller Milling.

ADDRESS:

EDW. P. ALLIS & CO.,

Mention this Paper when you write us.

MILWAUKEE, WIS.

The United States

MILLER

Published by
E. HARRISON CRAWKER. { Vol. 12, No. 2 }

MILWAUKEE, DECEMBER, 1881.

{ Terms: \$1.00 a Year in Advance.
Single Copies, 10 Cents.

HOW JERRY SAVED THE MILL.

The dull, cold day was at its close; but the heavy rain and the strong south wind which had swept the town since early dawn still continued with undiminished fury. The gale shrieked as it tore about the corners and lashed the faces of the few hurrying foot-passengers; while the driving rain penetrated everywhere, drenching the streets, flooding the gutters, and collecting in deep, treacherous pools at the corner crossings. The bare trees moaned and writhed and wept; the swinging sign-boards in front of small taverns creaked and groaned dismally; the tall chimney of the Dumbleton Knife Works rocked threateningly; and in the midst of all the tumult the great river was swelling and straining in its wintry bonds, while the sharp crackling sounded ever and anon from the broad field of ice that stretched from shore to shore and little streams of water began to appear here and there, running swiftly along the frozen plain.

March had come in like a lamb; it was departing like a lion; and, shrouded by wind and rain and heavy mist, the last night of the month came thickly down.

It was past supper time, past closing time for the mills and factories, past trading time for the stores, and, except for an occasional light here and there in some saloon or corner grocery, the windows along the business streets of the town were dark and the rain beat unheeded against their black panes. Few people were abroad, and those few seemed to have been forced upon unwelcome journeys, for they hastened through the sloppy streets with bent heads, shivering as the sharp wind tore at their wrappings, or the gusts of rain beat upon them.

One such man, clad in a heavy oil-cloth coat was walking rapidly up State street when, just at a particularly windy corner, he came in sudden contact with a lad who was crouching in front of a baker's window, where a single lamp still burned, eyeing with hungry gaze the dainties therein.

"Hullo!" cried the man, starting back, "I almost ran over you, my boy." Then, looking more sharply at the dripping figure before him, he continued: "Why, Jerry, is that you?"

"Yes, sir," replied the other, half pulling his tattered cap from his head. "If you please, sir, it's me."

"What's wrong?" said Mr. Watterson, the proprietor of the great mills that skirted the river, for it was he. "What's wrong? Why are you not at home? The mills closed two hours ago."

"I know it, sir; but I haven't worked a day this week, sir, for sister Nellie's sick, and I've been a nussin' of her up at our boardin' house. You see, sir, since mother died, an' our house was sold, Nellie an' me has stopped at Mis' Crawford's boardin' house; but my money's gave out, an' Mis' Crawford, she told me this mornin'—she said, sir, this mornin'—" The boy stopped abruptly.

"What? Come, Jerry, speak out. You're not afraid of me. Tell me what she said."

"Well, sir, she did say as how I must pay our board every week in advance now; for if Nellie was going to be sick an' I was going to quit work to nuss her, she didn't see how she'd get her money. An' our week ran out to-day, sir, an' my money, too; all but twenty cents, an' that I spent for oranges for Nellie. An' Mis' Crawford, she said as how I couldn't eat at her table 'thout I paid first. So I jest slips out into the street at meal times, for fear Nellie'd know I wasn't eatin', an' 'twould worry her, she bein' sick. An' that's how I came here, sir."

The boy finished, half frightened at his own long speech to "the master," and again pulled on his ragged cap, while the wild March wind tossed his yellow hair about his wet face and the cold rain beat upon his scantily-clad shoulders.

Mr. Watterson stood an instant in deep thought. It was hard for him to realize such poverty as this, and among his own hands, too. Jerry was a "bobbin-boy" in the mills, whom he had known for a year or more by sight, the only support of a widowed mother and sister—now of the sister only, it seemed; but the lad had always been bright-faced and cheery, and the great proprietor remembered him as one of the happiest among his boys. That this child could actually suffer for food while striving to care for his little charge (the orphan Nellie) seemed to the gentleman too terrible to be true.

And yet there, just before him, his honest blue eyes telling the same story which his lips had repeated, stood Jerry—dinnerless, supperless, and almost homeless, upon this the wild-est night of all the year.

Mr. Watterson forgot the rising flood, which even now was threatening his mills; he forgot the urgent errand which had driven him out into the storm; he forgot the wide social gulf between his servant and himself; and, remembering only that he was a christian man, answerable to his Father in heaven for the welfare of His child before him, he seized the boy by the arm, pushed open the door of the little bakery before which they stood, and fairly dragged him within.

"Here!" he cried to the baker's wife, who came, bowing and smiling, to execute the great man's commands. "See? Give this lad the best supper you can cook and all the provisions he can carry, and send the bill to me." Then, hurriedly drawing some money from his pocket-book, he thrust it into Jerry's hand and said: "When you have eaten, go back to Mrs. Crawfords and pay her for a month in advance. Then find a doctor for Nellie, and stay with her yourself until she is well. After that come back to me at the mills. If they are standing, you shall have work. No. Not a word!" he continued, as the astonished boy would have spoken. "The money is a present to you and Nellie from me." And before Jerry could recover from his surprise Mr. Watterson had gone.

Supper! money! and a doctor for Nellie! Could it be possible? The boy unclasped his hand and looked at the precious bills. Yes, it was true!

As he ate the bountiful meal prepared for him by the baker's good wife, the bobbin-boy pictured Nellie's delight when he should return and tell her of what had happened him; and later when he faced the dreary storm homeward bound with a great basket heaped with buns and cakes and oranges from the baker's shelves upon his arm, his heart was light and his laugh rang merrily out across the darkness and the rain, as he thought of how boldly he would meet "Mis' Crawford," and how astonished and puzzled she would be when he paid her—not a week, but a month in advance!

"It's just like a fairy story said he, half aloud, as he climbed the sloppy steps of his boarding house—"just like a fair, with a great big, splendid rich man fairy."

It was almost morning. Already the black curtain of night, rent here and there by the furious wind, was slowly lifting toward the east and the dull gray dawn appearing, forming a sombre background, upon which the leafless trees that fringed the far-away hill were painted in waving silhouette.

Since ever the sun had gone down the wild storm had continued, and even the rain driven by the mighty wind, fell in long, slanting lances upon the town and the frothing river, filled with great masses of ice and debris from the up-country, roared and plunged between its banks and shook with giant hands the foundations of the mills beneath which it ran.

At the head of the dam, where the channel was the narrowest, and directly opposite the lower Watterson mill, was an ice-jam.

Piled block upon block until it towered high

in the air, pressing with terrible force against the mills upon one hand and the natural wall of rock upon the other, the broken ice had formed a great white barricade, growing each moment, which checked the mad rush of the water and sent it swirling backward in eddying waves, which beat furiously upon the mills and threatened each instant to engulf them.

Along the higher shore the townspeople had gathered, powerless to aid, but simply awaiting the catastrophe; and among them, pale and haggard, was the proprietor himself already a ruined man.

As he passed to and fro, intent upon the scenes before him, hoping against hope that the jam might even yet give way in time to save his buildings, many a watcher turned aside with pitying word and look, for Mr. Watterson was a man beloved by all of his employes.

Suddenly there was a movement in the crowd—a hastening toward a common center—and with eager faces men and women gathered about a new-comer, who was speaking earnestly.

"Yes. If that timber could be cut it would break the jam! It lies just so that it holds—"

The owner of the mills broke through the crowd.

"What timber? Where? Quick! Tell me! Can the jam be broken?"

"Yes, sir," returned the other, respectfully touching his hat. "It can; but its dangerous work. I have just been below, and from there I saw that great log which had lodged at the very crown of the dam is all that holds the ice. It that could be cut the jam would be broken."

"But how can it be reached?" queried Mr. Watterson anxiously. "Can any one get at it to cut it?"

"Yes, sir," replied the man; "in one way."

"And that is—"

"Over the ice itself!"

A shudder ran through the listeners, and even the proprietor's face grew more pale. Who would venture upon such a bridge on such an errand?

With a common impulse, the crowd, led by the workman who first discovered the log, turned hurriedly away from the river's brink, ran through a side street, and gained a position lower down the stream, from whence the dam could be plainly seen.

The report was true. The jam was held in place by a single timber—a great square stick, doubtless torn by the angry waters from some bridge far up the country. If that could be cut, the blockade would be broken, the ice would no longer clog the stream, and the mills would be saved.

For a moment silence fell upon all; then, suddenly, Mr. Watterson's voice, hoarse and thin, rang out above the noise of the storm and the war of the waters.

"A thousand dollars to the man who will cut that timber!"

The women in the little group looked at each other and shuddered; the men fixed their eyes upon the dam; but no one replied. The roar of the angry stream increased and the waters deepened beneath the mill-walls.

"Two thousand dollars!"

The proprietor's voice was hoarser than before; but the women closed their lips firmly and shook their heads. The men moved a little uneasily, and one drew his hand across his mouth, as if he would have spoken; but still no one replied, and the white foam from the imprisoned river was tossed by the wind against the lower windows of the mills, while the corners of the buildings were already beginning to crumble and waste away before the grinding ice.

"Three thou—"

"I will go!"

The two voices sounded so closely together that it was not until the crowd turned their eyes upward and saw the one who had

answered that they fairly understood the reply.

Running from a third story window of the lower mill directly across the river, above the dam, was a long, endless chain, used to convey power from the mighty water-wheel of the mills to the machinery of a little box factory located upon the opposite bluff. This chain was at rest now, and there appeared at the window near it the figure of a boy, in a blue blouse, carrying in his hands an ax. He it was who had said "I will go!"

When the people saw him, and realized what he was about to attempt (for already he had fastened a rope around his body and was passing the end over the chain, evidently with the intention of sliding along the same until he found a point from which he could lower himself within reach of the timber); when they realized this, a great murmur went up from the crowd, and the women cried out in terror, while many turned to Mr. Watterson and urged him to order the boy back.

"Who is he!" said the proprietor in a dazed manner.

"It's Jerry, sir. Jerry the bobbin-boy," said a man stepping forward. "An orphan, sir, and strivin' to care for his sick sister."

"Jerry! Is it Jerry?" cried Mr. Watterson turning quickly. "Then he shall not go," and he waved his hand and shouted toward the window: "Go back! Go back!"

But already it was too late, for, with a little cry, the boy dropped from his perch and hung swinging above the roaring, grinding ice, the rope which supported him sliding slowly downward along the chain toward the centre of the dam. The breathless crowd, the terror-stricken proprietor, could only watch and wait now.

Slowly and unevenly the looped rope from which Jerry was suspended slipped link by link down the sagging chain; slowly his feet neared the great mass of ragged ice beneath. At length, when he was directly over the center of the dam, and just above the long beam which held the jam, allowing the rope to slide quickly through his hands, he dropped lightly upon the timber he had come to cut.

At the sight the sympathetic crowd broke into a wild cheer, both men and women; but Jerry wasted no time listening. A moment, half a moment lost might mean destruction to the mills, and before the echo of the shouting had ceased he was plying his ax with vigorous strokes, which rang sharp and clear above the voice of crumbling ice and gathering waters.

It was not a long task. The strain upon the timber already was enormous, and ere the lad had dealt half a score of blows an ominous cracking sound warned him that his errand was accomplished and that he must be gone.

Dropping the ax, he turned, seized the dangling rope, and began to climb toward the chain above, when, with a shock like the report of a cannon, the timber gave way, and in an instant, in the twinkling of an eye, the air was filled with horrible roaring, as the imprisoned waters burst the bonds which had confined them, and in one impetuous boiling flood rushed over the dam, tossing the great cakes of ice that had formed the barrier high on the frothing waves—so high that they hid from sight the form of poor Jerry—and there went up from all the people a single cry: "The boy is lost!"

But the jam was broken! The mills were saved!

And Jerry was saved too! Bruised and stunned and bleeding, hanging half insensible above the black waters that swept with a terrible swift curve towards the fall, when the ice that had buffeted him had passed away, the watchers saw that the boy still lived; and, quicker than it can be told, a boat was procured and manned, a long line made fast to it and dropping down the stream until they were close to him; tender hands were upraised, loving voices called, and, with a long sobbing cry, the little hero loosed his grasp upon the rope which held him, and dropped in the waiting arms below.

To-day the great mills still stand by the river's brink, and the rumble of their machinery is heard all day long as of yore, but it does not reach the ears of the "bobbin-boy," nor yet those of Sister Nellie. For the one is at college and the other at school, both foster children of that most pleasant of old bachelors, the proprietor himself; and it is only at vacation time now, when his days are brightened by the presence of both his loved ones, that Mr. Watterson's memory turns back to that spring time, long gone by, when his son Jerry, in simple soulful gratitude, risked his life to save the mills.

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The Minnesota State Millers' Association will meet in Minneapolis December 6.

Twenty-three patents were issued to Thomas A. Edison, of Menlo Park, N. J., October 18.

The Illinois State Millers' Association will meet at the Leland Hotel in Springfield, Ill., December 7. All Illinois millers are urged to attend.

A GERMAN statistician has figured out that Europe annually used 80,915 tons of matches. It will now be in order for him to estimate the number of pantaloons worn out in lighting them.

DURING the month of October, there arrived 76,061 passengers—of whom 67,929 were immigrants, 6,345 citizens of the United States returned from abroad, and 1,787 aliens not intending to remain in the United States.

MR. ELIHU VEDDER, the well-known American artist, lately returned from Rome, has been working since last summer upon a permanent cover for *The Century Magazine*. The new cover, which is just completed, is to consist, not of one design, but really of five—four of them for the different seasons of the year. Surrounding each are appropriate emblems for every month in the year, and in each will appear an emblematical female figure

of great dignity. The midwinter cover will, perhaps, be the most striking of all, as in the background is seen the Aurora Borealis

The sub-executive committee of the Millers' National Association, at their meeting in St. Louis November 16, appointed Edward Sanderson, Esq., of Milwaukee, a delegate to the Tariff Convention, to be held in New York City November 29.

Compromised at Last.

A termination, not unexpected since the last reorganization of the Miller National Association, was reached at St. Louis November 16. At that time the executive committee of the Association, to which is delegated full power to transact all important business, met C. R. Knickerbocker, Esq., the representative of the George T. Smith Middlings Purifier Company, of Jackson, Mich., to take into consideration the further defense or compromise of several suits against prominent millers in different parts of the country, including the claims for infringement of the "Cochrane Patent."

After a lengthy discussion it was finally agreed by the committee to pay the George T. Smith Middlings Purifier Co. the sum of \$6,000 in full of all claims against the members of the National Association, including the withdrawal of all suits now pending (two of which are in the United States Supreme Court) against members. Thus endeth the great Cochrane and Smith cases so far as the Association is concerned.

Outside millers will doubtless soon have reason to regret that they did not join the Association while they still had time, and thereby have availed themselves of the benefits of this and former compromises.

Since the reorganization of the Association the idea that the cheapest way to get out of litigations was the best way has evidently prevailed.

The outside millers will undoubtedly now raise a greater cry than ever, but really they have no reason for so doing. They were solicited for years to join and help bear the burdens of defense. Many of the little millers said "our big rich millers will fight—they are able to pay—we will get the benefit of it."

Millers representing less than 4,000 run of stone have stood the worry and expense thus far, and have seen fit to at last form themselves into a close body for their own protection.

Outside millers can now either defend themselves individually—form a new defense organization and fight it out—or pay whatever royalty will be demanded. Perhaps in the end they will not be much more out of pocket than they would have been if they had been members of the Association, but this time alone can determine.

In addition to the compromise with the Consolidated Middlings Purifier Company, the sub-executive committee discussed the troubles growing out of the Denchfield patent. The owners of this patent will be invited to meet the sub-executive committee and talk over the differences. This patent covers an article known as a ventilator on the buhr in grinding and is used in connection with the exhaust. The owners of the Denchfield patent have some large suits now on hand against millers and have already secured some judgments. The following address, which explains itself, was issued November 16. It reads as follows:

To the Members of the Millers' National Association:

Owing to a variety of adverse circumstances, the arrangements by which the several Cochrane patent suits were to be abandoned, so far as they concerned the members of the association, could not be brought to a practical termination until now; your committee has succeeded in getting the vexed question in shape so that within a short time each member of the National Association, in good standing, will receive through his State Secretary, or through the National Secretary's office, a full license covering the whole past under the Cochrane patents.

More than this, the constant reissues and cooking up of old and worthless patents with the view of blackmailing the milling fraternity will be a constant menace to millers until the principle which we have established is fully understood and appreciated. Machines of any kind should only

be bought of perfectly responsible parties. The seller must give a written guarantee to the purchaser to defend him and indemnify him in case of infringement; if any fighting is to be done the manufacturer and patentees should do it, while the purchaser may look on as an interested party, so to say.

During the past two years the tendency has been to gradually transfer the burden of lawsuits from the miller to the manufacturer. Certainly we have much less to contend with now, while the fighting is very lively and exceedingly interesting among manufacturers, patentees and machine men in general. The Consolidated Middlings Purifier Company and the Geo. T. Smith Purifier Company, who own and control to a large extent the underlying patents pertaining to the purification of middlings, and who have expended a large amount of money in securing these patents, thereby giving the purchaser of these machines a good title and immunity in their use, have given a written guarantee to your committee (which guarantee is backed by the acknowledged responsibility of the concern), that in any case where members of the association have purchased machines of them, not only to furnish first-class legal talent to defend any suits against members using their machines, but have obligated themselves to pay any damages or judgment that may be rendered against such purchasers of their machines. Your committee would call your especial attention to this guarantee in order to relieve any anxiety our members may have by reason of the re-issue of an old patent on which suits are threatened for infringement.

[Signed]

GEO. BAIN, President.
ALEX. H. SMITH
C. H. SEYBT,
S. H. SEAMANS, Secretary.

LATEST.—In accordance with the terms of the compromise above referred to, November 21 the cases of the American Middlings Purifier Co. vs. The Atlantic Milling Co., of St. Louis, and the American Middlings Purifier Co. vs. John A. Christian & Co., of Minneapolis, Minn., in the United States Supreme Court, were called up, and on motion of Mr. Rodney Mason, counsel for plaintiff, were dismissed with costs.

MR. JOSEPH NIMMO, JR., Chief of the Bureau of Statistics, has prepared for his annual report a paper on "the cost of transportation, railroad confederation, or pooling arrangements, and the governmental regulation of railroads." Mr. Nimmo, in his statement as to the reduction in the cost of transportation on railroads, gives some very interesting statistics. It appears that the number of tons of freight carried on the railroads mentioned in the table referred to increased from 45,557,002 tons during the year 1873 to 78,150,913 tons during the year 1880, an increase of about 71.5 per cent. The receipts from freight, however, increased from \$112,004,648 in 1873 to \$143,388,178 in 1880, an increase of \$41,383,530, or only about 28 per cent. This small rate of increase of receipts in proportion to the increase of traffic was due to the fact that the average rate per ton charged on these thirteen railroads fell from 1.77 per cent. per ton per mile in 1873 to 1.07 per cent. per ton per mile in 1880, a decrease of 39.5 per cent.

Recent Milling Patents.

During the week ending Oct. 18, patents were granted to C. U. Orandall, of Sterling, Ill., for a grinding mill; John Fitzgerald, Brooklyn, N. Y., for a feed device for grinding mills; James L. O. King, Anderson, C. H., S. C., for an anti-friction mill-bush; Geo. and A. Raymond, Waupun, Wis., for a corn-sheller; Charles C. Schill, Richmond, Ind., for a flour mill; Edmund Schmeja, Biala, Austria, assignor to H. Gruson, Buckan b. Magdeburg, Germany, for an apparatus for grinding grain; Francis Taggart, Brooklyn, N. Y., for a process and apparatus for disintegrating wheat; Baxter Wright, Marshall, Mich., for a grain-cleaning machine.

During the week ending Oct. 25, 1881, patents were granted to Geo. W. and J. W. Ayres, Allowaystown, N. J., for a middlings purifier; to Hiram P. Edmunds, Covington, Ky., for a smut and polishing machine for wheat and other grain; to Heinrich Seck, Frankfort-on-the-Maine, Germany, for a roller mill for grinding corn, etc., and to Job Smith, Paradise, Utah, for a floating water-power.

During the week ending Nov. 1, the fol-

lowing patents were granted: To Samuel L. Bean, Washington, D. C., for a dust collector for grinding mills; to Gustav Behrns and G. Unruh, of Lubeck, Germany, for an elevating apparatus; to John P. Bond, of Warsaw, Ind., for a grain-cleaner; to Henry Coker, Indianapolis, Ind., for a steam grain-drier; to Casimir Dechamp, Paris, France, for a disintegrating apparatus; to Wm. H. Dechant, Reading, Pa., for a wicket and caisson for movable dams; to Gustaf Falk, Peru, Ill., for an elevator; to Wm. H. Janney, Martinsburg, W. Va., for a grain separator; to Samuel Potts, Minneapolis, Minn., for a feed-governor for middlings purifiers and a wheat grading machine; to Charles G. Rollins, Minneapolis, Minn., for a middlings purifier; to Robert Schneider, Dusseldorf, Germany, for a grinding mill; to Christian Wais, Newport, Ct. (assignor to Simpson & Gault, Cincinnati, O.), for an automatic grain-weigher.

During the week ending November 8, patents were granted to Stephen P. Sawyer, Muscatine, Ia., for a machine for making oat meal and to Patrick Wall, of Allegheny City, Pa., for a lamp for use in mills.

During the week ending November 15, patents were granted to Hugh Gerred, Chester, Ill., for a grain-meter; to Harmon Milford, assignor to Geo. T. Smith Middlings Purifier Co., Jackson, Mich., for manufacturing flour, and to John Hutchinson, Three Rivers, Mich., for a feeder and separator for mill-stones.

Emory vs. Hopkins.

ED. UNITED STATES MILLER: In the October number of the *Milling World* I noticed an article entitled "Chemistry in Milling," in which the writer makes some statements that are not intelligible to the average mind.

First, he startles us with the information that: "After the now solid earth were satisfied, as it passed from boiling sand to clear cold water, there were a number of gases left over which were not combined, and which now form our atmosphere, or acrid invisible sea, in which we live, move and have our being." It has always been supposed that at one time the earth was a mass of molten matter, and not of loose particles rolling and tumbling over the other. If by the "now solid earth" the writer means that we are really upon a globe of solid matter, what has become of that "clear, cold water" into which that "boiling sand" was transformed? Has there been a partial transformation since the time of which Mr. Hopkins speaks? If the gentleman is correct, all theologies that we have been taught to believe true are upset; and we shall have to throw them aside, and follow in the train of the apostle of this "new dispensation." The revision of the bible is incorrect; our ideas of geology are wrong, and we are floundering about, uncertain whether we are in water, sand or on a solid rock.

In his calculations as to the amount of nitrogen existing in the air over an acre of ground, he says: "We have got an atmosphere which contains above the same square foot 1,700 pounds of nitrogen. . . . The nitrogen, if condensed and put into phosphate would be worth 20 cents per pound, or for the farm \$340. Now if there are as he says 1,700 pounds of nitrogen to the square foot, for one acre there would be 74,052,000 pounds, at 20 cents per pound would amount to the snug sum of \$14,810,400, showing that he is \$14,810,400 out of the way. Now perhaps the gentleman can discover some means by which the existing nitrogen can be put in the shape of phosphate. How happy must be the small land-owner to know that he is a millionaire. But how nitrogen, which is the base of ammonia, can be transformed into phosphates, is a chemical puzzle that is racking the brain of

Yours, wonderingly,
EMORY.

Questions From Maine.

A correspondent in the Pine Tree States asks us the following questions, to which we append answers by Birkholz:

Question—What is the best pitch for buckwheat reels, and about how many revolutions should they make per minute? Answer—The best pitch is $\frac{1}{2}$ inch to the foot. The reels should make 25 to 27 revolutions per minute.

Q.—Is there anything better than beef tallow to grease wooden journals with? A.—It is well to coat the bearing surface of wooden boxes when new with a mixture of nine parts of beef tallow and one of plumbago. Then the pores of the wood will be filled—the bearings will be coated with a film of metallic substance, greatly reducing friction and liability to take fire. Afterwards the bearings must be oiled by fluid unguents. Vulcan oil is well adapted for the purpose, for tallow will only become unguent when fluid, and it requires some heat to make it limped, which heat can

only be produced at the expense of power and wear. It is advisable to apply the tallow mixture, above mentioned, once in six months. Wooden boxes ought never to be used for shafts running faster than 100 revolutions per minute.

Q.—Are not sharp, corrugated rolls well adapted to grinding buckwheat? A.—Buckwheat is always more or less full of water. The buckwheat in the Northwest is this year very damp and cannot be properly ground on mill-stones without being kiln dried first. Corrugated rolls, with sharp corrugations, are eminently fit for grinding buckwheat in my opinion. An elegant buckwheat meal can be produced by sharp rolls, which will bolt very freely. Rolls have no tendency towards "pasting."

Q.—What is the best thing to put on a pulley to prevent the belt from slipping? A.—The slipping of the belt is generally an indication that the pulley is not large enough for the work required of it. Cover rim of pulley with paper, which can be glued on easily. As friction between leather and paper is almost twice as great, the tendency of belt towards slipping will be about half that in case of uncovered pulley.

Letters on Milling, written expressly for the UNITED STATES MILLER.]

Birkholz on Milling.

BY R. BIRKHOLOZ, M. E.

NO. II.

Often enterprising men go to mill-furnishing shops with the intention of contracting for small stone mills. They do not want a purifier, as they want to grind low, and consequently do not make any middlings. They want nothing but stones and reels, perhaps in connection therewith a combined smutter and separator to clean their wheat. Those men also, with few exceptions, call for a feed stone, as they intend to emigrate to the far west amongst the farmers of Dakota, Nebraska, etc., where a feed run pays very well indeed. The men, picking up courage enough to lead an uncomfortable life with many hardships in such remote quarters of the globe, generally are remarkable for the inverted ratio of money and courage they possess; the less money they have, the more courage they can boast of. Generally they are called for by a group of farmers needing their help, which farmers offer a subvention in shape of money or security. "Build us a cheap mill!" is their standard verbal invitation to the mill-furnisher, and figures are drawn up at once of a mill of following contents: One 4-ft. run of stone for wheat; one 4-ft. run of stone for feed; one elevator for wheat meal; one elevator for ground feed; one two-reel bolting chest; one 4-ft. proof-staff; one 4-ft. paint-staff; one pick-handle; one dozen picks; one stone crane; one hoisting screw, bail and pins.

Such a mill will grind from five to eight bushels of wheat per hour, producing about one to one and three-quarters barrels of flour per same time; also the feed-stone will deliver twenty-five to thirty-five bushels of feed, according to fineness desired. It takes the power of about thirty-five to forty horses to drive such a mill, the feed-stone alone consuming nearly one-third of all the power.

Now, an all-roller mill can be built for about the same expense, and affords a great many advantages. "Rolls" and "high-grinding" convey related meanings, so much so that but few millwrights heretofore could emancipate the idea of costly spouting and handling in connection with rolls. Let those enterprising men above mentioned that can easily carry their whole wealth in their pocket, come to interview such millwrights and they will find out that a small dive into the labyrinth of "handling the stuff" will be advisable, and on learning the price of a roller-mill for their particular requirements, they will find it far beyond the reach of their pocket.

An all-roller mill that would suit those western millers best would consist of—

One roller machine with two pairs of rolls, machine being divided by a partition so that each pair will grind separately. Rolls to be about nine inches in diameter and twelve inches long; one pair of rolls to have sixteen corrugations per inch, and the other pair twenty-four corrugations; one single pair of 9x12 rolls, with twelve corrugations per inch; one elevator for one side of divided roll; one elevator for other side of divided roll; one short elevator for single roll, being driven from shaft of slow roll, heading below joist of grinding flour ceiling, high enough to sack feed on grinding flour; one two-reel chest.

By comparing both bills of machinery, the party interested will notice that the difference in price will only depend on the stones and fittings in regard to stone mill, and on the rolls and the short feed elevator in regard to

roller-mill. The probable prices of the stones and fittings I enumerate herewith:

One pair of old stock 4-ft. stones, one pair of new stock 4 ft. stones; two 6-inch spindles and drivers; two 40x13 inch balanced pulleys, two copper-lined trampots; two lighter screws and fixtures; two wood pulley-forms; two sets of leveling screws and plates; two 4-ft. walnut finished curbs; two belt tightners; one silent feeder; one hopper, damson and shoe; one stone crane; hoisting screws, bails and pins; seventy-six feet of 8-inch light double belt; one 4-ft. proof-staff; one 4-ft. paint-staff; two pick-handles; one dozen picks; the total cost of which will be about \$810.

The total sum of \$820 will buy one double pair of 9x12 corrugated rolls, one single pair of 9x12 corrugated rolls, and one short elevator complete, also roller belting.

The interested miller will notice that—as I vouch for the correctness of figures given—both mills will cost about the same, in regard to machines used. It is, I think, useless to refer to the fact that a great sum is saved by having no husk-frame to build, in case of adopting the all-roller plan, and that other time and money is saved by the easier effected construction of a roller mill.

Both of these items reduce the starting outlay of the mill-owner. Other expenses that are saved after roller-mill is in running order are found in the fact that no stones need to be laid idle and dressed, that about ten to fifteen horse powers are saved—which means an hourly saving of fifty to seventy-five pounds of coal, and that the flour produced is of greater strength, sharper and whiter than obtained by stones, and that the yield is a better one, as bran will be well scraped off and light. All of the most nutritious matter adherent to bran, matter needed very much by farmers' stomachs to build up bones and sinews, is contained in the flour. The grinding operation is also so simple in case of the roller-mill described, that any clear-headed mechanic can run it successfully, which he cannot undertake to do with the stone system. The stones have their puzzles and troubles, and demand a miller to watch, balance and dress them well. The stone meal, ground low, is soft, hot, and sticky, owing to its being chased through in a *parforce* manner and owing to the very large grinding surface; the meal is gray owing to pulverized bran particles; the meal will require a great amount of bolting capacity, owing to its stickiness (it ought to be cooled before being bolted), and the bran is always bound to be rich, carrying along to the cattle-trough the most nutritious matter. In case of the roller-mill, the operator only needs to set his rolls, and he will soon find out how close he has to hold them; he may look out for having bearings well oiled. His meal is bound to be delivered and bolted cool and easy: owing to its sharpness; white flour is made, as bran is not cut up so fine as to drop through the flour silk in hurtful quantities.

The feed, ground on rolls, will be very loose and well granulated. Should the operator desire to grind corn, he can bolt off the meal in a small extra reel, clothed with No. 28 wire; meal—the sharpest, evenest, flourless corn meal that ever went into Johnny cakes!

It is not possible to grind corn entirely down at once with a roll; tailings of this small reel may be sacked and re-ground on same roll at will; thus the corn can be ground out perfectly.

The *modus operandi* of the small all-roller mill described above, of a capacity of grinding from six to nine bushels of wheat per hour, and fifteen to twenty-five bushels of feed in the same time, turning out one to one and three-quarters barrels of flour per hour, with the power of twenty to twenty-five horses, a consumption of 120 to 125 pounds of steam coal per hour, the employment of a common engine supposed, is as follows:

The cleaned wheat is ground pretty close on one side of the double roller machine, on the pair with coarser corrugations. Meal is carried to the upper reel of the two-reel-chest, clothed with strong grit-gauze, giving the same bolting results as No. 10 or No. 9 Dufour silk; the siftings are flour, and the tailings are dropped to the second pair of rolls of the double machine and ground home; this meal is elevated to the lower reel, bolted over grit-gauze equal to No. 9 or No. 8 Dufour silk. The siftings are flour, and the tailings are feed, fine and coarse bran.

The roller-mill will also give far better results than stones on grinding rye in same manner as wheat. Rye is damper and softer than wheat, and will grind very well indeed on rolls; the flour will be sharp and white. The great Borsig Mill, in Berlin, Germany, is grinding rye with corrugated rolls, on the

gradual reduction plan. The all roller mill described above is, as noticed, also working on the gradual reduction plan—in a measure.

For a large mill turning out per hour about two to two and one-half barrels of flour, the same plan will do as I described above, only, instead of 9x12 rolls, 9x18 rolls must be substituted (rolls eighteen inches long instead of twelve inches). One pair of 9x18 rolls will grind very readily twenty bushels of fine feed and thirty-five to forty bushels of coarse feed.

Supposing a miller would like to turn out about four to five barrels of flour per hour, and make two kinds of it, a patent and a bakers' flour, grinding high and purifying the middlings; he can do this in a cheap way by following my description as given below.

Before I proceed I must describe a machine designed for smaller mills and built by Edw. P. Allis & Co., Milwaukee, Wis.

I can recommend these machines for the purpose they are designed, for they are easily put up, very effective, in short, "*multum in parvo!*" One pair of corrugated rolls is placed on one end of the machine, about four feet above the bottom. Below this is placed a wire screen, pitching down toward the other end of the machine. The screen is as wide as the rolls are long, and about five feet long. Below tail end of screen is placed another pair of rolls, finer corrugated, underneath which is hung up another screen, pitching down toward the other end of machine. The screens are hung in noiseless springs, and reciprocating motion is imparted to them by an eccentric shaft, rotating about 500 times per minute. The screens shake in opposite directions to avoid the shaking of the mill building, and the cloth meshes are kept open by traveling brushes acting underneath the cloth. The whole machine is constructed and driven similarly to Edw. P. Allis & Co.'s famous Noiseless Roller Mills, having also all the adjustments of those.

After the miller has procured such gradual reduction machine, he may buy a single roller machine with smooth rolls, nine inches in diameter and twelve inches long, a Smith No. 1 purifier and a pair of 3½-ft. stones with outfit. Besides this he may build a three-reel chest with 32-inch reels, 18 ft. long, each reel having two conveyors below it in attendance, provided with necessary cut-off slides. He will also need an elevator to take flour and middlings of the gradual reduction machine to the upper reel, an elevator to take the meal of stone to middle reel, and an elevator to take meal of smooth roll to lowest reel. The grinding plan is to be as follows:

Wheat cleaned on a smutter with shoe is thence sent to a gradual reduction machine; after being ground on upper pair of rolls the meal drops on upper sieve, and is freed of flour and middlings during its passage down the sieve; it then drops into the lower pair of rolls, with twenty-four corrugations per inch, where it is ground out completely; the meal then falls into the sieve below, and travels toward the tail end, being freed of flour and middlings, it tails off as finished bran.

The flour and middlings made by these two wheat-reductions are elevated to the upper reel, which is clothed so that bakers' flour and dust middlings drop through, separately, of course; the tailings are middlings, which are spouted to the purifier. Dust middlings are spouted to the stone. The purifier is clothed and handled so that it produces purified fine and purified coarse middlings. The tailings must be poor, and may be sent to the shorts bin. The purified middlings finer than No. 3 silk are spouted to the stone, and the coarser middlings to the smooth rolls. The lowest reel receives meal from the smooth rolls. It must be clothed so that the sharp patent flour bolts out, also the dust middlings and fine sharp middlings together, which are sent without further purification to the stone.

Near the tail end of the reel, provision must be made in coarseness of cloth so that nothing but flattened chit passes over the tail into the shorts bin; the siftings through this last section of cloth are purifiable middlings, which must be spouted to the purifier again.

The meal from the stones is bolted in the middle reel, which is to be clothed in such a manner that patent flour and bakers' flour drops through; cut-offs must be set to suit; near the tail a piece of coarser silk is to be applied, in order to reduce the value of tailings enough to render them fit for the shorts bin. Returns through this coarser section may be returned to stone or spouted to a bin and ground up by stones at intervals.

It will be noticed that I do not purify the dust middlings (middlings between No. 8 and flour). I am not in favor of purifying them

together with coarser middlings, as the suction to suit the latter would unavoidably carry the dust middlings off to the dust room.

I do not wish to convey the idea that the mill just delineated can run close competition with the largest and best built mills in the country, but it will give far better results than a stone mill of same capacity, make a stronger and sharper flour, in fact. The flour through No. 11 silk of the lowest reel will be an A No. 1 patent. The mill will only consume two-thirds of the power (and coal) which is required to drive a stone mill of same capacity.

I will also add, that in order to obtain a good quantity of coarse middlings, which after being reduced on smooth rolls give the best flour in the mill—it is absolutely necessary to provide rolls with sharp, saw-tooth corrugations. It must be borne in mind that as wheat (or rye) is only reduced twice, the rolls must have finer corrugations than if more wheat reductions were employed, and rolls have also to work lively, thus the chances for obtaining coarse middlings are reduced enough, and ought not to be lessened by employing dull corrugated rolls.

The saw-tooth corrugations on rolls will stay sharp enough for three to four years, after which time the miller ought to have made money enough with them to pay for their redressing.

Garfield as a Protectionist.

A MEMORIAL ADDRESS AT THE CHICAGO TARIFF CONVENTION BY DELEGATE JOHN W. HINTON, OF MILWAUKEE.

Mr. Hinton said:

MR. CHAIRMAN AND GENTLEMEN OF THE CONVENTION: "I feel confident that every one present will agree with me in the idea that, before we depart for our several homes, some expression should be made in grateful memory of a man whom we no longer have with us—a man who was ever the unflinching, clear, concise, honest, able advocate of protection to American industries; a man who gave the best definition of American industries, I think, that we have ever had, who in that description said, 'It is not only for the plow that furrows the land, but for the ship that plows the ocean.' For some of us who for many years sailed under the flag remember with pride the grand position of what used to be the American mercantile navy. We think of its condition to-day with sorrow, and many of us with shame. He was the same man, sir, who gave birth to what I venture to call one of the grandest sentiments ever uttered in this or any other country. 'It is our glory,' said he, 'that the American laborer is more intelligent and better paid than any of his foreign competitors.' [Applause.] Mr. President,

THAT SENTIMENT OF JAMES A. GARFIELD

[applause] touched deeply the heart of every workingman almost in America, and in grateful response they virtually put him into the Presidential chair. Now, I do not think it becomes us to leave here without at least some recognition, some public expression of the sorrow that we all feel, not alone at his death in the terrible manner in which it occurred, but at the loss to our cause. You remember what he said in the convention in which he was nominated in this city—how he told of the condition, the low and abject condition in which the country was placed before the Republican party came into power, how it threw its protecting arm around our enfeebled industries, and they sprang into new life—but I have no desire to introduce politics here—and then how the era of a new prosperity dawned. Then it may not be generally known that the very last public act of General Garfield's life was to read a proof of his own report advocating the retention of the duty upon wool, and I hope if we have any agricultural representatives here that they won't forget it. [Applause.] I don't wish to detain you further than to again suggest a suitable expression of our sorrow at the loss of not only so good and so great a man, but of such an unflinching and able advocate of American protection and steadfast friend to American labor." [Loud applause.]

The Chair—"If Mr. Hinton will be kind enough to prepare a resolution of the kind he contemplates, I have no doubt the committee on resolutions will embody it in their report."

Mr. Hinton—"Mr. Chairman—The committee on resolutions is composed of such able gentlemen that I feel confident they will frame a resolution better than I can, and if agreeable would prefer to leave it to them."

Mr. J. B. Grinnell, of Iowa—"I second Mr. Hinton's motion."

The motion was put and carried by a unanimous vote.

The resolution as submitted by the commit-

tee was as follows, and carried unanimously:

Resolved, That this convention, in common with an afflicted country and a sympathizing world, recognizes in the death of President Garfield a profound national calamity to the appropriate expression of which no language of eulogy or regret is fully adequate. But in an especial degree we, as friends of American industry, lament in his decease the loss to the world of a judicious and experienced economic legislator, a profound student and master of true national economy, and an able champion of the American doctrine of protection to industry. Nor is our sensibility to this loss rendered in any degree less acute, notwithstanding our respectful and due appreciation of the fact that his successor in the Presidential office, President Arthur, is equally devoted in principle and by conviction to the same cause of protection to American industry.

UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

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MILWAUKEE, DECEMBER, 1881.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER— You will thereby oblige not only this paper, but the advertisers.

MARKET REVIEW.

Prepared expressly for the "United States Miller," by Messrs. E. P. Bacon & Co., of Milwaukee, Wis.

Wheat has ruled dull and depressed for the past month, with an occasional spasmodic upward turn of a few cents, receding further on each depression than previously, the net decline on cash wheat having been about five cents per bushel. Apprehensions that December delivery might be "cornered," carried this delivery and cash wheat also to a premium of two cents over January, towards the latter part of the month, which diminished afterwards to $\frac{1}{2}$ cent, but has again widened out to $1\frac{1}{4}$ cents.

The chief influences producing the decline have been the disturbances in financial affairs at the East, anticipated increase in receipts, with more favorable weather for threshing and marketing grain, together with continued dullness in foreign markets and absence of demand for flour. These influences appear to have had their full effect, however, and a better feeling is noticeable to-day, with a rally of about one cent in the market.

Disappointment is being expressed that receipts show so little improvement, and the condition of the great bulk of the wheat arriving here is disheartening, a large share of it being damp, unsound and musty, and inspecting No. 3 or condemned. Of the arrivals during the past month, only 32 per cent. has inspected above No. 3. Only seven cars have inspected "hard."

The "visible supply" in this country, comprising stocks in store at lake and seaboard ports, and in transit, diminished 243,150 bushels during the month; whereas, during the corresponding period last year, it increased 6,710,582 bushels. The total "visible supply" is now reported at 20,614,386 bushels, against 24,190,673 bushels at the corresponding date last year.

We quote the market closing strong to-day at \$1.27 $\frac{1}{2}$ for No. 2 cash or December, and \$1.26 $\frac{1}{4}$ for January. Grades below No. 2 are sold almost wholly by sample, on their merits, and anything fit for milling is readily taken at from two to six cents under the price of No. 2, testing from 53 lbs. upwards.

SEVERAL of our contemporaries gorge their readers with illustrated excerpts from the U. S. Patent Office Gazette. Few millers ever investigate them, as they have something else to do, and inventors receive these Government documents direct from the patent office weekly, upon application, for \$5 per year, which includes illustrated descriptions of all patents issued, whether pertaining to milling or not. It makes

life easier for the overworked editor, perhaps, and gives the photo-lithographer an occasional job "at ruinous rates," but it makes the miller yawn when he comes to those pages filled with the matters above "substantially described and set forth."

MANY French millers mix 2 to 3 per cent. of bean flour with their wheat flour, and Parisian bakers say that the flour works better. Quite a number of mills are kept busy making flour from Egyptian beans.

THE Eureka Manufacturing Co., of Rock Falls, Ill., report business lively, and that more first-class mills have purchased the Becker Wheat Brush during the present than in any previous year.

THE cases known as the Milford, (Wis.) dam suits, brought by a number of farmers against N. S. and W. S. Greene have been finally decided in favor of the defendants. Jury decided that the overflow was not caused by the dam but by the unusual rainfalls.

READERS OF THE MILLER who have sons or daughters whom they wish to educate for business, will find the Spencerian Business College, Milwaukee, Wis., exactly suited to their wants. It is an old, staunch, thorough business training school. Students can enter the college and commence their studies at any time they wish. For circulars, address R. C. Spencer, Milwaukee, Wis.

"WOOD AND IRON" is the title of a new industrial monthly journal, published at Minneapolis, Minn., by Messrs. Hoppin & Palmer. The subscription price is one dollar per year. The initial number of *Wood and Iron* is a very handsome one, typographically, and it is ably edited. We know of no handsomer publication in the Northwest. We have no doubt but this latest aspirant for favor from a discerning public will be well received.

The Electric Purifier.

The Electric Middlings Purifier is said to be meeting with great success and is daily being introduced into flouring mills in every section of the country. The manufactory is driven to its utmost capacity to keep up with orders, and those who have introduced one machine experimentally, after trying it thoroughly, have sent in their orders for additional machines. This speaks volumes for its intrinsic merits. An award was made to the Electric Purifier at the late Paris Electrical Exhibition. The machine attracted the attention of the learned scientists of Europe and they express themselves delighted upon seeing this new practical use of that mystic substance—electricity.

Cawker's American Flour Mill Directory for 1882.

The work of preparation on Cawker's American Flour Mill Directory for 1882, is at this writing nearly completed, and it will soon go into the hands of the printer and be ready for delivery about January 1st, 1882. This directory contains several thousand more names than the previous one, and the greatest of care has been taken to make it correct and complete. Upwards of 20,000 circulars have been sent out to obtain particulars as to capacity and power of mills, and this will be a valuable feature of the directory. Cawker's American Flouring Mill Directory is a book of the greatest importance to all desiring to reach the flour-mill owners of the United States and Canada, by circulars, letters, papers, or otherwise. Several of our patrons for the previous edition (March, 1880), purchased copies for each of their traveling agents. The price of the directory is ten dollars (\$10) per copy, post-paid, to any part of the world. Send in your orders immediately. Address UNITED STATES MILLER, Milwaukee, Wis. Make all drafts and money-orders payable to E. Harrison Cawker.

New Publications.

THE COTTON GOODS TRADE OF THE WORLD, from the Department of State, Washington.

This valuable public document contains reports on the trade from American Ministers, Consuls and Consular agents in all parts of the world, and the information therein contained will doubtless prove of great value to our trade in cotton goods.

THE CENTURY MAGAZINE, for December, published by The Century Co., New York, subscription price \$4.00 per year.

The Century for December is one of the most interesting numbers we have yet seen. Among the leading articles are the following: "Characteristics of Garfield," by E. V. Smalley; "A Cruise in a Pilot Boat," by Benjamin (illustrated); "A Colonial Monastery," by Seidensticker (illus.); "Lincoln's Life Mask," by Volk; "Hieroglyphs of Central America," by Holden (illus.); "American Students of the Beaux-Arts," by Richard Whiting (illus.), and numerous others.

WEBER'S EXPORT TABLES, by Bernhard Weber, of New York, price \$5.00. For sale by the UNITED STATES MILLER, Milwaukee, Wis.

The above work is simply invaluable to all interested in the export trade, either as shippers, bankers, brokers or commission merchants. The second edition of this work is just ready for delivery.

HARPER'S MAGAZINE, published by Harper & Brothers, New York. Subscription price \$4.00 per year.

The December number of this famous periodical is replete with choice illustrations and written contributions. The following are deserving of special notice: "The Bernadottes" (illustrated); "Journalistic London," by T. B. Aldrich; "A Day in the House of Commons," by J. C. Stockbridge; "Among Our Footprints," by W. H. Gibson; "The Grave of Wm. Penn," by Alfred Story; "How America Came to be Discovered," by John Fiske, etc., etc.

J. F. Evans & Co. will have their new brick, steam, fifty-barrel flour-mill ready for operation January 1st, at Midland, Mich.

The Schlitz Brewing Company will build a dam across the Milwaukee river about a mile above the site of the old one, which was carried out recently.

The Union Iron and Steel Works, of Chicago, will light their mammoth establishment by electric light, and have ordered an engine of the Atlas Engine Works, of Indianapolis, to furnish the power.

LUBRICATING HEAVY BEARINGS.—In a recent foreign invention for lubricating heavy bearings the oil is placed over the shaft which is to be lubricated. A spindle is driven by an arm and a little band. This spindle is in the upper part of the box and inside, the box contains a worm which runs into a spur wheel. A pin on the spur wheel plays in the slotted arm of a double-ended lever. The ends of this lever are shaped like a spoon. This spur wheel with the pin is driven by the worm, and at every revolution dips one end of the lever—the spoon-shaped end—and lifts the lubricating end, whatever it may be. When this end containing the material is lifted higher than level with its center, the oil flows from the spoon towards the middle of the lever and down through a hole which leads to the oil holes of the bearings.

Thirty-Four Questions and Answers Relating to Milling.

1. What is burr stone?
A. Burr stone is a cellular silicious stone, about as hard as flint, but not so brittle.
2. Where is it found?
A. It is found in Hungary, Sardinia, Germany and France, especially at Le Ferte, Sous Juarre, and Epernon, France.
3. In what sizes do the blocks come?
A. The blocks come from four inches to two feet in diameter. The regular sizes of dressed blocks are from 75 to 100 pounds, from 12 to 20 inches down to 14 by 8 inches.
4. How many colors are there?
A. Clear white, pale blue, deep blue, light and dark gray, violet, yellow, drab and variegated.
5. How many grades of texture?
A. There are open, medium, and close grades of texture.
6. How many grades of hardness?
A. In hardness, there may be distinctly recognized a dozen grades.
7. What are the principal first-class brands or marks?
A. These marks are put on at the quarries to aid those buyers who make them up into mill stones. We may name "Anchor R," close, sharp and hard; "W," medium open, yellow and gray, medium hard, fine grained; "S," large, more sandy than "Anchor R," and "W," white, yellow and violet; "B," inferior quality, coarse in grain, and dark; "A," like "Anchor R," only gray.
8. What stones are used instead of burr stones proper?
A. Instead of burr stones proper there are used granite, sandstone and other rocks.
9. For what purpose is Esopus stone used?

A. Esopus stone is used for corn or oats.

10. Where is it found?
A. It is found in Ulster County, N. Y.
11. What is the best kind of burr for old process wheat milling?
A. The best burr for old process wheat milling is the old stock, which is more porous than the new.
12. What is the best kind for new process wheat grinding?
A. For new process wheat grinding, close to medium texture.
13. What is the best burr for middlings reducing?
A. For middlings reducing, close-grained old stock is the best.
14. What is the best for corn?
A. For corn, new stock is the best.
15. What for rye?
A. For rye, the same stone as for wheat.
16. What for buckwheat?
A. For buckwheat, the same as for wheat.
17. What is the proper kind of stone for oatmeal making?
A. For oatmeal making, Esopus or Akron stone.
18. What for ending wheat?
A. For ending wheat, Peninsula stone.
19. What for pearling barley?
A. For pearling barley, the same as for ending wheat.
20. In how many different ways are burrs mounted?
A. Burrs are mounted vertically or horizontally. The horizontal stones have either the upper or the lower the runner. Either the runner or a bed may have either rigid or oscillating connection.
21. What are the advantages of the upper runner?
A. The upper runner is generally more simple and easier to handle than the under runner, and will do better work if it gets out of truth than the under runner will do; it is easier mounted and dismounted.
22. What of the under runner?
A. The under runner feeds easier than the upper; has greater capacity, grinds cooler, and may be run at a high speed.
23. What of the vertical mill?
A. The vertical mill is very well for small mill and for rough grinding.
24. What are the advantages of the rigid runner?
A. The rigid runner, if properly made and kept in order, will do more regular grinding than the oscillating. It is better for middlings than the balanced runner.
25. What of the oscillating runner?
A. The oscillating runner will do tolerably good work, even after the spindle gets out of truth.
26. What is the proper rim speed for stones?
A. This varies according to the diameter, the texture, the dress, the material to be ground, and the material desired as the product. For average purposes, 40 turns per minute for a 4-foot stone may be taken as a basis.
27. What is the proper number of revolutions for burrs of different sizes?
A. The proper number of revolutions per minute for burrs of different sizes may be got by the Rule of Three from the speed of 140 per minute for a 4-foot burr. Thus a 3-foot burr should travel 4 to 3 as fast; a 5-foot stone 4 to 5 as fast, etc.
28. What are the highest and the lowest capacities of burrs of different diameters with wheat?
A. Capacities of stones from 14 to 42 inches in diameter, on wheat, may be thus stated: Diameter of stone, 14, 18, 20, 24, 30, 32, 36, 42 inches; bushels of corn per hour, maximum, 4, 6, 6, 8, 10, 10, 12, 14; bushels wheat per hour, minimum, 3, 4, 5, 6, 8, 8, 10, 12.
29. What with corn?
A. Capacities of stones from 14 to 42 inches in diameter, on corn, may thus be given: Diameter of stone, 14, 18, 20, 24, 30, 32, 36, 42 inches; bushels of corn per hour, fine, 8, 10, 12, 16, 20, 25, 35, 60; coarse, 10, 12, 16, 20, 30, 35, 60, 75.
30. What with rye?
A. For rye about $\frac{1}{2}$ less than for wheat.
31. What with middlings?
A. For middlings the capacities may be given as: Diameter of stone, 14, 18, 20, 24, 30, 32, 36, 42 inches; pounds of middlings per hour, 95, 125, 140, 150, 160, 190, 250, 285.
32. How many horse-power are required to drive burrs of the different diameters at average speed, with wheat?
A. The power required to drive wheat stones of different diameters may be thus approximated: Diameter of stone, 14, 18, 20, 24, 30, 32, 36, 42 inches; horse-power, 3 to 4, 4 to 6, 5 to 6, 6 to 8, 8 to 10, 8 to 10, 10 to 12, 12 to 14. That is about one horse-power per bushel of wheat per hour.
32. How many with middlings?
A. The power required to grind middlings on stones of different diameters, is about the same as for wheat, reckoning 95 pounds of middlings to 13 bushels of wheat.
34. How many with corn?
A. The power needed for corn stones will be about $\frac{1}{2}$ horse-power for every bushel of corn, or say as follows: Diameter of stone, 14, 18, 20, 24, 30, 32, 36, 42 inches; horse-power, 4 to 5, 5 to 6, 6 to 8, 8 to 10, 10 to 15, 12 to 15, 15 to 20, 20 to 25.
—*Corn Trade Journal and Miller Gazette (London.)*

The Fire Hazard of Flour Mills.

A PRIZE ESSAY BY ERNEST C. JOHNSON.

Read before the Northwestern Underwriters' Association
Chicago, Sept. 14.

(CONTINUED FROM NOVEMBER NUMBER.)

The milling machinery will here be detailed, in its order, from the receiving spout to the barrel; and, for brevity, its fire contingencies are classified as ignescent and augmentative. 1. The chief points of danger will be given of such as singly, or in combination, may produce ignition. 2. Devices that have no nominal hazard, which simply add to combustion when started, will be passed chiefly as augmentative. The grain receiving elevator, being the first working device, for brevity all mill elevators will be treated here.

Experienced millers agree that elevators are the most prolific source of flour mill fires. 1. The chief point of danger from elevators is at the pulley head. The confined space under the pulley, and between it and the cross, or strut board, fills up with dust and various materials, and keeps accumulating, if not removed, until the pressure and friction of the pulley face upon it produces ignition. 2. Elevator legs stand nearly vertical, and, of course, maintain the height originally given them, while other mill timbers, joists, etc., shrink, crosswise of the grain, settling the line shafting, and often letting the under face of the pulleys down onto this strut board. In this position, wooden pulleys have been found, in chop elevators, by friction of face, to have cut entirely through hard inch poplar, wearing away the nails, which secure the side boards, equally smooth. These boards have been found charred where the frictional fire, for want of vent, had expired. 3. Elevators often clog, and the running pulley, in the stationary belt, alone rapidly produces frictional heat and sometimes starts a fire. It is sure to do so, if the belt is cotton; even leather belting has been found burned off, and head boards charred, from this source. 4. The pulley sometimes is untrue, and, by friction against the side boards, has been known to cause fire. 5. With this concealed space full of fine dust, which it rapidly collects, with the pulley face bearing on the strut board, or, equally bad, on this compressed accumulation of material beneath, and the face of the pulley running in the clogged belt on top side, or the pulley running against side boards, will produce frictional heat with intense rapidity; and, although the center revolutions, are simply 40 per minute, only a few minutes are required for the face, running 300 feet a minute, to start a fire. Elevators, for handling grain exclusively, may be successfully run at double this speed, or have a face motion of 600 feet per minute, which may be accomplished on the same shaft with a larger pulley; as grain is more easily delivered from the cups than chop, or mill product. 6. Fire, at this point, may linger for many hours before breaking out. Its location prevents ready detection, and, once fairly started, has great destructive advantage. 7. A prominent mill-wright, of milling experience, says that he has found side boards, on pulley heads, worn almost entirely through by the friction of the belt and cups; and also many instances where frictional fires had started and smothered out.

8. The strut boards should be given sufficient inclination, from the up spout to the down spout, so that the material falling on it will run to the lower side and pass into the down spout, through a hole made for that purpose. This arrangement will also ventilate the pulley.

9. The pulley should be iron, with the face slightly raised in the center, so as to draw the belt centrally. 10. It should also have a beveled shear, on each edge of face, like flange of a car wheel, to keep belt and cups from contact with sides of spouts and head. It should be enough wider at outer edges of the shear flange to carry over any dislodged material. These two precautions will prove a great protection and should be insisted on everywhere, as the old dangerous style is almost universally used in all elevator heads. Elevators, like spouting, there being so many in flour mills, have proved great obstacles in the way of extinguishing fires, besides facilitating its rapid spread. An effectual remedy for the same will be named later.

11. Elevator boots are sources of considerable hazard, chiefly from strings and other refuse getting wound around the lower pulley, binding and producing frictional fires. Numerous fires have started in smaller mills from this source, where grain is handled more in bags. All elevator boots need care, and would be safer if entirely of metal.

There is such a diversity of separators,

smutters, scourers, and brush machines, and combinations of the same, that space will not permit detailed notice of each. 1. The fire hazard of these machines does not materially differ. 2. The rate of speed in all is substantially alike, from 600 to 650 turns per minute. 3. Each of these machines is provided with blast fans, usually of the same speed as the spindle being generally attached to it. 4. The chief points of danger are from frictional heat, and from the dust and dirt which they produce. 5. While all of them are arranged to discharge the dust outside of the building, too much of it is deposited in the mill, and should be systematically removed. 6. Dampened smut, or a few drops of oil in any of the refuse, readily produces spontaneous combustion. 7. Most of these machines are vertical, with the driving pulley between the floor and working parts, as they should be, but some are still ordered with this objectionable top gear. 8. No device of this kind should be allowed in a mill with the main driving pulley on top. 9. The machine being secured only on the floor, the strain necessary to drive the spindle and fan, at high speed, acts as a lever, producing unequal bearings, and vibrations conducive to frictional heat. 10. Again, if the driving belt is below, it is necessary to keep the dust and rubbish cleaned up and out of the way.

Cockle machines have no specific feature of danger, are usually a screen or reel of only 32 turns per minute; they are slightly augmentative, but, quite frequently, are combined with some cleaning machine.

Grading reels, for sizing the wheat, have simply a reel motion of 32, and no special points of danger, and are simply augmentative.

Devices for heating the grain are numerous. The temperature sought is necessarily so low as to render the style in general use hazardless; but there are a few forms, designed for water mills, which require a fire space to produce steam. The fire hazard of this style is simply that of a stove and its attachments, and should have similar protection. In any case, these are on the grinding floor only, and under its supervision.

Palmer's hot air wheat heater sets on the curb, and has a kerosene lamp for heating; these should be discarded as uninsurable.

Magnets, in the grain spouts to the reduction machines of all systems, are indispensable. The amount of wire, ends, tacks, nails, and screw heads, and metallic substances extracted, in the smallest custom mill, is astonishing. These are inexpensive, and should be universally used.

The fire contingencies of the usual mill-stone system are better understood by millers generally than any other cause, and rank among the chief sources of mill fires. 1. Any metallic substance between the burrs will not only strike off sparks, but will become red hot before it is let go at the skirt. 2. Danger from this source is not particularly reduced in high grinding without magnets, because the burrs, running dry, would still strike fire; and any hard substance passed between them would produce the same result, by bringing one side of runner in contact with the bedstone. 3. The center speed of mill stones, in high milling, is reduced to from 120 to 150 turns, but this rate still gives a surface speed of about 1,600 feet per minute, at the runners' skirt. 4. The necessity of a more perfect tram and running balance in modern burr milling, and the setting of the runner higher, and reducing the temperature of the chop to about 50 deg. higher than the mill atmosphere, may somewhat reduce the contingency of fire from frictional sparks; but the possibilities from increased number of operations on the same amount of grain, will fully offset it.

Automatic tell-tale bells, attached to all feed spouts, should be indispensable, especially as so much regrinding increases the tendency to clog.

While the chief object of using the mill-stone exhaust is to grind cooler, a proper form of it will greatly reduce the danger from frictional fire, but improper styles have been prolific aids to explosions therefrom. Any style of mill-stone exhaust that does not condense the dust at the stones, but blows it through a spout into a dust-house inside of the mill, increases the danger of explosions and should not be tolerated. Numerous explosions have been promoted by this style of exhaust. Prominent among them were the Tradeston mills. The Behn's mill-stone exhaust, with a metal, spiral, automatic drop for the chop, and exhausting outside the building, is the proper style, and has no objectionable features. Several cases are instanced where frictional fire inside the curb entirely destroyed the dust screens of Behn's exhaust, without communicating the fire to any other part. Any style

of exhaust that does not carry dust through its conduits, that discharges the air outside the mill, and provides an automatic cut-off to smother sparks in the chop delivery, is reasonably safe. Mr. Gustav Behn, a civil engineer of Lubeck, Germany, who has made flour mill explosions a special study, speaks as follows of the danger from mill-stone sparks: "Through a series of observations, made wide and near, extending over four years of time, and embracing over a thousand runs of burrs, the writer found that in one year for every 122 run of burrs at work, one run of burrs, on an average, would afford a practical illustration of the ability of these sparks to accomplish destruction."

Automatic mill-stone lifts, as a precaution, are noteworthy. Fruen's is a simple device and cumbersome; when set, if the burrs run dry from any cause, the cords, weights and lever attachments to the lighter rod under the floor, raise the runner and divert the certain dangers of this condition. They are said to be efficient safeguards, and their use should be encouraged.

There are various styles of under-runner and other burr mills, designed for a single purpose, and others intended as a specific system for all reductions; but none of them have gained a noteworthy position.

Potts' ending stones for preparing the wheat, a cleaning process, consist of small burrs with an under-runner speed of 300 to 500 turns per minute. The danger of friction fires from these, on account of speed, etc., is about the same as that of the ordinary mill-stone plant. These mills have not been largely adopted, and many have discarded them entirely after thorough trial and purchase. It is the belief of practical millers conversant with them that they will not succeed.

All of these small burr mills are speeded, for the various reductions, from 300 to 700 turns per minute. Their liability to produce frictional fires is not less than the old system. Provided with no exhaust, the high temperature of the chop from them is an objection which will probably prevent their successful introduction.

There are two leading roller mill systems, both being introduced as fast as they can be produced—the Stevens and Gray's. Both are successful, but each possesses a special advantage over the other at certain points of reduction, and the combination of the two is desirable. Stevens' rolls on the first two, and Gray's on the last three reductions, with Stevens' rolls for cleaning the bran, gives the best results.

Corrugated iron rollers, with differential speed, are used for the various breaks of the grain. The maximum speed of these is 350 turns, giving a surface rate of about 850 feet per minute. A speed of only 204 for the fast, and 84 for the slow roll, is used on the five breaks by several large mills; but the authority quoted claims that this rate of speed is too slow, that it necessitates setting the rolls so close together as to make more flour on the first and second breaks, and produces more heat in the chop, than a higher setting and speed does. The chief aim of modern milling is to make the least flour possible on the first and second breaks, and to make all the reductions with the lowest possible temperature in the chop. This expert also states that, with an aim to increase the capacity of rolls, he experimented at length with 14x36 inch rolls in proper condition, but that they were so heavy, and had to be set and speeded so slow, that they not only produced too much flour on first and second breaks, but also produced so much frictional heat that it was necessary to stop them frequently to prevent fire. He also states that the large rolls seeking adoption now in Europe will certainly prove failures, that the gain in capacity will be more than offset by loss in other directions. Properly the temperature of the chop from rolls is about 10 deg. higher than the mill atmosphere, but if the feed is increased by crowding, its temperature may be raised 30 to 40 deg. higher.

Any metallic substance passing between the rolls is heated red-hot, and frictional sparks would probably be added to this fire contingency. Cog gear is objectionable for driving rolls, and even in those delicately adjusted machines which use such, might produce unsafe frictional sparks or heat. A poor quality of oil, or neglect in lubricating, would rapidly develop danger.

Smooth iron and porcelain rolls, with uniform speed of 300 turns, are used to flatten the germ, and with different speed to reduce the fine middlings, and also, by some, to clean the bran. These rolls run very close together, and the porcelain surfaces, if empty, lightly brush each other, and rapidly produce frictional heat, so much so that the surfaces soon

crack and chip, and the porcelain shell finally breaks in pieces. Reliable authority states that a fire was started in the Camp Spring Mills at St. Louis from this source. A miller in Germany states, as the result of some of his experiments, that hard pressed heaps of flour are more liable to take fire than most other combustible materials. He also states that a roller pressed some flour into a heap, in the course of its operation, and then set fire to it by friction.

Roller mills have been in use in Europe for many years, and if the London tariff is any relative measure of their hazard, it would seem to exceed even that of mill-stones. The extra charge for each set of rolls, beyond five, is 6d. per cent. on £100; i. e., 25 cents on \$1,000.

"Jones' New Process Mill" consists of a stone roller and concave. The system is designed to make all the reductions, either in the half high process, or in the gradual, consisting of six reductions. The maximum speed given the roller varies from 200 to 400 turns in the various operations. The chop from their reductions has an average higher temperature than from rolls. The fire hazard of this system probably does not differ from other roller systems.

Mills' gradual reduction machines are designed to constitute a complete system, except the reduction of the middlings, which may be treated by burr or roller mills at option. Two metal horizontal discs of 18 inches surface diameter, with depressed faces, except the belt corrugations, three inches wide at the skirt, form the chief dissemblance to other forms of portable and under-runner mills. The action is an under running disc, held rigid on the spindle, speeded from 500 to 700 turns, according to the work—same as similar sizes of under-runner burr mills—which give an average surface motion at the skirt of about 3,000 feet per minute. The boxes are delicately contrived for the speed rate, very like those of the "Munson" under-runner burr mill, with double bearing surface in upper box, running in a chamber of oil, and with similar transport and lighter screw. Five reductions are made, by five specially adjusted machines. The average temperature of the chop must naturally be higher than from rollers, on account of speed and friction. The capacity is given as from 150 bushels per hour in the first, to 50 in the fourth and fifth reductions. The frictional fire contingencies in these cannot be less in any respect than that of other burr systems mentioned. The frictional effect of a speed rate of 550 turns, with a face motion of 2,700 feet in first reduction, carrying 2½ bushels or 150 lbs. of grain per minute, cannot be regarded as automatic, but must have close supervision to guard against accident. A poor quality of lubrication in these boxes, so near the running disc, and with their extensive frictional surfaces, would rapidly start a fire.

The agitator is simply a normal speeded reel (32) to receive and cool the chop, and better prepare it for free bolting; it is more augmentative than other single reels, because the higher temperature of the agitated chop in it would be more sensitive to contact of fire.

Scalping reels of wire gauze, with 32 turns, have no feature of hazard except that which attends all journals regardless of speed, the contingency of drops of oil in dust, or product, left on floor, thrown into feed bins, or left in mill, spontaneously igniting; they are augmentative.

Bolting chests are chiefly augmentative, and still numerous accidents from ignition of dust have occurred from use of open and improperly protected lights during their supervision. The known results of some of these was simply to singe the miller's hair, knock him off the step-ladder, or flash and expire from concussion of air.

A remarkable instance occurred in a Cleveland mill. The fire filled the entire bolt, and was extinguished only by thoughtfully breaking the upright bolt power shaft, stopping the reels, and beating the fire out with brooms; the fire had extended to the dusty, cobwebbed beams. A miller in the same city tried to insert an open light into a bolting chest of a large mill; he had strength enough left to crawl out, but had not the courage to tell the adjusters, much less his employers, how the fire started. Perhaps he did not wish to expose the hazard of such action.

The number of bolting reels is at least trebled in modern mills. A 275 bbl. Chicago mill, on the old process, employed nine run of burrs and 14 bolting reels; to-day the same mill, with two stories added on top, with 15 run of burrs, 16 sets of rollers, 27 purifiers, and 50 bolting reels, or four times the machinery on the gradual process, has a capacity of 500 bbls.; it is clear that if it reeled before,

it must be real-dizzy now. The necessity of frequent supervision of the bolting chests, letting dust into the mill, and the accidents attending same, constitute their nominal fire hazard. The conveyors are the chief points of danger in the bolting chest; they frequently choke up and pack so tight with material as to heat and ignite from friction within. The principal causes of this choking are too small a discharge, too small conductors from the discharge, and too small and too flat down spouts, especially in damp atmosphere. Spouting for these conveyors, as well as for all product handling, should never have less than 45 degrees pitch, and a tin bottom should be put in conveyor ends at the drop. Millwrights fully understand this dangerous tendency in chop conveyors, but still, to serve some other purpose or convenience, they frequently give these spouts less capacity and less pitch than is safe or should be tolerated. And once on fire they are difficult to suppress. Bolting chests should have glass plates, at ends and sides, through which to observe the operation without opening, and provided with tight fitting slides on inside, to remove the dust, and to take their place in case the glass is broken. They should be placed with gear ends toward the best light, and so banked above each other as will simplify their supervision and concentrate their possible oil drippings and dust. Belt gear is preferable, because there is less greasy waste from it, and the danger of frictional sparks from bound wheels is removed.

Purifiers of endless number and variation are in the market, and more coming. Their light construction and agitated contents makes them decidedly augmentative, and their high speed, in light frames, makes them somewhat ignescent. Their fans run from 400 to 600 and upward; the shaker from 400 to 450. The chief hazard of the best styles is from not being properly braced when set for the speed of gear, inattentive supervision, poor and deficient lubrication, not being properly leveled, or twisted by sagged floors, causing unnatural bearings and frictional heat. Repeated heating of the eccentric bearings of a purifier, in a Des Moines mill, disclosed that there was an unnatural bearing in the frame, which was finally supposed to be removed; but it ultimately burned the top off the mill. There are some open purifiers still in use in smaller mills; they need no comment here, for probably most insurers refuse to write within 150 feet of them.

Imperfect exhaust conduits from purifiers sometimes deposit quantities of dust on the machine and in the mill. This is liable to absorb oil, and, if put into feed or stock bins, is exceedingly apt to produce spontaneous combustion. Fully a half bushel of product was recently seen on top of a purifier around a defective joint of its exhaust spout; also a quantity of same on the floor, with a puddle of oil in it. It was removed, but not to the stock bin. Purifiers need scrutinizing care, should be concentrated on the main bolting floor, if possible, for convenience of supervision, and for cleanliness generally.

Exhaust and blast fans, of large size, for collecting and condensing dust from many machines, are speeded from 1,000 upwards; the resistance of air in such produce a heavy draught on their bearings, and they must have proper and frequent attention.

The dust house should be outside the mill, with a solid wall on the mill side, even when dust from reducing machinery is not discharged into it. A dust house in the mill, with direct exhaust into it from the burrs, renders the property uninsurable at any obtainable rate. There are some average sized mills that have a dust room of canvas sides in mill attic; it is a mystery that such are insured at all. All equally dangerous devices should be so discriminated against, by rate, as to remove them.

The mill owner may often be ignorant of the extreme danger of such fire-traps; his interest is to put dollars into his pocket, that of insurers to avert danger and ignition; therefore, the surest argument against defects must be a discriminating tariff, invariably collected if deficiencies are not corrected, or declination of the risk. Many disastrous fires have been averted by dust houses being outside the mills, the most recent being that of the Camp Spring Mill, at St. Louis. If necessary, a lightly constructed dust house, with substantial base, may be made approximately safe on top of mill building.

All dust houses must have free ventilation; if not provided with exhaust condensers, a much larger exit is required to liberate the blast, to prevent condensation and danger of spontaneous combustion, deemed possible by some experienced millers, and proven by known fire occurrences.

The Washburn compartment dust house and other similar inside arresters are doubtless improvements on old internal styles; but if the disaster of old "Mill A" was a correct measure of the destructibility of ignited mill dust, then the smallest compartment, practical for such purpose, being diffused with this powerful element, is large enough, when fire reaches it, to produce a fatal explosion.

There is a reasonable belief entertained by some experienced millers that a more powerful agent supplemented mill dust in that terrible calamity; this will be presented under explosions.

If dust rooms must be made inside the mill, then choose the compartment, or dust arrester style, with heavy and substantial internal walls, and built against outside openings of the same or nearly equal width, covered only by light iron-clad material, which may be easily blown outward without weakening the mill structure.

Dust receivers and arresters of several styles are in use; a vertical reel of low speed, with canvas wings, is quite satisfactory; these, of course, tend to reduce the quantity of material in dust houses, and, while they are augmentative, are about the same hazard as the Washburn compartment dust house.

Sizing reels for classifying middlings usual speed, and are chiefly augmentative.

Conveyors are not particularly augmentative, and but slightly ignescent. They sometimes clog, from various causes, chiefly from improper construction, as stated in connection with bolts above; both tube and auger should be of metal to smother out fire in them from any sources. They should be accessible at either end for inspecting and cleaning.

Bran scourers are numerous, and vary equally in speed and likeness; they are for cleaning the bran. Among the highest speeded devices for this purpose are the vertical iron disc machines, with steel pins or beaters, similar to Mr. Mills' double bran machine described below. There is a bran scourer called the "Dismembrator," a device imported from Germany, consisting of iron and steel discs, very similar to that of Mr. Mills', and speeded from 1,000 to 1,500 turns per minute. One of the largest mills in the Northwest is using it, and regards its hazard not greater than that of a large "Sturtevant" fan. It may not be, but, while the speed of each are about equal, there are contingencies from metallic substances in the bran not possible in the fans. The fire hazard of most of these is equal to any of the wheat cleaning machines, and are not automatic, but must have care.

"Mr. Mills' Double Bran Machine" consists of two stationary vertical iron discs of 32 inches surface diameter, with eight rows of steel pins, set in concentric circles; and a revolving vertical disc of six radial sections of steel pins, set in seven curved, oblique, transverse rows, extending equally on each face, which, in motion, pass between the pins projecting from the stationary discs. The bran is fed at the center, on each side, and by centrifugal force, driven outward through the pin rows, cleaned and delivered at the marginal bottom spouts. The speed rate of this center disc is 1,200 turns, giving a marginal motion of 9,000 feet per minute, with capacity to clean 1,000 lbs. of bran per hour. The boxes are especially adapted with oil chambers. The fire contingencies of this machine, from any hard substances entering it, poor oil or deficient lubrication, have not yet been developed, and speculations are unnecessary.

This machine is not credited with any special advantages by some practical millers who have examined its operations. They believe Stevens' roll more efficient and less hazardous. This machine does not take the place of a bran duster, but its object is the same as that of regrinding, or rolling of the bran.

Bran dusters are usually either a vertical or horizontal wire reel and brush of 400 turns per minute. The fire contingencies of these are not less than, nor particularly different from that of a smutter or brush machine, and should have equal care against accident. The fine flour removed from the bran by bran dusters frequently will not feed, especially in heavy atmosphere; it is driven to the top of the brush, where it remains, and by friction is heated dangerously hot.

It has been found in this condition unbearable to the hand. The position of this machine, usually on top floor, renders it more objectionable than any one cleaning machine.

Flour mixing machines of usual form are very similar to and possess simply the hazards of conveyors. There is a centrifugal machine, with capacity to mix 100 bbls. flour per hour, which in use may develop some hazard.

Stock bins should have glass plate indica-

tors down the side, to show the quality of contents. They should not be opened or entered except when the mill is not running, and then with thoroughly protected lamp.

Flour packers possess contingencies nearly identical with all down spouts which handle product, except there is a greater liability to clog, and when started a greater chance to produce "fluff," or cloud of dust in the mill.

Corn shellers are always found in smaller merchant and custom mills. These are now usually provided with a blast fan, and have a speed of about 600. Their fire contingencies are quite identical with smutters and brush machines, and need the same attention.

Corn dryers or heaters, by fire heat, are very dangerous, since a greater amount of heat is used, and it is liable to get hotter than required or safe; steam for the same purpose is much safer, and should be used instead in all grain dryers. These must not be confounded with wheat heaters for grinding purposes, as seems prevalent with insurers.

Palmer's hot air grain heater, however, arranged with kerosene oil lamp attachment to stand on the curb, is very bad, and should not be tolerated at all by insurers.

The arrangement of machinery should secure simplicity, reducing the number of elevators, spouts and conveyors to the lowest possible minimum. Convenience, placing important, high-speeded and cleaning machines which require frequent watching as near the reducing floor as possible. System, securing the most even distribution of daylight and greatest facilities for clear lines.

There should be two watchmen with watch clock and keys at all high-speeded journals, the one to watch at night and the other by day. In average mills, when running, these men may do the oiling also.

Discipline of a military nature should prevail in flour mills; each man should have his duties, understand their importance, and perform them without deviation or omission. Sweepers should be looked to for cleanliness, which will aid more than hand hose or extinguishers in controlling a fire.

Temperance, of a total abstinence kind, should be a qualification for employment in a flour mill.

[TO BE CONTINUED.]

American Milling Methods.

BY ALBERT HOPPIN, ESQ.

[Concluded from November number.]

The germ middlings, after being slightly crushed as before stated, are sent to a reel covered with five feet of No. 13 cloth, five feet of No. 14, and the balance with cloth varying in coarseness from No. 7 to No. 00. The flour from this reel goes into the patent, the tailings to the red dog rolls, the middlings from next the tail of the reel which still contain some germ to the second germ rolls, while the middlings, which are free from germ, go to the middlings stones.

The tailings from purifiers 3, 4, 5 and 6, the material from the reel following the second germ rolls, which is too good for shorts but not good enough to be returned into middlings again, and the tailings from the reel following the first germ rolls are sent to the red dog rolls, which, as I have stated, are finely corrugated. Following these rolls is the red dog reel. The flour goes to the red dog bin, the tailings to the shorts bin, while some stuff intermediate between the two, not fine enough for flour but too good for shorts, is returned to the red dog rolls.

This finishes the programme. I have not given it as one which is exactly suited to winter wheat milling. However, as I said before, the general principles are the same in either winter or wheat gradual reduction mills, and the various systems of gradual reduction, although they differ in many points, and although there are probably no two engineers who would agree as to all the details of a programme, the main ideas are essentially the same. The system has been well described as one of gradual and continued purification. In the programme above given the idea was to fit up a mill which should do a maximum amount of work of good quality with a maximum amount of expenditure and machinery. In a larger mill or even in a mill of the same capacity where money was not an object, the various separations would probably be handled a little differently, the flour and middlings from the first and fifth breaks being handled together, and those from the second, third and fourth breaks being also handled together. The reason for this separation being that the flour from the first and fifth breaks contain, the first a great deal of crease dirt, and the fifth more bran dust than that from the other breaks, the result being a lower grade of flour.

The object all along being to keep the amount of flour with which the dirt can get mixed as small as possible and not to lower the grade of any part of the product by mixing it with that which is inferior, always bearing in mind that the aim is to make as many middlings as possible, for they can be purified while the flour can not, and that whenever any dirt is once eliminated it should be kept out afterwards. This leads me to say that if a miller thinks the adoption of rolls or reduction machines is all there is of the system, he is very much mistaken. If anything, more of the success of the mill depends upon the careful handling of the stuff after the breaks are made, and here the miller who is in earnest to master the gradual reduction system will find his greatest opportunities for study and improvement. A few years back it was an axiom of the trade that the condition of the millstone was the key to successful milling. This was true because the subsequent process of bolting was comparatively simple. Now the mere making of the breaks is a small matter compared with the complex separations which come after. In the foregoing programme we had five breaks or successive reductions. Although this is better than a smaller number, I will here say that it is not absolutely essential, for very good work is done with four breaks. The mill for which this programme was made, including the building, cost about \$15,000, and is designed to make about sixty per cent. of patent, thirty-five per cent. of bakers, and five per cent. of low grade, results which are in advance of many larger and more pretentious mills.

One difficulty in the way of adopting the gradual reduction system to mills of very small capacity is that the various machines require to be loaded to a certain degree in order to work at their best. It is only a matter of short time when our milling inventors will design machinery especially for small mills; in fact they are now doing it, and every day brings it more within the power of the small miller to improve his manner of milling. To show what can be done in this direction I will briefly describe a mill of about ninety barrels maximum capacity per twenty-four hours, which is as small as can be profitably worked. I will premise this description by saying it is designed with a view to the greatest economy of cost, the best grade of work, and to reduce the amount of machinery and the handling of the stuff as much as possible. This latter point is of much importance in any mill, either large or small, no matter upon what system it is operated, for it takes power to run elevators and conveyors, and especially in elevating and conveying middlings, especially those made from winter wheat, their quality is injured and a loss incurred by the unfavorable amount of flour made by the friction of the particles against each other. So much is this the case that in one of our largest mills it is deemed preferable to move the middlings from one end of the mill to the other by means of a hopper bin on a car which runs on a track spiked to the floor, rather than to employ a conveyor. A mill built as I am going to describe would require from fifty to sixty horse-power to run it, and including steam power and building would cost from \$10,000 to \$12,000, according to location. I give it as of interest to those among your number who own small mills and may contemplate improving them.

The building is four stories high, including basement, and thirty-two feet square. It would be some better to have it larger, but it is made this small to show how small a space a mill of this size can be made to occupy. No story is less than twelve feet high. The machinery is very conveniently arranged and there is plenty of room all around. The system is a modification of the gradual reduction system, the middlings being worked upon millstones. The first break is on one pair of 9x18-inch corrugated iron rolls, eight corrugations to the inch, the corrugations running parallel with the axis of the rolls. The second break on rolls having twelve corrugations to the inch, the third sixteen, and the fourth twenty to the inch, while the fifth break, where the bran is finally cleaned, has twenty-four corrugations to the inch. The basement contains the line shaft and pulleys for driving rolls, stones, cockle machine and separator. The only other machinery in the basement is the cockle machine. The line shaft runs directly through the centre of the basement, the power being from engine or water wheel outside the building. The first floor has the roller mills in a line nearly over the line shaft below the middlings stones, two in number, at one side opposite the entrance to the mill, the receiving bin at one side of the entrance in

the corner of the mill and the two flour packers for the bakers' and patent flour in the other corner. This arrangement leaves over half of the floor area for receiving and packing purposes. The bolting chests, one with six reels the other with three reels begin on the second floor and reach up to the attic. An upright shaft from the line shaft in the basement geared to a horizontal shaft running through the attic parallel with the line shaft below comprise about all the shafting there is in the mill. There is a short shaft on the second floor from which the two purifiers on this floor and the two in the attic are driven, and another short shaft on the first floor to drive the packers. There are four purifiers, two on the second floor and two more directly over them in the attic. The elevator heads are all directly upon the attic line shaft, and the bolting chests are driven by uprights dropped from this shaft. The combined smutter and brush machine is on the third floor at one end of the bolting chests and directly over the stock hoppers. This comprises all the machinery in the mill. The programme is about as follows:

The break reels are clothed as follows: First break No. 20 wire cloth, second break No. 22, third break No. 24 and fourth break No. 24. The material passing through these scalping reels, now called chop, goes to a series of reels, the first clothed with Nos. 6, 4 and 0. The material passing over the tail is sent to the germ purifier, that passing through Nos. 4 and 0 to the coarse middlings purifier, and that through the No. 6 goes to the reel below clothed with Nos. 12 and 13. Some nice granular flour is taken off from this reel; the remainder, which passes over the tail and through the cutoffs, goes to the next reel below clothed with Nos. 14, 15 and 9. Some good flour comes from the 14 and 15; that which passes through the 9 goes at once to the stones without purifying, while that which passes over the tail is sent to the fine middlings purifier.

After the purification the middlings are ground on stones and bolted on Nos. 13 and 14 cloth, after having been scalped on No. 8. The germ middlings are crushed on smooth rolls and bolted on Nos. 12 and 13. What is not crushed fine enough goes with the poor tailings to the second germ rolls, and from these to a reel by themselves or to the 5th reduction or bran reel. A mill of this kind could be made much more perfect by an expenditure of two or three thousand dollars more. I have instanced it to show what can be done with gradual reduction in a very small way.

In mills of from three hundred to five hundred barrels capacity and still larger, the programme differs considerably from that I have sketched, the middlings being graded and handled with little if any returning, and are sized down on the smooth rolls, a much smaller percentage of the work of flouring being done on mill-stones. For a three hundred barrel roller mill the following plant is requisite: five double corrugated roller mills, five double smooth roller mills, three pairs of four feet burrs, sixteen purifiers, four wire scalping reels six feet long, one reel for the 5th break, one reel for low grade flour, eight chop reels, seven reels for flour from smooth rolls, three reels for the stone flour, two grading reels, three flour packers and necessary cleaning machinery. The reels are eighteen feet thirty-two inches. The programme is necessarily more complicated.

When it comes to the machinery to be employed in making the reductions or breaks, the miller has several styles from which to choose. Which is best comes under the head of what I don't know, and, moreover, of that which I have found no one else who does know. Each machine has its good points, and the mill owner must make his own decision as to which is best suited to his purpose. The main principles involved are to abrade the bran as little as possible while cleaning it thoroughly, and to make as little break flour and as many middlings as possible, the latter to be made in such shape as to be the most easily purified.

Regarding the difference between spring and winter wheat for gradual reduction milling, it may be stated something after this manner: Spring wheat has a thinner and more tender bran, makes more middlings because it is harder, and for the same reason the flour is more inclined to be coarse and granular. In milling with winter wheat, especially the better varieties, there will be more break flour made, the middlings will be finer with fewer bran specks, and the bran more easily cleaned because it will stand harsher treatment. Winter wheat, moreover, requires more careful handling in making the breaks,

not because of the bran, but to avoid breaking down the middlings and making too much and too fine and soft break flour. In order to keep the flour sharp and granular, coarser cloths are used in bolting, and because the middlings are finer the bolting is not so free and a larger bolting surface is required. In milling either spring or winter wheat there should be ample purifying capacity, it being very unwise to limit the number of machines so that any of them will be overtaxed. The day has gone by when one purifier will take care of all the middlings in the mill.

There is one point which is of much interest to mill owners who wish to change their mills over to the gradual reduction process, that is, how far they can utilize their present plan of milling machinery in making the change. Of course the cleaning machinery is the same in both cases, so are the elevators, conveyors, bolting chests, etc. But to use the mill-stone is a debatable question. After carefully considering the matter I have come to the conclusion that it has its place, and an important one at that, under the new regime, viz.: that of reducing the finer purified middlings to flour. The reason for this lies in the peculiar construction of the wheat berry. If the interior of the berry were one solid mass of flour, needing only to be broken up to the requisite fineness, it could be done as well on the rolls. But instead of this, as is well known, the flour part of the berry is made up of a large number of granules or cells, the walls of which are cellular tissue, differing from the bran in that it is soft and white instead of hard and dark colored. It is also fibrous to a certain extent, and when the fine middlings are passed between the rolls instead of breaking down and becoming finer it has a tendency to cake up and flatten out, rendering the flour soft and flaky. It does not hurt the color, but it does hurt the strength. When the mill-stone is used in place of the roll the flour is of equally good color, and more round and granular. I know that in this the advocates of smooth rolls will differ from my conclusion, but I believe that the final outcome will be the use of mill-stones on the finer middlings, and in fact on all the middlings that are thoroughly freed from the germ.

It has been said that that which a man gives the most freely and receives with the worst grace is advice. I will, however, close with a little of the article which may not be wholly out of place. If you have a mill do not imagine that the addition of a few pair of rolls, a purifier or two and a little overhauling of bolting chests is going to make a full-fledged Hungarian roller mill. If you are going to change an old mill or build a new one, do not take the counsel of every itinerant miller or millwright who claims to know all about gradual reduction. No matter what kind of a mill you want to build, go to some milling engineer who has a reputation for good work, tell him how large a mill you want, show him samples of the wheat it must use and the grades of flour it must make, and have him make a programme for the mill and plan the machinery to fit it. Then have the mill built to fit the machinery. When it starts follow the programme, whether it agrees with your preconceived notions or not, and the mill will, in ninety-five cases out of one hundred, do good work.

The American Grain Trade.

BY R. H. EDMONDS, OF BALTIMORE, MD.

The production of cereals in the United States has attained such enormous proportions, and the amount exported to foreign countries is so rapidly increasing, that the statistics of this trade, both past and present, are of absorbing interest to Europeans as well as Americans. In all the ramifications of the world's commerce the American grain trade exerts a most potent influence. Wheat, it is stated, was first sown in this country in 1602, at Cuttyhunk, one of the Elizabeth Islands, by Goswold, when he explored the coast. In Virginia wheat was sown in 1611 for the first time, and from that date it increased quite rapidly until, in 1648, it is recorded that there were several hundred acres of it.

In the Dutch colony of New Netherlands wheat was cultivated at an early date, and in 1626 samples of this cereal were taken to Holland to show what could be raised in the new country. In 1608 the James river settlers, under the instructions of the Indians, began to raise corn, and in three years thirty acres were devoted to its cultivation. When the Pilgrim Fathers landed on Plymouth Rock they found the Indians raising corn, and under the teachings of the red men the Pilgrims began to grow it in 1621. Following the ex-

ample of the Indians, the Pilgrims manured their land with alewives, then called "shad." An early chronicler of the Pilgrims says: "According to the manner of the Indians, we manured our ground with herring, or rather shad, which we had in great abundance, and take with great ease at our doors;" and later, "You see in one township a hundred acres together set with these fish, every acre taking a thousand of them; and an acre thus dressed will produce and yield as much corn as three acres without fish." Rye, barley and oats were also introduced and cultivated by the early settlers. From these small beginnings the production of the different cereals steadily increased, and at a comparatively early date this country not only raised enough grain for their own needs, but each year, with a few exceptions, had a surplus for foreign shipment.

During the four years, 1836, 1837, 1838 and 1839, the yield of wheat was very small, and it was necessary to import a considerable quantity from Europe to meet the deficiency in this country. In 1837 alone, over one hundred wheat and flour laden vessels arrived at the port of Baltimore from Europe, the bulk of grain coming from Germany and Holland, although England sent us a few cargoes. The statistics of the export trade since 1820 have been compiled with great care, and are presented in a concise form. The exports of wheat and flour from the United States, summed up in five year periods, has been as follows (flour reduced to bushels in the total):

Five fiscal yrs. ended	Wheat, bushels.	Flour, barrels.	Total, bushels.	Per ct. flour in total.
1825.....	72,874	4,451,384	18,878,410	99.61
1830.....	125,547	4,651,940	23,385,247	99.46
1835.....	614,145	5,241,964	26,823,965	97.20
1840.....	1,842,841	4,092,923	22,397,501	91.70
1845.....	2,946,861	6,274,697	34,320,346	91.10
1850.....	10,184,645	12,284,828	71,608,765	85.77
1855.....	16,446,955	13,149,618	82,194,545	79.90
1860.....	38,898,573	15,778,268	117,699,913	67.00
1865.....	138,396,907	19,757,733	237,985,572	42.09
1870.....	81,880,364	11,454,785	139,082,289	41.20
1875.....	224,019,376	16,797,684	308,007,796	27.20
Total for 55 years.....	515,177,088	113,935,733	1,081,404,369	52.6
1875-6.....	55,073,122	3,935,512	74,750,682	26.32
1876-7.....	40,325,611	3,343,665	57,043,936	29.30
1877-8.....	72,404,961	3,946,855	92,139,236	21.42
1878-9.....	122,353,936	5,629,714	147,687,649	17.10
1879-80.....	153,352,795	6,111,419	180,754,180	15.20
1880-81.....	149,451,770	7,874,483	184,886,943	19.20
Total for 6 years.....	592,862,995	30,841,648	737,262,626	18.8
Grand total for 61 years.....	1,108,039,283	144,777,381	1,818,666,995	35.80

One of the most important facts brought into special prominence by the above exhibit, is the large decrease in the relative proportion of flour shipped to foreign countries, compared with the exports of wheat. During the five years ended 1825, the exports of flour and wheat combined were 18,878,410 bushels, of which 99.51 per cent. was shipped in the form of flour. In the next five years the percentage of flour was 99.46, a small decrease, and this was followed by 97.2 per cent. for the five years ending 1835, and that in turn by 91.7; then by 91.1, and steadily on down, without a single exception, till for the five years ended 1875, the proportion of flour was only 27.2. Taking each year after 1875, the falling off in the percentage of flour exported continued steadily, with the one exception of 1877 down to 1880, during which year the percentage was 15.2, the lowest figures in the history of the export flour trade. In the fiscal year 1880-81 there was a slight rally.

For the sixty-one years ended 1881, the exports of corn aggregated 837,888,184 bushels, valued at \$530,902,136, while the exports of meal for the same time were 15,797,584 barrels, valued at \$58,452,795. The aggregate value of the exports of breadstuffs from the United States for the sixty-one years ended June 30, 1881, was:

Wheat.....	\$1,386,464,469
Flour.....	906,754,694
Corn.....	530,902,136
Meal.....	58,452,795
Other breadstuffs and grains.....	27,276,409
Total.....	\$2,909,856,503

A new mill is about to be erected at Wartrace, Tenn., by Messrs. Anderson & Johnson. Mr. Anderson formerly operated the old mill at Wartrace. The new mill will consist of four run of stones and two sets of rolls, and will be driven by an Atlas engine. The entire machinery comes from the shops of Nordyke & Marmon Co., of Indianapolis, Ind.

The value of exports of breadstuffs for nine months ending September 30 last, \$177,452,349 against \$209,742,770 for the corresponding period of a year ago. The Department of State is informed the expected deficit in the wheat crop of France will be 58,000,000 bushels, which must be supplied mainly from the United States. The crop in the neighboring countries is being far from what was anticipated. The wheat crop of Algeria is in a very deplorable condition.

Jottings From an Engineer's Note Book.

[Written for The United States Miller.]

There have been many cases where loss has been caused by lack of having employed proper expert skill, and the record of these taken at random from actual practice could not but prove interesting and profitable to those who read them. The cases which follow are given with literal truth, the names and places being suppressed for obvious reasons.

One of the most careful railroad corporations in the country, one which by its extreme care had fewer accidents than others of the same length and traffic, spent thousands of dollars per year in trying to preserve its track embankments at a certain slope, while the nature of the material was such that it could never be made to hold that slope. For instance, dry sand, gravel and earth, slope 1½ to 1, when dumped in large quantities from carts and wheelbarrows, and the neat slope of 1½ to 1 that the railroad company tried to maintain was impossible, as could have been foretold had the question been asked before the case was put in professional hands for treatment.

A party having a bank of corundum took a contract to furnish the material crushed into grains of a certain size, at a certain price, without knowing that corundum comes next to the diamond in hardness. Trying the large lumps in a Blake crusher, the belt slipped; wider and heavier belt, with greater wrap around the pulley and more tension, also slipped; and after getting on the crusher all the power that could be put to it, the jaws broke. Yet this material can be handled quite well by stamps, and very easily by rolls properly managed.

A steam engine was designed and built by an inventor almost without drawing, and entirely without any theoretical knowledge of the strength of the parts or the dimensions of ports, point of cut off, etc. The result was that the machine, costing \$3,500 (most of which was for changes), and after several strengthenings, was a total failure, considered as a machine or as a motor. From a set of plans costing \$100 the engine could have been built for \$1,250, and would have run without danger or failure.

The patentee of a bearing metal put it upon the market as guaranteed better than phosphor bronze, without having any tests made of its wearing and anti-friction qualities. The material proved to have neither, causing much loss to the maker, who could have been saved this by having made before making his guarantees and sales the tests which he had to have made later to try the worth of the metal.

A manufacturer of leather belts, trying something new in tanning and making up, had doubts about its value. Sending specimens to be tested for tensile strength and driving power, he discovered, very much to his advantage, that the new material, instead of being less valuable than the old, was much better in every way.

A manufacturer of cotton belting, hearing from time to time that cotton belting had less driving power than leather or rubber, had samples tested for strength and driving power, expecting to find that the strength was greater and the driving power less. He found that both were far ahead of his expectations, and that the driving power of his particular kind of cotton belting was greater than that of either rubber or leather.

In an electrotyping establishment where there was much trouble with the deposition of the copper, causing loss of money and custom, the matter was traced back by the expert to the slipping of the belt on the dynamo-electric machine which furnished the electric current. The pulley was too small, the belt too narrow, the arc of contact too small, the belt tension too great, and the surface of the pulley was polished like a mirror and coated with black lead (which is one of the best lubricants that there is), and which filled the air in the entire establishment. The remedy was a wider belt and pulley, the substitution of rubber for leather belting, covering the new pulley with rubber, increasing the arc of contact by an idle pulley, the tension lessened, the belts ordered to be kept washed free from black lead when needed, and the machine boxed in to prevent as far as possible the entrance of the black lead.

A water-works built to deliver a certain quantity of water per day, at a certain cost, and with regularity, was found to deliver much less than the required quantity, and at times it was impossible to draw water at all. The valves being reset, the fuel bill was lessened 18 per cent., the capacity increased 5 per cent. The loss of suction was discovered to be a siphon bend in the pipe in which air accumulated in the high portions, and was easily remedied.

A manufacturer of agricultural machinery and implements complained a great deal of the excessive fuel bills he was compelled to pay. The indicator showing that the amount of power consumed by the transmitting device was excessive, this was ordered to be remedied. The shafting was put in line, more frequent hangers put in, and the friction of the shafting reduced to one-fifth what it had been. When it is considered that the extra work that the engine was doing was practically bending shafts of diameters from 1½ to 2½ inches diameter, about 1-16 of an inch in each length, from 70 to 250 times per minute, it will

be seen that a good deal of work might be used up without doing any good.

A flour mill was troubled with excessive wearing of bearings and journals. In this case the trouble was caused by the excessive use of tighteners, which in the case of the main driving belt really caused the main shaft to run in the top brasses. Remedied by taking out the tightener and using an idler to give more wrap to the main belt; also by lacing the belt square and true, putting upon it the proper tension, lagging the jack pulley with leather, and giving the belt a good dose of castor oil.

A saw mill was troubled with heating of the mandril of a 60-inch circular. Trouble caused by excessive tightening, too narrow a belt and boxes out of line. Remedied by lagging the pulley and lining up the boxes.

Stationary boiler of the locomotive type, steam-ing power becoming less and less for two or three months, when it becomes almost impossible to get steam enough to run more than half the machinery. Boiler examined and found dangerously coated inside with hard scale about 1 1/4 inches thick, very hard to detach with the hammer and pick. Trouble remedied by first loosening the scale mechanically, and removing all that could be got out that way employing suitable chemical antidotes, and then putting in a feed water heater and purifier, which by heating the feed to about 210 degrees by means of the exhaust steam, not only increased the capacity of the boiler when cleaned, but extricated nearly all the impurities from the water, and rendered it necessary to add only a very slight quantity of anti-incrustating compound from time to time.

Steam Engine Formulas.

[Written for The United States Miller.]

The following formulas are good to remember: In a double-acting steam engine, having given the stroke of the piston in feet, the mean pressure of the steam on the piston, and the number of revolutions or double strokes per minute, the velocity of the engine in feet per second will be 1-30 of the product of the stroke by the number of revolutions. The horse-power will be the quotient of 16,500 into the product of the main pressure on the piston by the length of the stroke in feet, and by the number of revolutions per minute. The work done in any given time will be equal to 1-30 the product of the main pressure upon the piston, the length of stroke in feet, the number of revolutions per minute and the time. The work done in any number of revolutions or double strokes will be equal to twice the product of the main pressure, the stroke in feet and the number of revolutions. To put this in letters, for convenience in remembering, letting F equal the mean pressure of the piston, S the stroke in feet, N the number of revolutions per minute, and the velocity in feet per second:

$$V = \frac{SN}{30}; (HP) = \frac{FSN}{16,500}$$

If F equal the work done within any time, T, K equal—

$$\frac{FSNT}{30}$$

and the work done in any number of double strokes, N will be equal to 2 FSN. If A equal the area of the piston in square inches, and P the mean steam pressure in pounds per square inch, then the force upon the piston will be equal to A P S N

$$P, \text{ and the horse-power will be } \frac{A P S N}{16,500}$$

In the above friction and the power expended in working the pumps, etc., are neglected.

POWER REQUIRED TO PUMP WATER.

According to Nystrom, the power required to pump 100 gallons per minute, 100 feet vertically, is 5 horse-power; to pump 1,000,000 per 24 hours (that is, 41,658 gallons per hour.), 100 feet vertically, 35 horse-power.

POWER ABSORBED BY CYLINDRICAL JOURNAL FRICTION.

According to Nystrom, we may estimate the power absorbed by friction or cylindrical journals about as follows: Let W be the weight or pressure upon the journal, W' the force applied to give rotation, R the radius in feet, upon which the W force acts, R' the radius in feet of the journal, upon which the force or friction, F, acts, N the number of revolutions per minute; then

$$R = \frac{FR'}{W}; R' = \frac{RW'}{F}; F = \frac{RW'}{R}; W' = \frac{FR}{R}$$

the friction co-efficient, C, will be equal to—

$$\frac{FR}{W'}$$

and the horse-power of the friction will be equal to

$$\frac{2 \times 3, 1416 R N F}{33,000} = \frac{2 \times 3, 1416 R' N W C}{33,000}$$

$$\frac{R' N F}{5,252} = \frac{R' N W C}{5,252}$$

ANTI-FRICTION ROLLERS.

Rolling friction is so much less than sliding that it is well in many cases to run shafts upon cylinders. To estimate the amount of friction with this arrangement, let W equal the pressure of the shaft upon the rollers, R the radius of the rollers, R' the radius of the roller journal, R'' the radius of the shaft, C the co-efficient of friction in the roller journals, X=1/2 the angle between lines running from the shaft centre to the roller of the

journal centres, and F the force of friction on the shaft's radius, R''. Then this force of friction upon the shaft's radius will be equal to

$$W C R'$$

R times secant of X

THE LIFTING POWER OF DIFFERENTIAL PULLEY BLOCKS.

In the ordinary form of differential pulley blocks there is an endless rope or chain which passes over a compound pulley having two grooves of unequal radii; this pulley is above, and is fixed. The rope passes over a lower pulley, which is moveable, and from the axis of which the weight is suspended. The weight to be lifted is borne by the bottom rope or chain extended from the lower pulley, and is divided equally between the two ropes by which the lower pulley is hung from the upper pulley. The weight that such an arrangement will lift will be (less friction) equal to the quotient of the difference of the product of the larger radius by the force applied.

Conversely, the force required to lift a given weight will be (leaving friction out of account) equal to the quotient twice the larger radius of the upper pulley into the product of the weight to be lifted by the difference between the two radii of the upper pulley. To put these in the form of formulas, in which F represents the force to be applied, W the weight to be lifted, R the larger radius, and R' the small radius of the upper pulley,

$$F = \frac{W(R-R')}{2R}; \text{ and } W = \frac{2FR}{R-R'}$$

Suppose the weight to be lifted is one net ton, or 2,000 pounds, the larger radius of the upper pulley 10 inches, and the small radius of the upper pulley 9 inches, then the force required will be

$$\frac{2,000(10-9)}{2 \times 10} = \frac{2,000}{20} = 100 \text{ pounds, plus}$$

enough to overcome friction.

To move a weight of 2,000 pounds one foot high,

$$\frac{2,000}{100} = 20 \text{ feet.}$$

the small weight would have to travel

$$\frac{2,000}{100} = 20 \text{ feet.}$$

20 feet.

In Wood river, recently, the owner of a mine having become discouraged at the outlook and continual expense, sold his claim for \$150. The purchasers went down a few feet and found the ledge, and followed it on an upraise until it came within two feet of the surface. At this point the ledge was ten feet wide, and assayed \$1,000 per ton. The investment of \$150 can be sold for \$100,000.

JOHN BRIGHT has recently been calling the attention of the English Fair Trade agitation to the fact that the result of that agitation will be to prevent England from sending America the \$50,000,000 of manufactures which we now take annually of that country. Fair Trade is, in his opinion, an impossibility. England's exports are manufactures, while America's are raw material, and any agitation of this question is to the more and more, show the advantage to America of working up her own raw material, and in so doing consuming her own provisions.

From experiments made it has been ascertained that about two revolutions per hundred are lost in the transmission of motion by a belt. In ordinary practice this would be a slight loss, and would in no wise interfere with the usual manufacturing processes; but, where there is a long train of gear repeated from shaft to shaft by belts, the loss becomes serious. It is clear that if the coefficient of loss by slippage be .98 for a single pair, which has been verified with great certainty by varying the tensions of the same belt, it will become equal to the successive powers; 9, .96, .94, .92, .90, and so on; so that after a succession of five speeds, the loss amounts to one-tenth of the

calculated speed, and that at the end of thirty-four speeds the velocity will be reduced to half. From these considerations it appears that where it is required to transmit speeds as near determinate as may be, by means of bands and pulleys, it is necessary to increase the diameter of the driving pulley by its fiftieth part, or diminish the driving pulley in the same ratio.

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THE CENTURY MAGAZINE,

(SCRIBNER'S MONTHLY.)

FOR THE COMING YEAR.

With the November number began the new series under the title of THE CENTURY MAGAZINE, which will be, in fact, a new, enlarged, and improved, "SCRIBNER." The page is somewhat longer and wider, admitting pictures of a larger size, and INCREASING THE READING MATTER ABOUT

Fourteen Additional Pages.

The following is a summary of the leading features of the new series for the year:

A NEW NOVEL BY MRS. BURNETT (author of "That Lass o' Lowrie's," etc.,) entitled "Through One Administration," a story of Washington life.

STORIES OF THE LOUISIANA CREOLES. By Geo. W. Cable, author of "The Grandissimes," etc. A series of illustrated papers on the traditions and romance of Creole life in Louisiana.

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STORIES, SKETCHES, AND ESSAYS may be expected from Charles Dudley Warner, W. D. Howells, "Mark Twain," Edward Eggleston, Henry James, Jr., John Muir, Miss Gordon Cumming, "H. H.," Geo. W. Cable, Joel Chandler Harris, A. C. Redwood, F. D. Millet, Noah Brooks, Frank R. Stockton, Constance F. Woolson, H. H. Boyesen, Albert Stickney, Washington Gladden, John Burroughs, Parke Godwin, Tommaso Salvini, Henry King, Ernest Ingersoll, E. L. Godkin, E. B. Washburne, and many others.

One or two papers on "The Adventures of the Tile Club," and an original Life of Bewick, the engraver, by Austin Dobson, are among other features to be later announced.

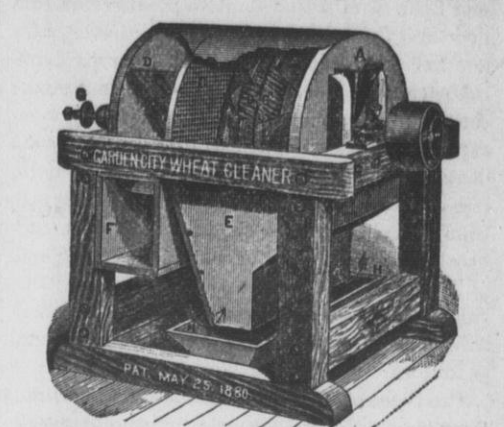
THE EDITORIAL DEPARTMENTS throughout will be unusually complete, and "The World's Work" will be considerably enlarged.

The price of THE CENTURY MAGAZINE will remain at \$4.00 per year (35 cents a number). The portrait (size 21x27) of the late Dr. Holland, issued just before his death, photographed from a life size drawing by Wyatt Eaton, will possess a new interest to the readers of this magazine. It is offered at \$5.00 retail, or together with THE CENTURY MAGAZINE for \$6.50. Subscriptions are taken by the publishers, and by book-sellers and news-dealers everywhere.

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FLOUR MILL OWNERS!

Please answer this advertisement BY LETTER. Do not delay but answer it at once. It will take but a moment and you will thereby serve the trade as well as yourself. It cannot but prove of value to you.

Flour Mill Owners in the United States and Canada

GENTLEMEN: We are preparing the matter for CAWKER'S AMERICAN FLOUR MILL DIRECTORY for 1882 and would beg you to kindly furnish us by return mail with the following information:

1. The name of person or firm operating your mill, with name of your Post-Office, County and State.
2. Capacity in BARRELS of flour, of mill per day of 24 hours. (If you are making improvements and increasing capacity, state what the capacity of your mill will be after your improvements are made.)
3. Do you use water or steam power?
4. If you have any special name for your mill, as, for instance, "Phoenix," "Oriental," "Capital," "Wild Moss," etc., please name it.
5. Are there any other flour mill owners receiving their mail at your Post-office? If so, kindly oblige us by naming ALL of them.

Upon receiving above information we shall duly insert your names with Post-office in our Flour Mill Directory. The Directory is used by the mill-furnishers, flour brokers, commission merchants and trade newspapers in this country and in Europe for the purpose of sending out their circulars, price lists, catalogues and sample papers, which will furnish you with much valuable information, which without your names in this Directory you would not obtain. If you are not already a subscriber to the UNITED STATES MILLER we invite you to subscribe. The subscription price is One Dollar a year. We desire to have the UNITED STATES MILLER a regular visitor in every flour mill in America. Do not fail to answer this advertisement immediately whether you subscribe or not. We want this our Third Flour Mill Directory, to be as perfect as possible, therefore make your answer full and complete. We wish it distinctly understood that we make no charge for inserting your name in the Directory. ADDRESS

UNITED STATES MILLER, Milwaukee, Wis.

Mention this paper when you write us.

Garden City Mill Furnishing Company, CHICAGO, ILL.

NEWS.

Everybody Reads This.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

Minneapolis millers complain of a lack of cars for shipping flour.

The dam across Rock river, at Beloit, Wis., went out November 5th.

The Eagle Milling Co., of Quincy, Ill., are putting in the Allis bran rolls.

H. G. Kropp, of Tioga, Ill., has recently purchased the mill at Stillwell, Ill.

Hawthorne Bros., of Minneapolis, Minn., have sold their mill to H. B. Beard.

The Carr-toufflin disintegrator is giving good satisfaction to Parisian millers.

The Winona Minn. Mill Co. are introducing the Edison electric light in their mill.

L. P. Hopkins succeeds Nickey & Hopkins in the milling business at Elizaville, Ind.

J. M. Veach & Co., of Adairville, Ga., are building a 150-barrel gradual reduction mill.

Gibson & Co., of Indianapolis, are putting in some more Gray noiseless roller machines.

Wm. Leffingwell & Sons have a thriving 30-barrel steam custom flour mill at Cambria, Col.

Joseph Kratochwell, of Dayton, O., is putting in more of the Wegmann porcelain rolls.

C. A. Pillsbury & Co. have placed another order with E. P. Allis & Co. for roller machines.

J. L. Leonard & Co. have rented for a term of years the 60-barrel steam flour mill at Burgoon, O.

Lowe & Mabee, of Jasper, Mich., are increasing their capacity from 60 to 120 barrels per day.

A. Papst & Co.'s mill at Orland, Col., burned recently. It was partially insured and will be soon rebuilt.

The Atlantic Mills, in Denver, Col., owned by Clifford F. Eagle, burned recently. Loss about \$25,000.

Samuel Stettler, of Onondaga, Mich., intends to increase his capacity soon to 150 barrels per day.

The Indianapolis Steel Rail Mills have just purchased an engine and boiler outfit of the Atlas Engine Works.

J. C. Blackburn, of Toronto, O., has placed his order for several of Gray's patent Noiseless Roller Mills.

Edwin Bradford, of Sparta Center, Mich., is putting in one of Gray's patent noiseless roller mills for cleaning bran.

Messrs. Scott & Weitzel have just completed a 150 barrel mill, on the Jonathan Mill's system at Anoka, Minn.

Doran & Smith's new 150-barrel steam mill at LeSaur, Minn., has just started up with J. B. Mainard as head miller.

F. S. Hinkle, proprietor of the "Holly Mill," Minneapolis, has withdrawn from the Minneapolis Millers' Association.

The Star Flouring Mills near Marengo, Ia., owned by Henry Bell, burned October 22. Loss \$2,000. No insurance.

The Jewell Milling Co., of Brooklyn, N. Y., are putting in eight Wegmann patent double porcelain roller machines.

Root & Co.'s new mill in Cincinnati, O., has a capacity of 500 barrels per day. It is driven by a Wheelock engine.

A Geo. T. Smith middlings purifier has just been placed in a Parisian flour mill. It will doubtless lead to heavy sales.

Burkhardt & Co., Cincinnati, have purchased the Atlas "Gold Medal" slide valve engine that was in the Exposition.

Johnson Bros., of Boardman, Wis., had 150 barrels of fancy flour stored in the depot which burned recently at that place.

Edw. P. Allis & Co., of Milwaukee, still continue full of orders and report their roller sales as amounting to ten machines a day.

W. Trow & Co., Madison, Ind., started up their new Atlas-Corliss engine on the 10th inst., and the mill will soon be ready to run.

Hyde & Brooks, of Hokah, Minn., are putting porcelain rolls in the Kaercher Mill at Isenours, Minn., which they are going to run.

Gaff, Gent & Thomas are remodeling their mill at Columbus, Ind. They are to put in an 80-horse-power Atlas-Corliss engine to furnish power.

The Atlas Engine Works, of Indianapolis, are to furnish Messrs. J. R. Allen & Co., of that city, with one of their standard 60-horse

power engine and boiler outfits complete, for their new saw-mill in Kentucky. They have also just received an order from Mr. H. C. Long, for a 40-horse-power outfit complete, for a similar purpose.

It is next to impossible to estimate the damage done to milling and other property in Wisconsin during October and November by high water.

The Atlas Engine Works, of Indianapolis, Ind., have just been awarded the first premium for their display at the Little Rock, Ark., fair.

W. W. Cargill & Bro., LaCrosse, Wis., are putting in two more of the Gray Roller machines, manufactured by E. P. Allis & Co., Milwaukee.

William Resor & Co., of Cincinnati, Ohio, have placed an order with the Atlas Engine Works, of Indianapolis, for an 18x48 Corliss engine outfit.

The Northwestern Mills in this city were destroyed by fire November 9th. The premises have been used for grain-mixing for the past two years.

Glassner, Hubbard & Co. have a neat 50-barrel water-power mill at Boston Mills, Cherokee Co., Kan. They intend to double its capacity next year.

Mr. Y. M. Riser, Franklin, Tenn., has just contracted with the Atlas Engine Works, of Indianapolis, Ind., for a new Corliss engine to drive his new 125-barrel mill.

R. M. Hubbard, of the Minneapolis Millers' Association, was stricken with typhoid fever a few days since, and Monday evening, November 21, was reported to be dying.

The Atlas Engine Works, of Indianapolis, have just shipped an engine and boiler outfit to the St. Nicholas Hotel, Cincinnati. It will furnish power for electric lighting.

Odell roller-mills have been set up and are being tried in the Standard and Cataract mills in Minneapolis. The mills are built by the Stillwell & Pierce Manufacturing Co., of Dayton, O.

Side, Fletcher, Holmes & Co., of Minneapolis, are taking out their mill-stones and substituting Wegmann's patent porcelain rolls for the flouring of the finished middlings.

The back water at E. Schrandenbach's dam, near Oconomowoc, Wis., overflows over 500 acres of land not usually flooded, and the grangers in that neighborhood are not a little excited about it.

Foreign advices all tend to show that there is too much "fancy" and not enough "straight" American flour in British markets. Hungarian brands of flour are, however, being driven from the market.

The Petoskey Cable Flour Mills are driven by power transmitted by a wire cable from the water-wheel, a distance of 250 feet. No trouble has been experienced with the cable since it was put up two years ago.

The Queen City Forging Co., of Cincinnati, have just contracted with the Atlas Engine Works, of Indianapolis, for one of their standard 75-horse-power engine and boiler outfits, complete, for their new forge works.

E. Nichols, of Bunker Hill, Kan., has a neat water-power 50-barrel mill and contemplates soon enlarging to a regular gradual reduction mill. W. T. Moore & Son are building a steam mill and will soon be ready to put in the machinery.

The Mosier mill, near Medicine Lake, in the town of Minneapolis, Minn., was destroyed by fire on Friday night, together with the dwelling-house adjoining. The mill had recently changed hands, and was a three-run structure.

The citizens of Benson, Minn., offer a bonus of \$4,000 to any one who will erect a suitable flouring mill at that place. The village lies in a fine wheat growing country, and will probably soon have railroad connections with Duluth.

Edw. P. Allis & Co. are filling an order from the Chicago, Milwaukee & St. Paul R. R. Co., for two large Reynolds Corliss engines, one a 26x48, for their new car shops in Milwaukee, and one a 28x48 for a large grain elevator in Minneapolis.

A miller in the far west who runs a two-run custom-mill, and is doing a fair business, says: "I have two run of burrs, one for wheat and one for corn. I grind 8 bushels per hour on either or both; make one straight grade flour. Use 38 feet bolt, return the middlings to the eye of the stone, bolt them with the other chop, return the flour of No. 2, bolt to No. 1. I keep No. 1 bolt full. I am doing well

now but see the strong necessity for radical improvements at an early date.

W. H. Bailey, lately connected with the Sioux Falls Water Power Company, is credited with an invention to build a flour-mill on the East Side canal, having a capacity ranging from 1,000 to 2,000 barrels per day.

A gentleman of Hartford has purchased an interest in the long wire-belted patent, and will introduce the material to the grain and flour shippers of San Francisco and to the United States postal department. The material is a woven product with warp of fine iron or steel wire and filling of cotton yarn. Seamless bags can be woven of this material which will be vermin proof for flour and wheat on the long shipment to Australia or to the western coast of South America, from San Francisco, and be an excellent substitute for the present canvas and leather mail bags.

BURNED—Erwin Lancaster & Co.'s flour mill at Girard, Ill. Insured.

BURNED—H. Bell's mill at Marengo, Ia.

BURNED—Robert, Worth & Co.'s mill at Moscow, Ky.

DEAD—G. M. Wills, of the milling firm Wills & Yenowine, Keokuk, Ia.

BURNED—L. & W. Thompson's mill at St. Stephens, N. B.

LEGAL MATTERS.

MIDDINGS PURIFIER PATENT—DECISION.

Consolidated Middlings Purifier Company, vs. Absalom R. Guilder. } October, 1881.

R. Mason and John B. and W. H. Sanborn, Solicitors for Complainant. Shaw, Levi & Cray and Benton & Benton, for Defendant. NELSON, J.

A motion is made upon bill and affidavits for a preliminary injunction, *pendente lite*. The defendant resists the application upon affidavits, and since the notice of motion an answer is filed which under the rule is used upon the hearing as an affidavit with the others presented.

The bill is filed for an account and to recover damages for an infringement of certain letters patent granted for improvements in purifying and dressing middlings, and owned by the complainant, and a permanent injunction is prayed for.

The bill of complainant sets up several patents, and charges the defendant with infringing each of them.

The complainant, on May 29, 1879, purchased and took an assignment of all patents owned by defendant, among them No. 8,386, reissue, under the following circumstances:

The defendant was manufacturing machines for purifying middlings under letters patent, and the complainant, believing that he was trespassing upon its rights, had an interview through an agent, when a settlement was perfected. The complainant agreed to give \$5,000 for all the patents owned by the defendant if he would stop manufacturing and quit the business, and also agreed to permit the defendant to sell certain machines he had made on payment of a royalty, which the defendant accepted.

An assignment was executed and delivered to the firm of which the agent was a member, of defendant's patents, which were finally assigned by said firm to the complainant, and the defendant has paid the royalty exacted for the machines on hand and for some time stopped manufacturing.

On March 9th, 1880, letters patent No. 225,278 for an improvement in middlings purifiers was granted defendant and he commenced to manufacture under this patent, and has been selling machines. The defendant in his answer admits that he made a full assignment of the patents owned by him, including reissue No. 8,386, to the firm of Bennett, Knickerbocker & Co., but denies that he agreed to quit the business of manufacturing purifiers, and also alleges among other things that reissue No. 8,386 is invalid, and that the claims therein made by him were expanded beyond the original invention.

It satisfactorily appeared on the hearing that Knickerbocker, who conducted the negotiation with the defendant, was duly authorized to act for the complainant, and that he conducted the same on its behalf, and also that as a part of the settlement made the defendant agreed to stop manufacturing, and the payment of royalty for machines on hand is not denied.

On the facts as thus established the defendant in my opinion cannot set up as a defense the invalidity of the assigned patents. He was not ignorant at the time of the settlement and when he made the assignments of all the facts which are set up in his answer, and he knew of the existence and full mechanism and operation of the machines, now alleged by him to have anticipated, one at least of those assigned the complainant, and having made the agreement above stated and paid

royalty for license to sell, it would be inequitable to permit such a defense now to be made. He of course is free to exercise his inventive genius, and manufacture and sell any improvements for which he may secure letters patent, provided he does not infringe the complainant's rights.

On this motion in the view taken by the Court, the fourth claim only of letters patent reissue No. 8,386, will be referred to in connection with No. 225,218, and the issue of infringement considered, and to do this satisfactorily, and determine whether defendant is a trespasser, an examination of the Guilder patent and reissue is necessary.

Guilder's Patent, reissue No. 8,386, claims, 4th: "The combination with a reciprocating riddle or shaker, of a brush, moving transversely across the entire under surface of the riddle, and independently of the movement of said riddle, substantially as and for the purpose set forth. In his specifications he states "that his invention has relation to machines for purifying flour and middlings wherein a suction fan and adjustable suction spouts are arranged over a riddle, and endless conveyers arranged beneath the riddle X X X." It also consists in the employment of detachable brush carriers or brush holders, which hold the brushes in contact with the under side of the riddle during the upper part of their revolution."

"It also consists in giving to the said brushes a continuous transverse motion across the bottom of the said riddle."

He afterwards describes the functions of the brushes:

"Beneath the riddle C is a transverse division H, which leaves X X X a space, J, on one side of it, for the material which passes first through the riddle, and a space J prime, for the coarser material which passes afterward X X X X. In each space or compartment (J or J prime) are single row dusting brushes which are arranged to sweep across the under surface of the riddle cloth from side to side, so that they move at right angles to the material, in its passage over the riddle, thus avoiding mixing the different grades of the material and keeping the cloth clear."

"This patent is for a new combination of old elements, and the brushes are so arranged that the meshes of the riddle cloth are kept clear and at the same time the brush moving transversely at right angles to the flow of the material prevents the mixing of the coarser with the finer middlings."

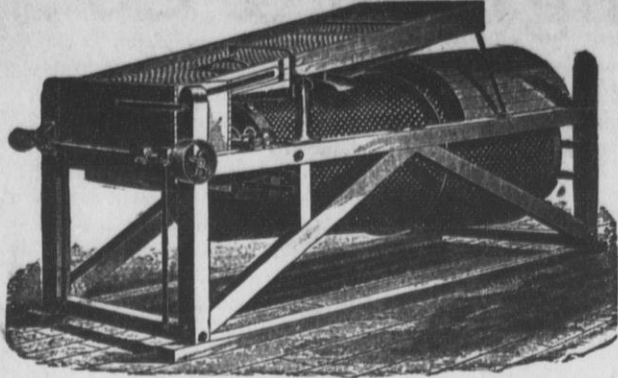
In other previous combinations the brush moving in the direction of the flow of the middlings would carry some of the coarse middlings with it, and deposit them in the compartment containing the finer middlings.

In Guilder's patent, No. 225,218, issued in March, 1880, which is the machine manufactured and is alleged to be substantially the old patent reissue 8,386, with some additional contrivances, he claims, 5th: "The combination of the reciprocating bolt, GG and transversely moving brush K, having a longitudinal reciprocating motion substantially, and as for the purpose described." In the specifications he describes the operation of purifying middlings in the machine, and the function of the various contrivances and mechanism used, which it is not necessary to set forth except what is said about the brush, which is this: K is a brush longitudinally under the bolt cloth G, the bristles of which are fast in the stock K prime, K K are supports to the brush stock X X X, L is a transverse guide stock attached to one of the supports K K, and has secured upon its upper edge a corrugated guide plate L, that goes between two friction rollers, on downward projecting studs on the underside of brush stock K prime. This brush stock is attached to endless chains, and travels with them in a transverse direction, across the entire width of the bolt cloth, in the corrugated or bent guide plate, and so moving gives the brush a longitudinal or endwise motion of several reciprocations, while in contact with and sweeping across the bolt cloth, and when a current of air by means of suction fan is passing through the middlings. The motion is in two directions, vibrating while in contact with the bolt cloth; it is said to be more effective in clearing its meshes from adhering substances.

If it is conceded that the zig-zag motion given the brush while moving transversely across the underside of the bolt cloth makes its operation more effective and the device of a corrugated guide renders the brush more serviceable, still the brush in combination with the reciprocating sieve or bolt cloth in No. 225,218 moves transversely across the underside of the bolt cloth at right angles to the material in its passage and performs the same function and keeps the cloth clear, substantially as in No. 8,386. The fact that the brush while crossing is given what is called a longitudinal reciprocating motion does not render the combination different from his previous patent; it embodies the substantial idea therein set forth. It may be better to adopt the motion given the brush by defendant, and he may be able to prevent the use by others of his device, but in the use of the combination described he violates his agreement with plaintiff. The identity of the two patents sufficiently appears, and although there has been no judicial decision in favor of the validity of No. 8,386, a preliminary injunction must be granted, unless the defendant gives bond, in an amount large enough to pay the royalty, on each machine manufactured by him, as shall be determined hereafter.

It is so ordered.

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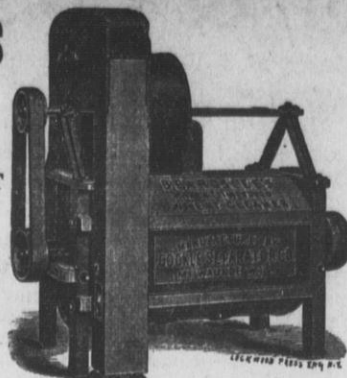
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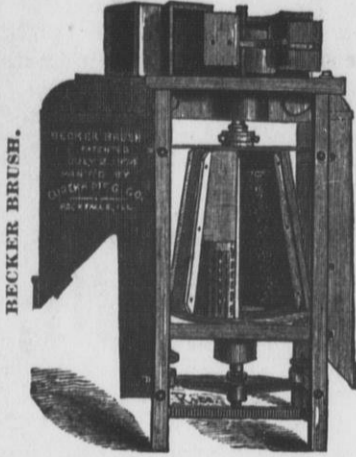
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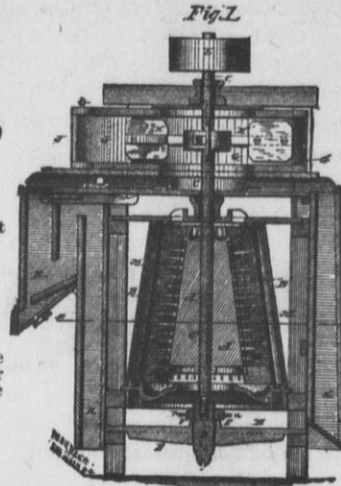
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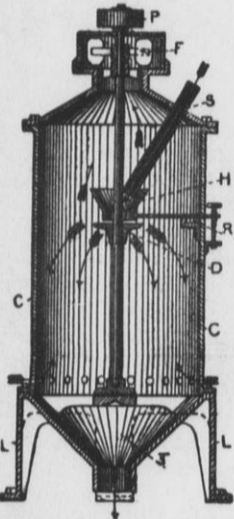


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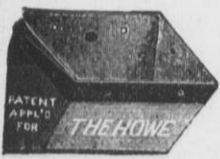
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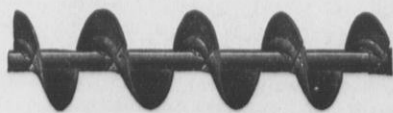
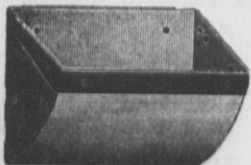
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4 1/2	4	6 1/2 "	6 1/2	4 3/4	9 "

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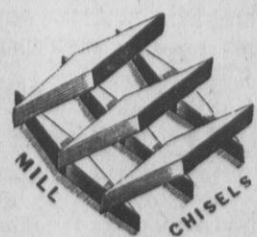
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GRAIN, SEEDS, PROVISIONS, ETC.

Special Attention given to the Purchase and Shipment of Grain for Milling Purposes.

We have an experienced man in attendance at each elevator constantly, to see to the inspection of grain when loaded into cars for shipment, and the interests of parties ordering through us will be carefully protected in every way.

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As Shippers of Grain, Flour, Provisions, Naval Stores;
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Or as Manufacturers of Tallow, Stearine, Oleomargarine, Cottonseed Oil, Starch, Grape-
Or as Refiners of Petroleum and Lard;
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WILL WANT TO GET WEBER'S EXPORT TABLES,

With WESTERN THROUGH FREIGHT TABLES,

Exchange Tables, for Sterling, Reichsmark, Francs and Florins. A new Detector of Errors in Cablegrams. A Table for Sterling Percentages, etc. This "READY RECKONER" translates Western Produce Quotations, (over twenty articles) into foreign market values and foreign quotations which newspaper cable reports bring daily, into dollar values. Address all orders to

THE UNITED STATES MILLER, Milwaukee, Wis.

ELECTRIC PURIFIER COMPANY,

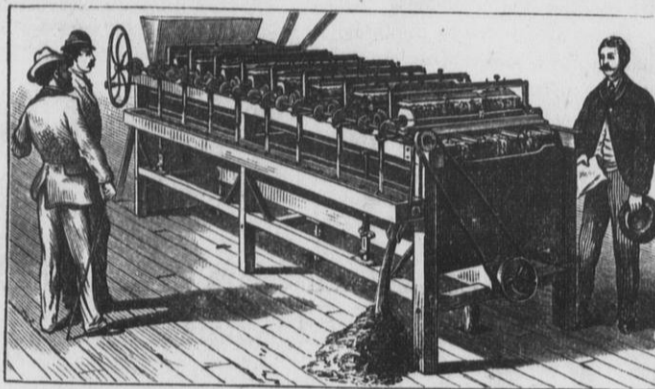
New Haven, Conn.

Factory, New Haven,

New York Office, 17 Moore Street.

This Company was Organized at New Haven on the first of March, 1881, with a Capital of \$300,000.

Electric Middlings Purifiers.



HAVING PURCHASED THE SMITH-OSBORNE PATENTS GRANTED BY THE

United States, Great Britain, France, Belgium, Austria and Canada.

The first Machine manufactured was put up soon after the United States patent was granted, in February, 1880, in the ATLANTIC MILLS, BROOKLYN, and has been in almost constant practical use since, demonstrating beyond a question that it possesses the following advantages:

- It Purifies Middlings Absolutely Without Waste.
- It Purifies Middlings with Greatly Reduced Power.
- It Purifies Middlings with Greatly Reduced Space.
- It Purifies Middlings with Greatly Increased Rapidity.
- It Purifies Middlings from Spring and Winter Wheat Equally Well.
- It Purifies Middlings with the Best Results.
- It Dispenses with the Use of Air Blasts.
- It Dispenses with the Use of all Dust Houses.
- It Dispenses with the Use of all Dust Collectors.
- It Dispenses with the Dangers of Explosion and Fire.
- IT PURIFIES DUST HOUSE MATERIAL OF ALL KINDS.
- IT PURIFIES THE FINEST MIDDINGS OF ALL KINDS.
- It is Remarkably Adapted to Custom Mills.
- It is Excellently Adapted to Manufacture Farina.

WHERE THE ELECTRIC PURIFIERS MAY BE SEEN IN OPERATION:

Atlantic Mills, Brooklyn, N. Y.; Archibald Schurmeier & Smith, St. Paul, Minn.; F. L. Johnston & Co., St. Louis, Mo.; Washburn, Crosby & Co., Minneapolis, Minn.; Norton & Co., Chicago, Ill.; Sanderson & Co., Milwaukee, Wis.; M. C. Dow & Co., Cleveland, Ohio; James K. Hurlb, Cincinnati, Ohio; Mosely & Moley, Rochester, N. Y.; Chas. Tiedman, O'Fallon, Ill.; Lyman & Co., Norfolk, Va.; Texas Star Flour Mills, Galveston, Texas; Zenith Milling Co., Kansas City, Mo.; C. Hoffman & Son, Enterprise, Kansas; Richter & Co., Williamstown, W. Va.; Kinney & Hobart, Burrton, Kansas; Parkville Milling Co., Parkville, Mo.; Norton & Co., Lockport, Ill.; Ballard, Isom & Co., Albany, Oregon; Niederhammer & Walton, Buena Vista, Ind.; Kimberly & Clark Co., Appleton, Wis.; Cyrus Hoffer, Lewisburg, Pa.; Roberts & Briggs, Seneca Falls, N. Y.; Phillips & Thomas, Kennedy, N. Y.; Hillsdale City Mills, Hillsdale, Mich.; Susong, Logan & Co. Bridgeport, Tenn.

SOMETHING NEW.

A Combination Electric Purifier—A Complete System of Three Purifiers in One.

Samples of work will be sent upon application, by mail, and all inquiries answered from the New York office. Parties contemplating building new mills, or reconstructing old ones, should see the superior working of the ELECTRIC SYSTEM before making contracts for Purifiers elsewhere.

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JOHN RICE,
General Manager.
GUNN, CROSS & CO., Minneapolis, Minn.,
Manufacturers and Agents for the Northwest.
GEO. G. SMITH, San Francisco, Cal.,
Manufacturer and Agent for the Pacific Slope.
JAMES E. LOOMIS, St. Louis, Mo.,
General Western Agent.

[Mention this paper when you write to us.]

RICHMOND MANUFACTURING CO.,

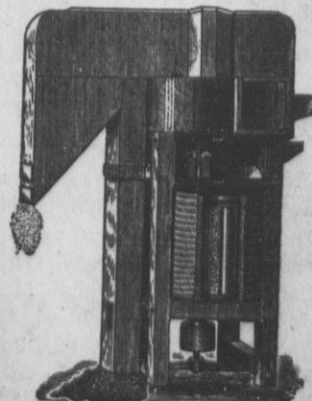
LOCKPORT, N. Y.,

Manufacturers of

RICHMOND'S CELEBRATED

Smut Machines,
Brush Machines,
Grain Separators,
and Bran Dusters.

Nearly Two Hundred of these Machines are now in operation in the city of Minneapolis, Minn., alone, and more than Sixty in the city of Milwaukee, Wis. They are also extensively used in many other sections, both on Winter and Spring Wheat.

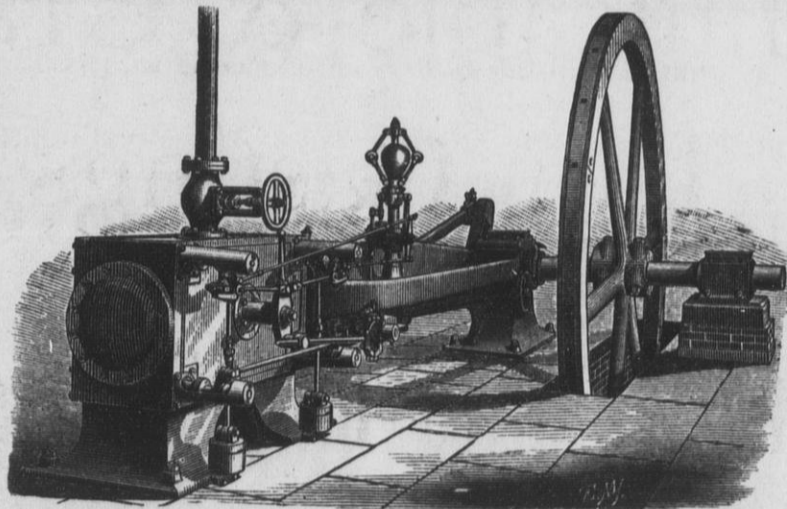


Adjustable Brush smut Machine.

SEND FOR DESCRIPTIVE CATALOGUE. [Mention this paper when you write.]

ATLAS-CORLISS ENGINE.

Will Replace Ordinary Engines Guaranteeing to Save One Third Fuel.



WRITE FOR ENGINE PAMPHLET.

ATLAS ENGINE WORKS, INDIANAPOLIS INDIANA, U. S. A.

BUILDERS OF ALL CLASSES OF

Engines and Boilers,

We Build The Best Farm Engines and Small Engines for warehouses and elevators. [Mention this paper when you write us.]

Stout, Mills & Temple,

DAYTON, OHIO.

MANUFACTURERS OF THE

American Turbine Water Wheel,

Best Quality French BURR MILLSTONES.

Sole Agents in Dayton for the sale of

DU FOUR & CO'S CELEBRATED BOLTING CLOTHS.

Flour and Paper Mill Machinery, Best Chilled or Porcelain Rolls for Crushing Wheat and Middlings and

GENERAL MILL FURNISHINGS.

The AMERICAN TURBINE, as recently improved, is unequalled in the power utilized from a given quantity of water, and is decidedly the BEST PART GATE WATER Wheel ever known. It has also been otherwise greatly improved.

Large Illustrated Catalogue Sent Free on Application.

[Mention this paper when you write us.]

LOOK AT THIS, MILLERS

ACME WHEAT STEAMER AND HEATER,
PRICE \$15. OVER 900 IN USE.

This is the Cheapest and Best Steamer ever offered. It is strongly made, easily regulated, steams and heats evenly and is sold at a price low enough to place it within the reach of all millers.

READ THE FOLLOWING TESTIMONIALS:

ATLANTA FLOUR MILLS, ATLANTA, Ga., April 18, 1881.
G. W. McNEIL, JR., AKRON, O.: Dear Sir—Yours of 4th inst. at hand, and in reply would say the three steamers purchased of you are working to our entire satisfaction.

H. LEWIS, Proprietor.
D. M. WELCH, Head Miller.
FELIX, Iowa, March 22, 1881.

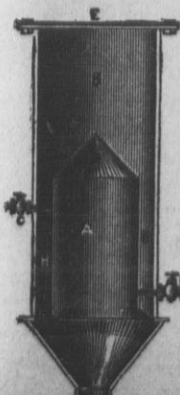
G. W. McNEIL, JR.: Dear Sir—The Acme Wheat Steamer is all that it claims to be, steam being better than hot dry pipes to make good clean bran and white flour.

Truly,
W. MARRIAGE & SON,
CANTON, Ohio, Oct. 4, 1880.

G. W. McNEIL, JR.: Dear Sir—In answer to your inquiry, would say that I have used your Acme Wheat Steamers and Heaters for the last six months, and it does its work well. I create my steam in a small boiler holding twelve gallons, and heated by three gasoline burners.

SEND FOR CIRCULARS AND TESTIMONIALS.

GEO. McNEIL, Jr., No. 113 North Broadway, Akron, Ohio



CLASSETT

Milling Improvements in the South.

A GEORGIA ROLLER FLOUR MILL—VISIT TO THE EXCELSIOR MILLS OF GEORGE T. JACKSON & CO., IN AUGUSTA.

Many of our readers, doubtless, have seen the term "patent flour" in the papers, but few, we imagine, have understood it. The fact is that until very lately there was no mill in the South that made this patent flour. It was all manufactured by the old plain—the stone system. The Western mills, however, have for some time been using the improved or roller system, and perceiving the great advantage which they had over those who stuck to the old plan, Geo. T. Jackson & Co., proprietors of the Excelsior Mills of this city, determined to investigate the matter, and, if satisfactory, to introduce the system into their mills. Last spring, therefore, Mr. Walter M. Jackson, of the firm, accompanied by Mr. H. C. Matthews, the head miller, went to the West and thoroughly inspected the great mills in several cities where the roller system was in use. The result of this visit and this inspection was the purchase of a complete set of rollers and purifiers, which were put in the Excelsior Mills under the superintendence of Mr. Jackson and Mr. Matthews, and the mill is now turning out two hundred and fifty barrels of flour a day under the new process, where it only turned out two hundred a day under the old, a clear gain of fifty barrels daily, for the new system. And this is not all, Mr. Jackson is satisfied that as soon as the system is in full working order they will make three hundred barrels a day. "But is this all?" the reader will be inclined to ask. By no manner of means, dear sir. We have shown where the advantage is to the miller; we now propose to show where there is a gain to the consumer, also. Under the old process the wheat went from the hopper to the stones, and was immediately ground fine. It was impossible to completely purify it afterwards. Under the roller system the grain goes from one set of rollers to another, is cracked gradually and everything eliminated by those and the purifiers from the flour, leaving that in its finest state. It then, as middlings, goes to the stones and the bolting cloths, and comes out cool and pure, retaining all its living principles and is capable of being made up into a much better article of bread than the old fashioned flour. It "wets up" better, takes more water, and, therefore, turns out considerably more bread than the other. But there is one thing the cooks must remember—it needs more kneading, for the very reason we have given, viz.: That it has more life, and is, therefore, firmer and more tenacious, and of course, nutritious. We saw yesterday two brands of flour—one old and the other the new process—placed side by side, together on a piece of paper, pushed up so that there was no space between them, and then wet. The line of demarcation was very perceptible. The new process flour was very white, while the other was dingy.

The following, copied from a Western paper, shows conclusively the advantages of the new system:

"1. Instead of crushing the grain at one operation, as on stones, and compelling it to remain under severe pressure several minutes, the roller does the work required of it in an instant, at one point of contact, and then the grain escapes without unnecessary friction and in a positively cool condition.

"2. Instead of grinding the grain with many of its impurities and then separating the mass, the roller system grinds gradually—first loosening all the germ and impurities and at once removing them, and only grinding to flour the product when perfectly pure. The quality of flour is whiter, stronger and more wholesome.

"3. The power required to make a barrel of flour is one-third less in the roller system than in the stone system."

In the Excelsior Mills there are fifteen sets of rollers and seven purifiers. There are also four runs of stones, to which the middlings go from the rollers. The system is complete and it is very interesting to go through the mill and inspect the process. This is the only mill in the South, between Louisville, Ky., and Richmond, that has this system.—*Augusta Chronicle.*

N. F. Burnham, York, Pa., has shipped to the following-named gentlemen his "Standard" turbine water wheel in the past few weeks: Irvin J. Sanders, Outhbert, Ga., one 10½-inch wheel; John M. Gunn, Outhbert, Ga., one 10½-inch wheel; D. S. Erb, Pine Grove Mills, Pa., one 9-inch wheel; J. L. Smith, Edgefield, S. C., one 30-inch wheel; A. J. Hamilton, Toll Gate, Ala., one 24-inch wheel; A. J. Libby & Son, West Waterville, Me., one 48-inch wheel; Osburn & Bro., North View, Va., one 21-inch and one 24-inch wheel;

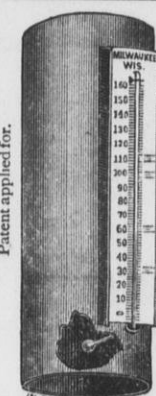
J. A. Murchison, Manchester, N. C., one 60-inch wheel; N. Duston & Co., Dexter, Me., one 36-inch wheel; J. V. George, Aiken, S. C., one 36-inch wheel; N. E. W. Siskmuk-Orangeburgh, S. C., one 24-inch wheel; E. O. Dinsmore, East Bowdoinham, Me., one 30-inch wheel; R. D. Byne & Co., Bluff Springs, Fla., one 30-inch wheel; J. T. & E. Kerner, Kenersville, N. C., one 15 inch wheel; S. K. Hansburg & Sons, Bloomington, Neb., one 9-inch wheel; W. E. Buyek, St. Mathews, S. C., one 16½-inch wheel; Scott & Armentroul, Collierstown, Va., one 24-inch wheel.

The following parties have lately bought the well-known Becker Wheat Brush (cone shape) made by the Eureka Manufacturing Co., of Rock Falls, Ill.: G. & W. Todd & Co., St. Louis, Mo.; Nordyke & Marmon Co., Indianapolis, Ind.; Fitzsimmons & Kreider, Jacksonville, Ill.; P. Worden, Red Wood Falls, Minn.; Barnoy & Kilby, Sandusky, Ohio; Strauss, Elston & Co., Marietta, Ohio; Vocke Bros., Napoleon, Ohio; Charles Boehm, Monroeville, Ohio; B. F. Gump, Chicago, Ill.; Bird & Eikerman, Oswego, Kansas; Mattingly & McAllister, Stanford, Ky.; M. W. Jarboe, Carrollton, Mo.; Knauth, Nachod & Kuhne, New York.

Nagel & Kemp, manufacturers of roller mills at Hamburg, Germany, are working a very large force day and night to keep up with orders.

PATENTS

We continue to act as Solicitors for Patents, Caveats, Trade Marks, Copyrights, etc., for the United States, Canada, Cuba, England, France, Germany, etc. We have had **thirty-five years' experience.** Patents obtained through us are noticed in the SCIENTIFIC AMERICAN. This large and splendid illustrated weekly paper, \$3.20 a year, shows the Progress of Science, is very interesting, and has an enormous circulation. Address MUNN & CO., Patent Solicitors, Publishers of SCIENTIFIC AMERICAN, 37 Park Row, New York. Hand book about Patents sent free.



DURANT'S Thermometer Attachment For Wheat Heaters

PATENTED AUG. 17, 1880.

Sample Thermometer \$2.50.

For Circulars, etc., Address **W. N. DURANT,** 420 Canal St., Milwaukee, Wis.

FOR SALE.

A good water power and mill with two run of stone at Stone Bank, Waukesha County, Wis. Mill is doing a good business, which with a moderate amount of improvements, could be largely increased. One half or the whole will be sold to the right party. For full particulars, address, U. S. MILLER, Milwaukee, Wis.

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(Brother of Adolph Hauser, the Jeweler.)



PRACTICAL OPTICIAN (Lately from Vienna), 469 EAST WATER ST., MILWAUKEE, WIS. Keeps a large stock of Spectacles, Eye, Opera and Marine Glasses, Microscopes, Telescopes, Barometers, Thermometers, and pays special care to a scientific adjustment of all kinds of Glasses to the eye. Any of the above glasses made to order and repaired.

Blanks, by means of which parties residing in the interior of the State may order spectacles as suitable as if they had personally selected them, will be mailed free on application.

Millers in need of magnifying glasses for any purpose can have their wants supplied at a reasonable price. Address as above.

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STEEL CAR PUSHER Made entirely of STEEL. ONE MAN with it can easily move a loaded car. Will not slip on ice or grease. Manufactured by **E. P. DWIGHT,** Dealer in Railroad Supplies, 407 Library St., Philadelphia, Pa. [Mention this paper when you write us.]

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The only complete story of his noble life and tragic death. Fresh, brilliant, reliable. Elegantly printed in English and German; magnificently illustrated; handsomely bound. Fastest selling book ever published. By **John C. Ridpath, LL.D.** CAUTION Do not buy the cheap penny, revamped campaign books with which the country is flooded. They are utterly worthless; an outrage upon the memory of the great dead, and a base fraud on the public. This book is entirely new. The only work worthy the theme. Send 50c. in stamps for Agent's Outfit. **JONES BROTHERS & Co.,** Chicago & Cincinnati.

HOPE for the DEAF.

Dr. Peck's Artificial Ear Drums PERFECTLY RESTORE THE HEARING and perform the work of the Natural Drum. Always in position, but invisible to others. All conversation, and even whispers heard distinctly. We refer to those using them. Send for descriptive circular and testimonials. Address, **H. P. K. PECK & CO.,** 853 Broadway, New York.

1865. **C. A. FOLSOM & SON,** Manufacturers of the Purest and Best **Lubricating and Burning OILS, GREASES, ETC.,** For Flour Mill Machinery, Specialties.

MILLERS' Castor Machinery Oil.

A compound oil, warranted better than Lard or Sperm Oil for machinery uses, and will last longer. Guaranteed not to heat or gum, and to give satisfaction when used on steps, spindles, etc.

MILLERS' LAMP OIL. Warranted free from Petroleum. Burns equal to Lard or Sperm Oil. Will not chill at 32° above zero, and much cheaper than Lard Oil.

Globe A. Natural W, Virginia Rock Oil, A perfectly natural Oil, just as it comes from the earth. Thoroughly settled and refined of high fire test, and will not congeal at zero. It is the best Black oil produced.

Peerless Mill Soap, A compound Grease for use on cogs and all heavy gearing. Put up in kegs, half barrels and barrels.

CAPITOL CYLINDER OIL, Manufactured for Steam Cylinders, especially for use in Patent Lubricators. Warranted not to foam, heat or gum, and endorsed by manufacturers of Corliss Engines.

We also have all grades of Sperm and Golden Machinery, Lard, Engine, and several grades of Cylinder and Black Oils, Plumbago, Cotton Waste, etc., etc., which we will offer at prices that defy competition, when quality is considered. Orders and correspondence solicited.

C. A. FOLSOM & SON, 130 West Water St., Milwaukee, Wis. [Mention this paper when you write to us.]

IMPORTANT NOTICE TO MILLERS The RICHMOND MILL WORKS, and RICHMOND MILL FURNISHING WORKS are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery, and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to **NORDYKE & MARMON CO.,** INDIANAPOLIS, IND.

CHOICE BEVELED EDGE FLOUR BRANDS For two dollars and upwards. Also RUBBER STAMPS, BURNING BRANDS, SEALS, STEEL NAME STAMPS, LETTERS AND FIGURES, Etc. Orders promptly attended to. **CHAS. H. CLARKE,** 82 Wisconsin St., Milwaukee. Box 114.

"THE MILLER," A MONTHLY JOURNAL, published at London, England, devoted to the interest of Millers. For the convenience of Millers in this country, we will receive and forward subscriptions for all who wish. The subscription price is \$1.50 per year, post paid. Address **UNITED STATES MILLER,** Milwaukee, Wisconsin.



[Mention this paper when you write us.]

Over 1,000 of these Turbines IN USE. It has tight shutting and easily operated Gate; gives more power for the water used, and will last longer than any other Turbine. Large shop with improved tools for making this wheel and machinery. Illustrated Pamphlet and Catalogue with prices sent free by **N. F. BURNHAM.** [Please mention this paper when you write us.]

CAWKER'S AMERICAN FLOUR MILL DIRECTORY FOR 1882:

Will be Ready for Delivery about January 1st, 1882. It has been compiled with the utmost care, and will contain **Several Thousand More Names Than Any Previous Edition.** It will give the **Capacity and Motive Power** of Mills wherever obtained. **MILL FURNISHERS, FLOUR BROKERS,** And Every one Desiring to Reach the Trade, **WILL FIND THIS WORK SIMPLY INVALUABLE.** PRICE, TEN DOLLARS PER COPY. Will be sent to any part of the world by Mail, REGISTERED, on Receipt of Price. 63

HARRIS-CORLISS ENGINE.

—BUILT BY— **WM. A. HARRIS, Providence, R. I.** Built under their original patents until their expiration. Improvements since added: "STOP MOTION ON REGULATOR," prevents engine from running away; "SELF-PACKING VALVE STEMS" (two patents), dispenses with four stuffing boxes; "RECESSED VALVE SEATS" prevent the wearing of shoulders on seats, and remedying a troublesome defect in other Corliss Engines, "BABBITT & HARRIS' PISTON PACKING" (two patents). "DRIP COLLECTING DEVICES" (one patent). Also in "General Construction" and "Superior Workmanship." The BE-T and MOST WORKMANLIKE form of the Corliss Engine now in the market, substantially built, of the best materials and in both Condensing and Non-Condensing forms. The Condensing Engine will save from 25 to 35 per cent. of fuel, or add a like amount to the power and consume no more fuel. Small parts are made in quantities and inter-changeable, and kept in stock, for the convenience of repairs and to be placed on new work ordered at short notice. NO OTHER engine builder has authority to state that he can furnish this engine. The ONLY WORKS where this engine can be obtained are at PROVIDENCE, R. I., no outside parties being licensed. **WM. A. HARRIS, Proprietor.** [Mention this paper when you write us.]

"THE GREAT ROCK ISLAND ROUTE" Calls your attention to the following REASONS WHY, if about to make a Journey to the GREAT WEST, you should travel over it: As nearly absolute safety as is possible to be attained. Sure connections in UNION DEPOTS, at all important points. No change of cars between CHICAGO, KANSAS CITY, LEAVENWORTH, ATCHISON or COUNCIL BLUFFS. Quick journeys because carried on Fast Express Trains. Day cars that are not only artistically decorated, but furnished with seats that admit of ease and comfort. Sleeping cars that permit quiet rest in home-like beds. Dining cars that are used only for eating purposes, and in which the best of meals are served for the reasonable sum of seventy-five cents each. A journey that furnishes the finest views of the fertile farms and pretty cities of Illinois, Iowa and Missouri, and is afterwards remembered as one of the pleasant incidents of life. You arrive at destination rested, not weary; clean, not dirty; calm, not angry. In brief, you get the maximum of comfort at a minimum of cost.



That the unremitting care of the Chicago, Rock Island & Pacific Railway for the comfort of its patrons is appreciated, is attested by its constantly increasing business, and the fact that it is the favorite route with delegates and visitors to the great assemblages, political, religious, educational and benevolent, that assemble from time to time in the great cities of the United States, as well as tourists who seek the pleasant lines of travel while en route to behold the wonderful scenes of Colorado, the Yellowstone and Yosemite. To accommodate those who desire to visit Colorado for health, pleasure or business, in the most auspicious time of the year, the Summer season and months of September and October, the Company every year puts on sale, May 1st, at all coupon ticket offices in the United States and Canada, round trip tickets to **DENVER, COLORADO SPRINGS AND PUEBLO.** At reduced rates, good returning, until October 31st. Also to San Francisco, for parties of ten or more, good for ninety days, at great reduction from regular fares. **REMEMBER,** this is the most direct route for all points WEST and SOUTHWEST. For further information, time-tables, maps or folders, call upon or address **R. R. CABLE,** Vice-Pres't and Gen'l Man'gr, Chicago. **E. ST. JOHN,** Gen'l Ticket and Pass' Agent, Chicago.

WEGMANN'S PATENT

PORCELAIN ROLLS

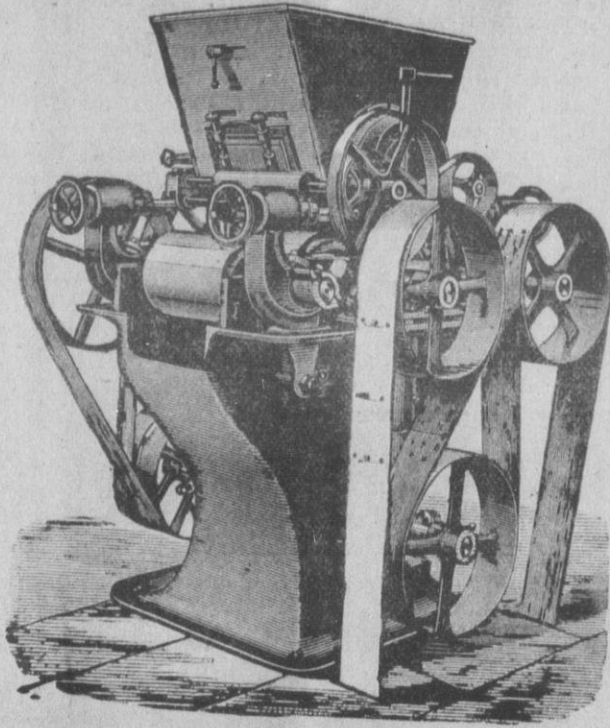
THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!



THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!

"AWARDED SPECIAL PREMIUMS."

OVER 6,000 OF THESE ROLLS IN USE

IN THIS COUNTRY AND EUROPE.

The Superiority of Porcelain over Chilled Iron for Reducing Middlings for Tailings is as under:

CHILLED IRON ROLLS, whether polished at first or scratched with fine grooves, soon become, through wear, smooth and glassy, and will only squeeze instead of grinding.

PORCELAIN presents a continual inherent sharpness, which no art can give to any other material in equal fineness and regularity, which enables it to act upon the smallest particles of flour and to separate them.

CHILLED IRON discolors the flour, by reason of the carbon that exudes from it, and also by its liability to rust.

PORCELAIN does NOT discolor the flour and is entirely indifferent to any and all chemical influences.

CHILLED IRON ROLLS are smooth and "cake" the meal; more especially is this the case on soft material.

PORCELAIN ROLLS possess a certain porosity, and no matter how finely ground, or how long they have been used, still re-

tain this granular and porous texture, and will reduce the middlings without "caking."

CHILLED IRON can be cut with steel.

PORCELAIN can ONLY be cut by the best black diamonds.

CHILLED IRON ROLLS require great power to reduce middlings to the proper fineness on account of their smooth surface.

PORCELAIN ROLLS will do the same amount of work, on account of the slight pressure required, and the gritty nature of the Porcelain, with one-half the power. The flour produced by Porcelain Rolls is sharper, whiter, stronger and more even than that produced by Iron Rolls.

No remarks need be made as to the superiority of Porcelain Rollers over Millstones, as it is a recognized fact by all. Porcelain Rollers are the only Rollers that will entirely supercede Millstones and Metal Rollers.

THESE MACHINES RECEIVED the FIRST PREMIUM!

At the late Millers' International Exhibition, Cincinnati.

Gold Medals at Nuremberg, 1876; Paris International Exhibition, 1878;

Little International Concours, 1879; First Gold Medal of the State, Berlin International Exhibition of the German Millers' Association, July, 1879; and Gold Medal Le Mans, 1880.

Full Instructions regarding the system of using Rolls in place of Stones given to parties purchasing. Address

EDW. P. ALLIS & CO., Sole Mfr's.

MILWAUKEE, WISCONSIN.

Mention this Paper when you write us.

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Guaranteed to Improve the Color of Your Flour.

The GARDEN CITY WHEAT BRUSH is so thorough in its work and has been so fully tested that we can safely offer to any customer who has not already learned the value of cleaning wheat without injuring it, that we will show him a **MARKED IMPROVEMENT IN THE COLOR OF HIS FLOUR AFTER PUTTING IN OUR BRUSH.** The following are selected from a large number of very flattering testimonials which we have received:

From the Superintendent of the largest mill in Chicago.

Star and Crescent Mills, }
Chicago, Sept. 26th, 1881. }
Garden City Mill Furn'g Co.:

Gents:—In reply to your inquiry as to how I am pleased with the two GARDEN CITY BRUSH MACHINES which we have had in use for six months in this mill, I will say that there are no words too strong for me to use in their praise. Thorough cleaning of the wheat without injuring the bran, is, in my opinion, much more important than many millers think it is, and this we certainly accomplish with your machines. In fact, I think that the superior whiteness of our flour is due in a large measure, to the use of the Garden City Brush. You do not claim too much for it.

Yours truly,
HENRY FUNCK, Head Miller.

From the Miller who furnishes Flour to the Royal Family of Great Britain.

Cairo City Mills, }
Cairo, Ill., Sept. 19, 1881. }
Garden City Mill Furn'g Co., }
Chicago, Ill.:

Gentlemen—Regarding your Brush Machine, we have delayed our opinion of its merits until we could give it a thorough test, and will say that each and every test made fully confirms your statements of its value, and we have no hesitancy in joining you in same, by saying that it comes fully up to your recommendation, and we consider it invaluable for cleaning wheat.

Respectfully yours,
CHAS. GALIGHER & SON.

For Circulars and Prices address

From one of the best known Millers in the West.

Victoria Flour Mill Co., Alex. H. Smith, Sec'y, corner of Main and Mound Sts., St. Louis, Sept. 28, 1881.

Garden City Mill Furn'g Co., Chicago:

Gentlemen—We have now been running your Brush Machine in our new mill for about a month, and find it entirely satisfactory in every respect. We have no other scourer or brush, and have no use for any other. It performs the double functions of scouring and brushing as well as any two machines we have in the old mill.

Yours truly, ALEX. H. SMITH.

From the Proprietors of one of the largest mills on the Pacific Coast.

Office of the National Steam Flouring Mills, San Francisco, Cal., March 25, 1881.

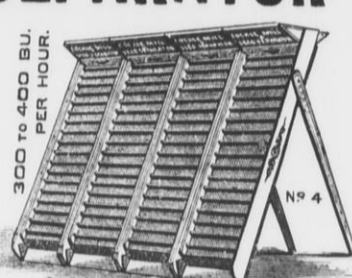
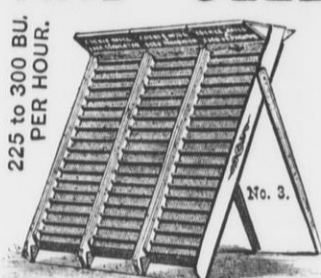
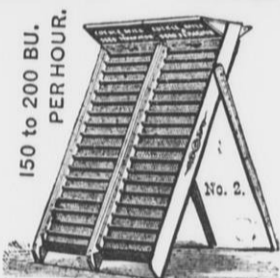
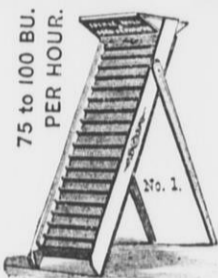
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Gentlemen—* * * We have the Wheat Brush running, and are well pleased with its working. * * * It took but a few minutes for us to learn that the Wheat Brush is the machine that we have needed for a long time. We think that a large number of the Garden City Wheat Brushes can be sold in this State.

Yours respectfully,
MARTENSTEIN & DEMING.

GARDEN CITY MILL FURN'G CO., Chicago, Ill.

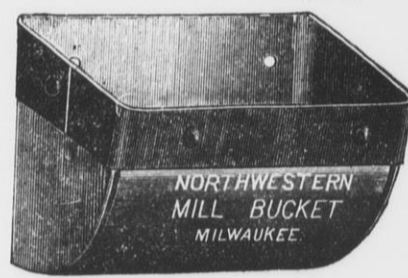
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Pat. November 9, 1880. Gives 25 Grades of work by Change of Elevation. No change of Screen. Requires no power. When used in Connection with Kurth Cockle Mill your cleaning capacity is more than Doubled. When used alone you have more Merit for the money than in any device yet invented. Write for circulars to La Du & King, Manufacturers, Rochester, Minnesota.

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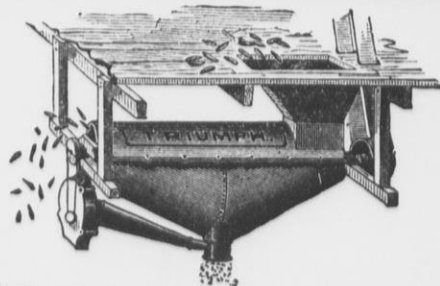
Flour, Sawmill, Tanners' and Brewers' Machinery, and General Mill Furnishers,

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Shells and Cleans 2,000 Bushels Ears per Day.

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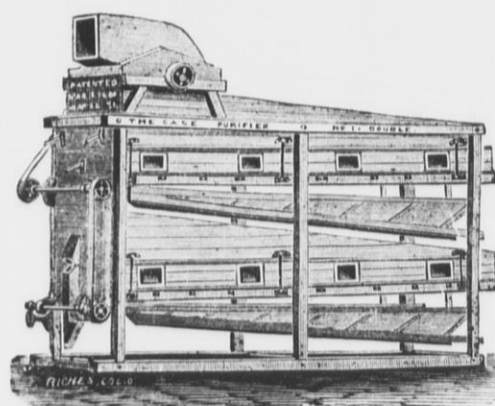
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Sold by the piece, or cut and made up in any quantity desired. Plans of bolting complete for stone or roller mills. Address,

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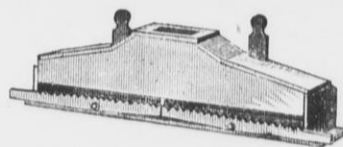
COSTS LESS AND HAS MORE CAPACITY THAN ANY in the MARKET.

IT IS THE KING OF PURIFIERS.

ADDRESS, CASE MF'G CO., Columbus, O. WM. E. CATLIN & CO., 68 LAKE STREET, CHICAGO, Chicago Agents.

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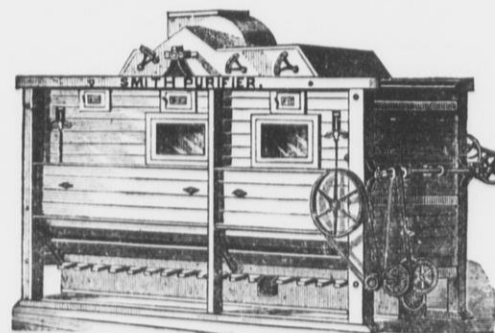
The Perfect Feed Box.



It insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address,

CASE MANUFACTURING CO., COLUMBUS, OHIO. W. E. CATLIN & CO., 68 LAKE ST., CHICAGO, ILL., AGENTS.

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SIMPLE, DURABLE, ECONOMICAL. Cheaper than any other of EQUAL CAPACITY. Licensed under all patents owned by Consolidated Middlings Purifier Co. Eight sizes single and three sizes double machines.

THE LOCKWOOD MEDAL. "Awarded to the Geo. T. Smith Purifier, as the machine making greatest progress and utility in its application to the grain and milling interests, invented within the last ten years." Millers' International Exhibition, Cincinnati, Ohio, 1880.



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Was awarded THE HIGHEST PRIZE ever offered for the competition of milling machinery — THE LOCKWOOD MEDAL — at the great Exposition. Competition and comparison with every other known Purifier only established it more firmly in the esteem and approval of millers and mill-owners.

It was UNANIMOUSLY awarded the FIRST PREMIUM in its class by a jury of five of the ablest, most successful and experienced mill-owners in the United States, men who represented the milling of every variety of wheat, and the use of all the latest and most approved methods of new process and gradual reduction milling.

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We invite particular attention to our SPECIAL machines, combining in one all the features of both air and seive Purifiers, perfectly adapted to handle and purify the breaks of roller mills.

Write for descriptive circular and price list to the

GEO. T. SMITH MIDLINGS PURIFIER CO., Jackson, Mich., U. S. A.

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The United States MILLER

Published by E. HARRISON CAWKER. { Vol. 12, No. 3 }

MILWAUKEE, JANUARY, 1882.

{ Terms : \$1.00 a Year in Advance. Single Copies, 10 Cents. }

ESTABLISHED 1850.
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 36 MARK LANE,
 LONDON (England.)
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 TELEGRAMS:
BRYCE, London or Glasgow.
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Flour Merchants,
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American correspondence solicited.

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AMERICAN FLOUR A SPECIALTY.

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Important Notice

For Millers about to purchase Roller Mills. We take this method of informing our friends that we have made arrangements for the exclusive manufacture of the

STEVENS ROLLER MILLS,

UNDER THE PATENTS ISSUED TO JNO. STEVENS.

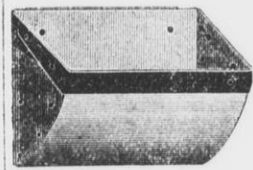
The work done by the Mills is far superior to that of any other machine known in this country or Europe. License to use the machine and process will be issued by the patentee for each mill furnished by us. Old rolls, or those with inferior dress, recut with the Stevens dress at reasonable prices.

JOHN T. NOYE & SONS, Buffalo, N. Y.

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THORNBURGH & GLESSNERR,

Successors to N. Hawkins & Co. and Charles & Swenson.



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Elevator Buckets, Elevator Boots, Elevator Bolts, Patent Iron Conveyor, Bolting Cloth, Pulleys, Hangers, Shafting, Journal Boxes, etc., etc.

Millers, Attention!

You can successfully purify the chop from either Stone or Rolls with the

Wheat Meal Purifier.

Satisfaction Guaranteed or No Sale.

THIRTY DAYS' TRIAL.

Send for circular and full particulars to

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Abernathy's New Book.

PRACTICAL HINTS

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Mill Building.

The Latest, Best and Only Exclusively Flour Mill Work in Print.

Every Miller, Millwright and Millwright's Apprentice should have a copy.

Price \$4.00, postage paid. Address,

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Nickle FLOUR TESTERS mailed for 25c.



HENRY HERZER,

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MILL PICKS!

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I have had twenty-two years experience in the manufacture and dressing of Mill Picks, and can and do make as fine Mill Picks as can be made by anybody anywhere. I use only the best imported Steel for the purpose. My work is known by millers throughout the country, and is pronounced to be first class by the very best judges.

We have hundreds of the most gratifying testimonials from nearly all the States. We solicit your orders and guarantee satisfaction. Address as above.
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MEDAL & PREMIUM AWARDED TO
ALCOTT'S
 TURBINE WATER WHEELS
 Most Perfect Turbine in Use.

ALCOTT'S IMPROVED TURBINE WATER WHEEL.
 MANUFACTURED BY T. C. ALCOTT & SON, MOUNT HOLLY, N. J.

MANUFACTURERS OF
 Circular Saw Mills, Shafting, Pulleys, Hangers & General Mill Machinery, Stating Particulars of Stream, &c.
 Address: T. C. ALCOTT & SON, Mount Holly, N. J.

[Mention this paper when you write us.]

This wheel is STRONG, DURABLE AND EFFECTIVE. Unsurpassed in Power at "part gate." Warranted to give full satisfaction.

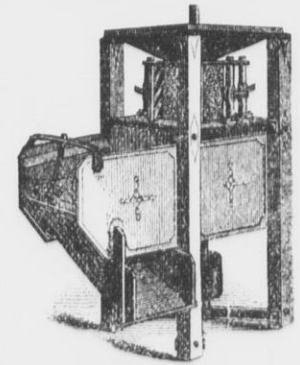
Mill Furnishing Foundrymen & Machinists. Established 1851. MANUFACTURE MILL STONES. Flouring Mill Contractors. Send for Pamphlet. Nordyke & Marmon Co Indianapolis, Ind.

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 Manufacturer and Dresser of
Mill Picks,
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Picks will be sent on 30 or 60 days' trial to any responsible miller in the United States or Canada, and if not superior in every respect to any other pick made in this or any other country, there will be no charge, and I will pay all express charges to and from Chicago. All my picks are made of a special steel, which is manufactured expressly for me at Sheffield, England. My customers can thus be assured of a good article, and share with me the profits of direct importation. References furnished from every State and Territory in the United States and Canada. Send for Circular and Price List.
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MARSHALL'S NEW CORN SHELLER.



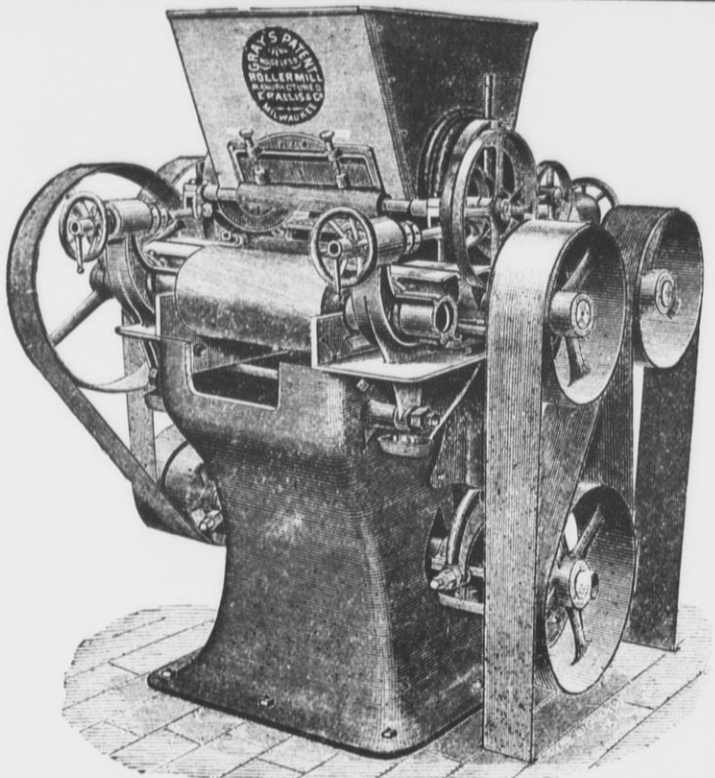
The only Self-Adjusting Sheller in use that will **SHELL MIXED CORN** FAST AND WELL. And that will clean it THOROUGHLY. Easy of access to all parts liable to clog. Thoroughly made. Sold as cheap as the cheapest. Send for circulars to **G. MARSHALL & SON, Mfrs.** Kilbourn City, Wis.
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EQUILIBRIUM Driving Pulley. Prevents Side Pull on Mill Spindle.

PREVENTS BACK LASH. JNO. A. HAFNER PITTSBURGH, PA.

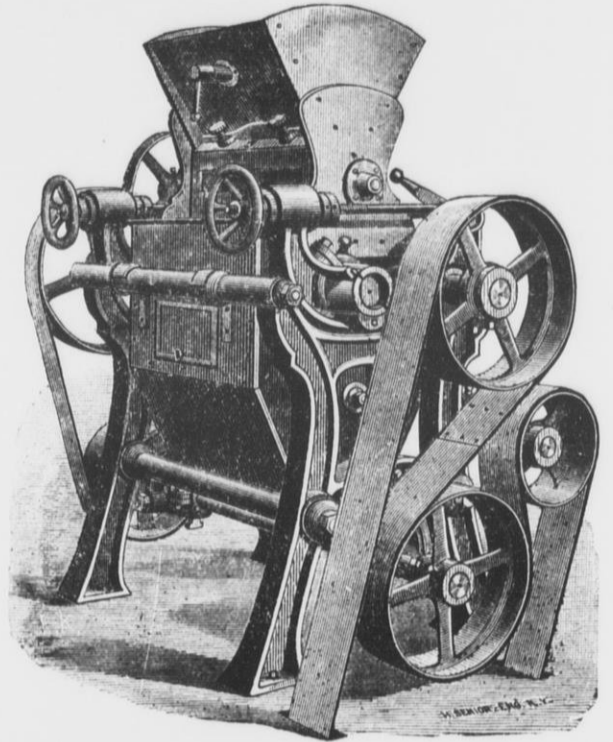
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GRAY'S PATENT NOISELESS ROLLER



DOUBLE MACHINE.

MILLERS



SINGLE MACHINE.

WITH

CORRUGATED CHILLED IRON ROLLS.

CORRUGATIONS CUT OF ALL DESCRIPTIONS.

OVER 5,000 IN USE.

First Premium Awarded at Millers' International Exhibition.

These Machines require little power, are perfectly noiseless, being driven entirely by belt; are simple in construction; strong and durable; perfect in every adjustment; adapted to both soft and hard wheats.

We refer to the following prominent millers who are each using from 50 to 150 of these machines:

Winona Mill Co., Winona, Minn.
 C. A. Pillsbury & Co. Minneapolis, Minn.
 C. C. Washburn.
 Washburn, Crosby & Co., "
 W. D. Washburn & Co., "
 Sidle, Fletcher, Holmes & Co., "
 E. V. White & Co., "
 John Glenn, Glasgow, Scotland.
 Jones & Co., New York City.
 Geo. V. Hecker, New York City.
 Becker & Underwood, Dixon, Ill.
 Schurmeier & Smith, St. Paul, Minn.
 E. T. Archibald & Co., Dundas, Minn.

Jesse Ames' Sons, Northfield, Minn.
 J. B. A. Kern, Milwaukee, Wis.
 Edw. Sanderson, "
 Daisy Roller Mill, "
 C. E. Manegold & Sons, Milwaukee, Wis.
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 L. H. Gibson & Co., Indianapolis, Ind.
 L. H. Lanier & Co., Nashville, Tenn.
 LaGrange Mill Co., Red Wing, Minn.
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 And Hundreds of others.

To all parties purchasing our Rolls we give full information regarding the system of Roller Milling.

ADDRESS:

EDW. P. ALLIS & CO.,

Mention this Paper when you write us.

MILWAUKEE, WIS.

The United States MILLER

Published by E. HARRISON CAWKER. { Vol. 12, No. 3 }

MILWAUKEE, JANUARY, 1882.

{Terms: \$1.00 a Year in Advance. Single Copies, 10 Cents.

Our Grain Crop and Its Commercial Importance.

During the past decade the production of breadstuffs in this country, as shown in the latest census reports, has been nearly doubled. During the same period the exportation of breadstuffs has increased fourfold. It is now more than ten times as great as it was twenty years ago, and more than twenty times what it was thirty years ago. As given by the Bureau of Statistics the total exportations were:

In 1860	\$ 13,066,509
In 1865	24,442,320
In 1870	72,250,933
In 1880	288,036,835

In 1850 the total production of wheat was a little over a hundred million bushels, of which the portion exported was less than four-fifths of one per cent. In 1880 the yield was close upon

450 000,000 bushels, of which 34¼ per cent. was exported. Of the second great staple, corn, the yield in 1850 was nearly 600,000,000 bushels, of which 1.11 per cent. was exported. In 1880 the yield was nearly 1,548,000,000 bushels, 6.34 per cent. being exported. The entire grain crop of last year—corn, wheat, barley, oats, rye, etc.—approached 2,700,000,000 bushels, valued at \$2,000,000,000. During the first eight months of the current year, the exportation of breadstuffs has exceeded \$20,000,000 a month, a material falling off from last year's business, owing partly to better crops abroad and partly to the fact that prices have been kept up by speculative holding of grain for higher prices.

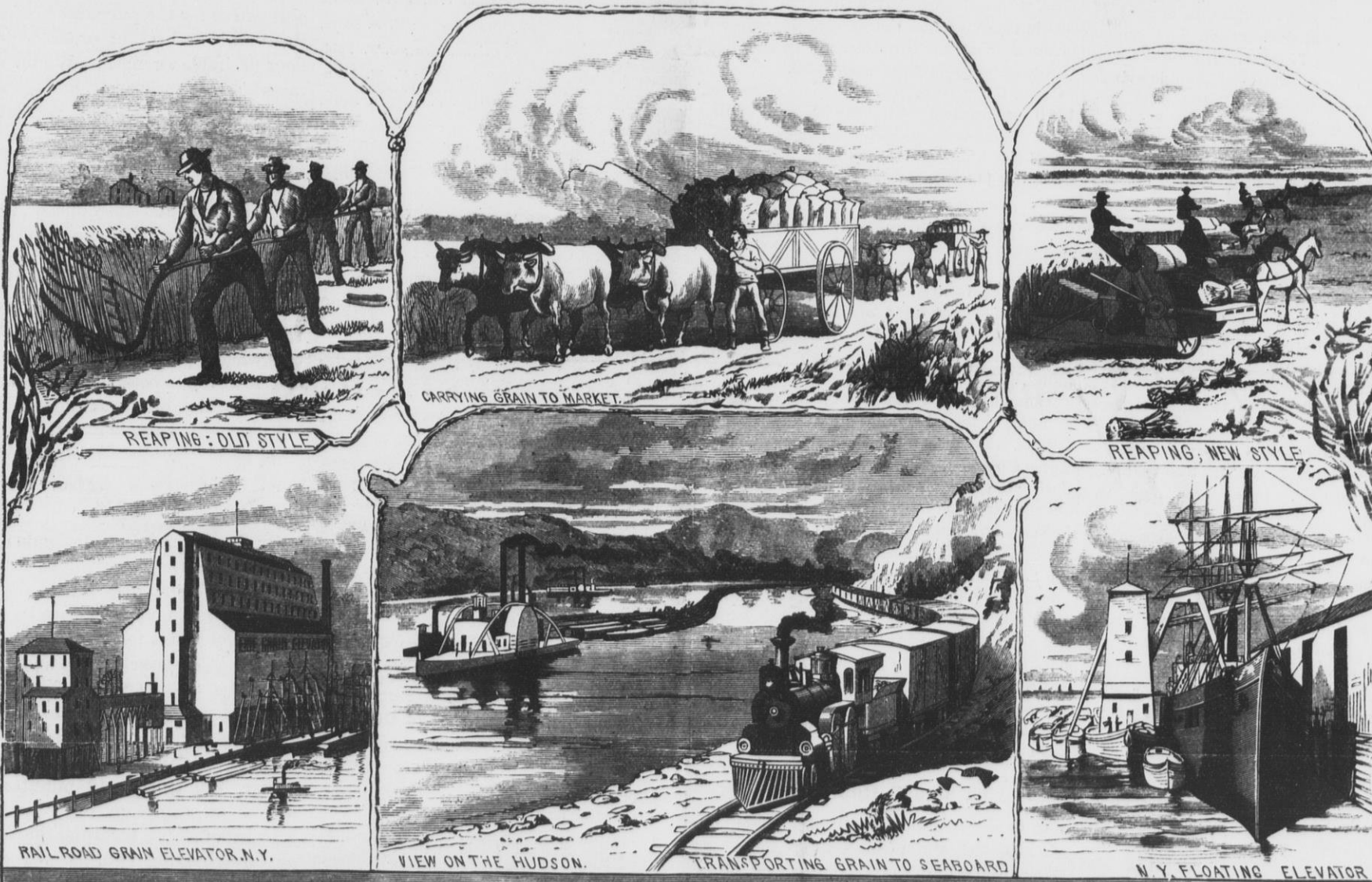
The apparent increase in the corn crop during the past decade was 133 per cent. In the census year (1879) the three principal corn-

growing States produced more corn than the entire country did in 1869. The increase in Kansas was fivefold—in Nebraska still greater.

The gain in the wheat crop was 73 per cent. in the last decade; in the preceding decades the gain was 66 and 60 per cent. Seven-tenths of the entire crop last year was produced in Illinois, Indiana, Ohio, Michigan, Minnesota, Iowa, California, Missouri, and Wisconsin. The products of these states were in round numbers: Illinois, 51,000,000 bushels; Indiana, 47,000,000; Ohio, 46,000,000; Michigan, 35,000,000; Iowa, 31,000,000; California, 29,000,000; Missouri and Wisconsin, each 25,000,000; Pennsylvania followed with 19,500,000; Kansas, 17,000,000; Nebraska, 14,000,000; New York and Kentucky, each 11,500,000. The home consumption of wheat is about 300,000,000 bushels.

The great corn-growing States are: Illinois, 326 000,000 bushels; Iowa, 275,000,000; Missouri, 200,000,000; Indiana, 115,000,000; Ohio, 112,000,000; Kansas, 106 000 000; Kentucky, 73 000,000; Nebraska, 66,000,000; Tennessee, 63,000,000. Far below in the scale of productions are the following, the figures standing for millions of bushels: Pennsylvania, 46; Wisconsin, 34; Michigan, 32; Virginia, 29; Texas, 29; North Carolina, 28; New York, 26; Alabama, 25½; Arkansas, 24; Georgia, 23; Mississippi, 21.

The oat crop comes mainly from Illinois, 62,000,000 bushels; Iowa, 50,500,000; New York, 37,500,000; Pennsylvania, 34,000,000; Wisconsin, 33,000 000; Ohio, 28,500,000; Minnesota, 23,500,000; Missouri, 21,000,000; Indiana, 15,500,000. Four-tenths of the area of this crop and nearly half the total product



REAPING: OLD STYLE

CARRYING GRAIN TO MARKET

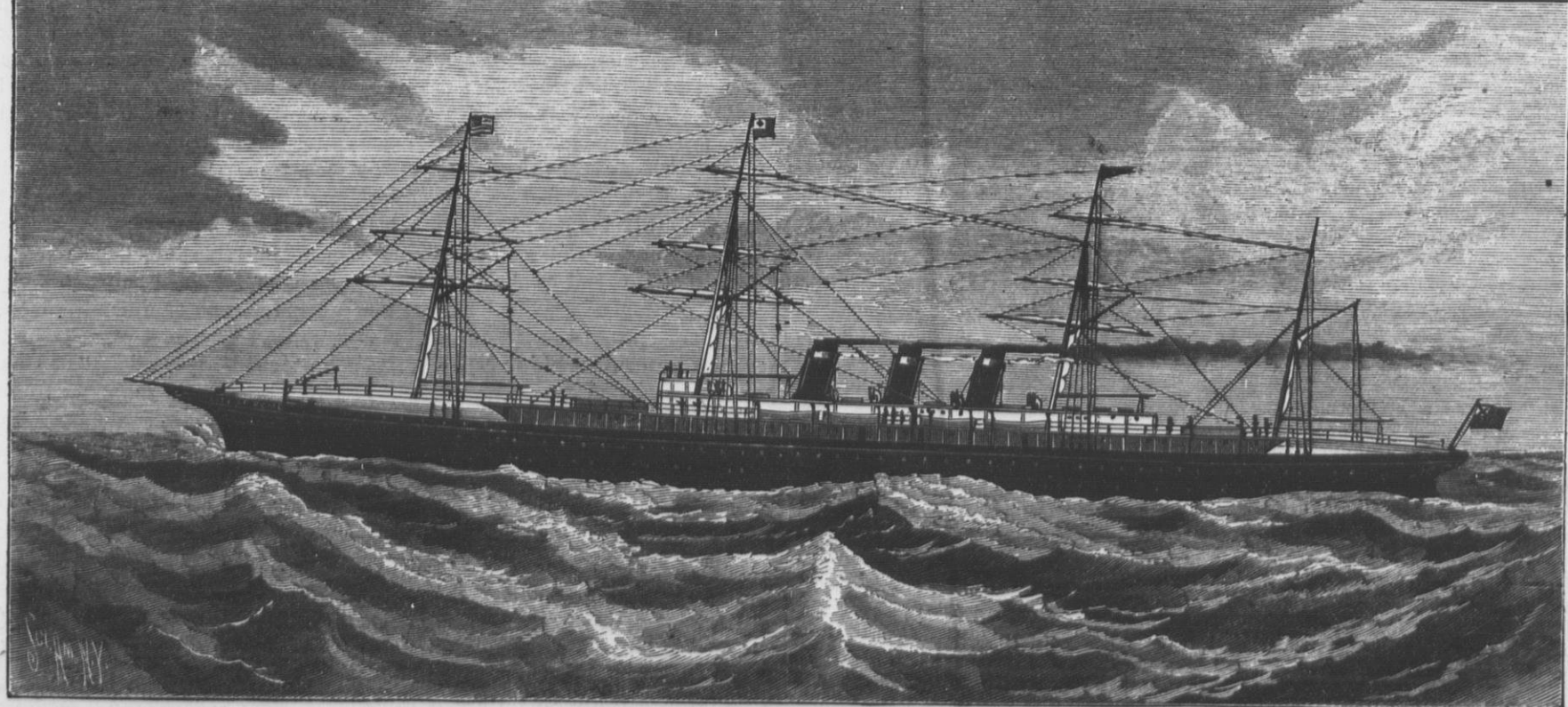
REAPING, NEW STYLE

RAILROAD GRAIN ELEVATOR, N.Y.

VIEW ON THE HUDSON.

TRANSPORTING GRAIN TO SEABOARD

N.Y. FLOATING ELEVATOR



OUR GRAIN CROP AND ITS COMMERCIAL IMPORTANCE.

are accredited to the first four states named.

Of the barley crop California and New York produce nearly one-half, and Wisconsin, Iowa, and Minnesota yield most of the other half. About half the rye crop comes from Pennsylvania, Illinois and New York. Of the buckwheat crop (about 12,000,000 bushels) two-thirds are produced by New York and Pennsylvania.

The enormous and wonderfully rapid increase in our grain crops is attributable to several causes. Primarily we have the invention and improvement of agricultural machinery, by which the cultivation of the great West has been made possible. Next we have the vast extension and improvement of our railway and water lines, making possible the profitable transportation of the large surplus to eastern and foreign markets. With this extension of means has come an important lowering of freight charges, which has made it possible to place American grain in the markets of Europe at prices at which it can compete successfully with European grain, especially that from Russia, Hungary, Austria and Germany.

Of course the vast immigration of farmers who have swarmed into the Northwest, a full regiment a day for every day in the year, is an element of the problem of no mean significance; but their labor has been largely invited and made profitable by the cheapening of the transportation of their crops to the East and to Europe.

Ten years ago it was the belief of railroad men that grain could not be carried from Chicago to New York for less than 24 cents a bushel. The rate has since been lowered to 20 cents, and for special rates, it is said on good authority, to half that sum. The nominal rate at this time is 17 cents. During the same period the cost of water-carriage has been correspondingly reduced. The lowest estimate that we have seen of the actual cost of bringing wheat from Chicago to Buffalo by steam barge is \$2.85 a hundred bushels; from Buffalo to New York by canal and river, \$5.70; making the cost from Chicago to New York by water (all charges included), 85-100 cents a bushel.

Ten years ago it cost nearly as much to get a bushel of grain from Buffalo to New York as it now does to carry it from Chicago to Liverpool. The influence of a reduction of a cent a bushel in transportation charges would be incredible if we did not know how narrow is the margin of profit in the handling of great staples. The reduction of one cent in the Erie Canal tolls was followed by an increase in grain-carriage from 29,000,000 bushels to 69,000,000 of bushels. In a recent legislative inquiry a prominent grain merchant expressed the belief that the abolition of the remaining one cent toll would increase the flow of grain through the canal to 150,000,000 bushels a year.

Something over half of the entire export grain trade of the country is done at New York, where the elevators and great warehouses have a storing capacity of nearly twenty-five million bushels. A very large part of the grain passing through the city, however, is loaded directly from the canal boats into the ocean steamers, as shown in our illustration. Commonly the loading and unloading go on together, a floating elevator hauling alongside and pouring in the grain as fast as the outgoing freight is removed. Usually the canal boats carry from five to seven thousand bushels or more, four of them sufficing to load a grain ship, and eight to ten a large steamer. The largest cargo ever brought through the canal was recently reported; it was 8,500 bushels. The largest grain steamer will carry 150,000 bushels; from 80,000 to 90,000 bushels is a large cargo.

To carry our entire grain crop would require from thirty to fifty thousand large steamers; or something like half a million canal boats, or a train of freight cars over thirty thousand miles long! To carry away as wheat our export of wheat and flour would require five thousand vessels carrying the average cargo of 30,000 bushels each. It is only by figures like these that one can make any approach to a definite idea of the magnitude of the grain trade, or its enormous influence upon the world's commerce.

Though not intended specially for the grain trade, the huge steamer, the City of Rome, shown at the bottom of our first page illustration, will, no doubt, prove an important factor in its future development. This steamer ranks next to the Great Eastern in size, and is the largest vessel in the merchant service. Her dimensions are as follows:

Length of keel, 546 feet; length over all, 590 feet; breadth of beam, 52 feet; depth of hold, 38 feet 9 inches; and depth from top of deck-house to keel, 52 feet. Her tonnage is

8,300, being over four-fifths that of the Great Eastern. The leading particulars of the engines are as follows:

There are three high-pressure cylinders 43 inches in diameter, and three low-pressure cylinders 86 inches in diameter, and 6 feet stroke. The diameter of the crank shaft is 25 inches, and of the crank pins, 26 inches. The length of the main bearings is 33½ inches, and of the crank pins 28 inches. The crank shaft, as built up complete, will weigh 64 tons; had it been made of iron, and solid, the weight would have been 73 tons. The propeller shafting is 24 inches in diameter, and the hole through it 14 inches in diameter. The thrust shaft has thirteen collars 39½ inches in diameter, giving a surface of 6,000 square inches. This piece of shafting weighs 17 tons. The propeller shaft is 25 inches in diameter and 30½ feet long, and weighs 18 tons. The engine-bed plate weighs 100 tons. The cooling surface of the condensers is 17,000 square feet, equal to nearly 17 miles 360 yards of tubing.

There are two air pumps 39 inches in diameter, and 3 feet stroke; these pumps, and the feed and bilge pumps, being worked by levers attached to the aft and forward engines. There will also be a large centrifugal pumping engine, which can either be used for pumping heavy leaks, or to discharge through the condenser. There will also be three auxiliary pumping engines, for feeding the boilers, for bilge pumping, and for deck purposes. Steam will be supplied by eight cylindrical tubular boilers, fired from both ends. Each boiler is 14 feet mean diameter and 19 feet long, with a steam receiver 13 feet long and 4 feet in diameter, and has six furnaces 3 feet 9 inches in diameter, three at each end, so that there are forty-eight furnaces in all. The fire bars are 6 feet long, giving a grate surface of 1,080 square feet. The shell plates of the boilers, supplied by Sir John Brown & Co., are 24 feet 8 inches long, 4 feet ½ inches wide, and 1¼ inches thick, and weigh nearly 2½ tons each; all the holes are drilled. The internal parts are of Bowling iron, and each furnace has its own separate combustion chamber. These boilers are constructed for a working pressure of 90 pounds per square inch. The engines are intended to work constantly at 8,000 indicated horse power, although they are capable of developing 10,000 indicated horse power.

Though built for a speed of over 17 knots an hour, or over 400 miles a day, the maiden trip of the great steamer was a slow one. Three stoppages of importance were necessary during the voyage, owing to the machinery. On the first night out from Queenstown the journals grew too hot to continue, and a two hours' stop was necessitated. On the following day the reversing gear of the engine got out of order, and for sixteen hours the monster vessel lay in a rough sea, rolling heavily. Afterward the steam steering gear became deranged, and two hours more were lost while the engineers worked at it. Stoppages excluded, the voyage across the Atlantic was made in eight days and twenty-two hours. —*Scientific American, New York.*

Buying Second-Hand Engines.

In buying second-hand steam engines, the cylinder and steam chest covers should be taken off and the parts examined to see if they are in proper condition. The cylinder may require re-boring to make it true and smooth, and the expense of this job should be taken into account in estimating the value. The valve-face may require refitting and the valve also, and this must be taken into account. The bearings must be examined to see if the brasses are not entirely worn out, and backed up with shims so as to make them "answer" the purpose. The bed-plate must be looked at to see if their threads are not stripped or worn out. Whatever heater is used on the engine it must be thoroughly overhauled to ascertain the condition of its tubes. In many cases they are nearly rusted out, particularly if the engine has been standing some time without use. The feed-pump will also bear inspection as to its valves and the condition of them. All the valves will need examination for the condition of their seats. —*Mechanical Engineer.*

LOUIS GATHMANN, Esq., President of the Garden City Exhaust Fan Co., will soon sail for Europe, where he will spend several months. The Garden City Middlings Purifiers and the Garden City Wheat Brush, of which he is the inventor, have already been quite extensively introduced in different portions of Europe. We wish Mr. Gathmann a pleasant journey and a safe return.

UNITED STATES MILLER.

PUBLISHED MONTHLY.

OFFICE NO. 118 GRAND AVENUE, MILWAUKEE, WIS.
Subscription Price.....\$1 per year in advance.
Foreign Subscription.....\$1.50 per year in advance.

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WM. DUNHAM, Editor of "The Miller," 69 Mark Lane, and HENRY F. GILLING & Co., 449 Strand, London, England are authorized to receive subscriptions for the UNITED STATES MILLER.

MILWAUKEE, JANUARY, 1882.

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It is said that 28 per cent. of the cultivated land in Spain is devoted to wheat-raising, and that the average crop is 160,000,000 bushels.

An important meeting of representatives of the Minnesota Miller's Association and prominent grain dealers of the state was held in Minneapolis Dec. 14, with the object of securing stricter grading, and greater care in buying wheat at the elevators, and to prevent loss by having their grades of wheat reduced when they reach Chicago. The meeting was secret, but it is learned that a combination was formed to enforce greater uniformity in the rules governing purchases of wheat in all localities in the state, and establishing an un-deviating system of grading for all points.

Contiguous Flour Mills.

The milling disasters in Minneapolis are striking illustrations of the danger of having several flour mills built close to one another. Millers will hereafter do well to bear this in mind when selecting a location. Should any one of the group of large mills in Milwaukee get thoroughly on fire, it cannot be denied that all the rest of them would be in serious danger. When E. Sanderson & Co.'s stove mill, situated between the Phoenix Mills and the Eagle Mills recently caught fire, it caused for a short time great anxiety amongst the millers and the firemen whose brethren

had recently suffered such misfortune in Minneapolis. The fire was happily extinguished without any very serious loss, but it caused many to meditate on the possibility that at any time two-thirds of the milling capacity of Milwaukee might be speedily annihilated.

Milling in Denmark.

Within the last two years the Danish millers have become considerably interested in improved milling, and the leading millers there are going over the same grounds that our leading millers have already passed. The mill-stones and rollers of different materials and conditions of surface all have their advocates, and each mill-owner strives with might and main to keep his neighbor from finding out what he is doing in the way of improvement. German and Hungarian milling engineers and mill-builders find at present a good field for work and considerable American milling machinery, especially for grain-cleaning, has found its way there already. One thing, however, seems rather remarkable. Most of the mills use the same system and bolting capacity they used under the old process, and seem determined not to make any change. But the time will come when they will learn the value of more extensive bolting and purifying capacity. Denmark imports foreign wheat to a considerable extent for the purpose of mixing with their native wheat, in order to give the flour desirable strength. Winter wheat is raised almost exclusively, and the varieties produced have a large percentage of starchy and less of glutinous component parts than most foreign wheats. A new centrifugal bolting machine has lately been manufactured and introduced in Danish mills by Messrs. N. Nielson & Co., of Copenhagen, and is said to give very satisfactory results. A medium sized machine styled the "Alexander," has a capacity of 200 pounds of extra fine flour in 45 minutes when working on meal made by mill-stones, and 300 pounds in the same time when working on fine middlings.

Unfortunate Minneapolis.

FIRE AND EXPLOSION DESTROY FOUR FLOUR MILLS.

On Sunday morning, December 4th, fire broke out in the basement of Pillsbury B Mill, and was first discovered being rapidly conveyed to the upper stories by the main belt. A machine tender in the B mill was the first to discover the fire and turned in the alarm at 3:40 a. m. The entire mill was soon wrapped in flames, and despite all efforts to prevent it, in less than forty minutes the flames had spread to the Excelsior Mill, and at 12 minutes after 5 o'clock an explosion took place in the Minneapolis Mill, throwing the front wall out and burying two firemen as it fell. There was no fire seen in the mill previous to the explosion, and it came entirely unexpected. About 6 a. m. the fire spread to the Empire Mill and it burned to the ground. If it had not been for the most persistent exertions on the part of the employes the Cataract, Dakota and Northwestern Mills would surely have been destroyed. As it was they escaped with comparatively slight damages. The total loss is put at about half a million dollars, a large portion of which is covered by insurance. The total capacity of the mills destroyed is reported at 2,850 barrels per day. Friction is supposed to have been the primary cause of the fire. Four lives were lost and several persons seriously injured. The names of those killed are as follows: O. Frederichs and John Tuhey, firemen; R. R. Robinson, millwright, and Alexander Burke, sweeper. It is probable that none of the mills will be rebuilt during the coming year.

Messrs. Trusty & West, who formerly operated the mill at Omaha, Ill., have selected a site at Equality, Ill., and will commence the erection of a first-class three-run new process steam mill.

Recent Milling Patents.

During the past month, patents of interest to the milling industry have been granted to the following parties for the inventions as specified: for a disintegrating mill, to Lewis J. Bennett, Buffalo, N. Y.; to Ross Forward, Cincinnati, O., for a grain meter; to James Higginbotham, of Liverpool, England, for a grinding mill; to Jacob Cornwell, Cadillac, Mich., for a machine for decorticating wheat; to Charles Forster, Pittsburgh, Pa., for a grinding-mill; to Louis Gathman, Chicago, Ill., for a machine for cleaning and hulling grain and also for a brush grain-cleaner; to A. McGinty and A. Wahle, of Neenah, Wis., for a roller grinding-mill.

December 13, patents were issued for a cockle machine to Thomas M. Bales, Dublin, Ind.; grain-cleaner, Franklin Dalbey, Sheridan, Cal.; barrel-stave jointer, Robert O. Dobbin, Berlin, Ont.; mill-stone bush, Chris. A. Milner and L. Woodward, Augusta, Ga.; middlings purifier, H. R. Moser and J. G. Hope, Kansas City, Mo.; Flour-bolt, Josef Nicht and A. J. Nicht, Albany, N. Y.; roller-mill, Udolpho H. Odell, Minneapolis, Minn.; grain-disintegrating machine, Francis Taggart, Brooklyn, N. Y.; middlings purifier, William S. Varner, Alexandria, Pa.; middlings purifier, John Zech, Chilton, Wis.

December 20, patents were issued for a grain-conveying apparatus to William Bayley, Springfield, O.; buckwheat huller to Giles S. Cranson, Silver Creek, N. Y.; middlings purifier and grinding mill, W. D. Gray, Milwaukee, Wis.; grain meter, Alexander Kaiser, Munich, Bavaria, Germany; dust collectors for flour-mills and middlings purifiers, A. H. Kirk, Minneapolis, Minn.; roller mill for grinding grain, Andreas Mechwart, Budapest, Austria, Hungary; dust-collector for flour mills and middlings purifiers, Abraham N. Wolf, Allentown, Pa.

The Denchfield Patent.

The suits brought against millers in various states by the owners of the Denchfield patent have occasioned a good deal of anxiety amongst the fraternity in general and the members of the Millers National Association in particular. The matter was brought before the sub-executive committee of the Association during its late meeting in St. Louis and a resolution was passed authorizing President Bain to invite Col. E. S. Janney, of Syracuse, N. Y., counsel for the Denchfield people, to meet the sub-executive committee at the Grand Pacific Hotel in Chicago, Dec. 20, to talk over the matter and if possible amicably adjust the claim. The meeting accordingly occurred. The Denchfield people were willing to compromise on the basis of one barrel out of 600 manufactured by those using the device or \$100 per run of stone. The committee did not accept the proposition, but it is understood made a counter proposition which they believed to be a liberal one. At the time the meeting adjourned no arrangement was made but the proposition tendered by the committee was left open for a definite time for the further consideration of all those interested in ownership in the Denchfield patent. It seems that many millers are inclined to admit that the claims of the owners of the patent are tenable, they having been so decided by United States courts, but think that the damages awarded in the New York cases (one barrel out of 600, or \$100 per run of stone), are excessive, as a rule, and that at any rate the invention has not been of equal value to all using it. From all appearances, we believe, at the present writing, that a compromise will be effected, for the Association (which since its reorganization is in a first-class condition financially and otherwise) desires to sweep away all troublesome matters and the Denchfield people are also desirous of effecting a settlement with a large number of milling firms through the Association at once—in a sort of wholesale manner.

P. D. Mickles, Esq., of Syracuse, N. Y.,

one of the principal owners of the patent, has engineered the matter in behalf of the Denchfield claimants with the assistance of Col. Janney, of Syracuse and Prof. Hurd, of Chicago, and he will doubtless be well pleased to see a large portion of his work accomplished at a stroke, which will give him leisure to search for the uninitiated millers who wear not the mantle of protection so long offered by the National Association. The term of the patent expired nearly two years ago and millers can use the device now as a matter of course, but if they used it previous to its expiration, which we believe was in March, 1880, they are liable as infringers according to the decisions of the United States Courts in the New York cases. Numerous cases are now pending in Milwaukee, Minneapolis, St. Louis, etc., most of which will be discontinued in case a compromise is made by the Association with the owners of the Denchfield patent.

Barley Milling.

Barley comes next to wheat in importance as an article of food. It has, however, less nitrogenized matter than wheat, and has only little gluten. It was a popular grain among the ancients, and Pliny relates in his works that the Russian gladiators used it to give them wind and endurance. It is not so agreeable to the taste as wheat or oats, and is now principally used for soups. There are several modes of preparing it, the most common being with vertical stones, running like a grindstone and enclosed in punched iron cases with wire at the rim. The cases also turn, but in an opposite direction from the stone and at a much slower rate of speed. They are, however, sometimes revolved in the same direction as the stone, and many millers assert that better work is done in that way. The barley is fed into the machine in about the same manner as grain is fed into a conical or perpendicular mill, through a hole in the eye above the shaft, and the lower space, between the stone and the casing is nearly filled. The case and stone, both revolving, keep the grain in constant motion, and it consequently meets with a continual changing surface. The stone used is generally of the Newcastle stock, although Nova Scotia stones are said to do good work. The stones should not be less than eight inches thick, and twelve or sixteen inches would do better work and less likely to burst, an accident which often happens when revolving at a high rate of speed. The dust escapes through the holes of the casing as it is rubbed off by the stone. The casing is about an inch and a half from the circumference of the stone and half an inch on each side. The stone is revolved at a speed of from two to five hundred revolutions, according to its diameter and texture.

The velocity of the case is not more than two feet per second, and it is generally driven by screw gearing. It is made in two semi-circles, and the halves are fastened together in such a way as to admit of being taken off without interfering with the spindle of the stone. The space between the case and the stone should be kept packed as full as possible, and as it becomes slack by the escape of the dust, it should be kept filled with barley which is only half pearled, and which should always be kept for the purpose mentioned. The kernels should be of as uniform a size as possible, and if not found so, they should be graded before going to the machine.

Like buckwheat, barley milling can be made a valuable adjunct to the regular business of flour making, and its manufacture is now a matter of much inquiry, particularly among millers who have a superabundance of power. The cost of the machinery is only a small item, and the manufacture is very simple. In the machine just described the feeding is done by charges, which is a very unhandy method; and some few years ago a machine was invented which had a regular feed and discharge, somewhat similar to an ordinary stone scourer, and it could be regulated so as to pearl to any degree. The scouring parts are made of emery, two feet in diameter by one inch in thickness, placed on a shaft at a distance of about an inch from each other. Between each is placed a wooden wheel seventeen inches in diameter. Rods or pins are placed in the case to prevent the grain from running around with the wheels, and extend nearly to the face of the wood between the emery wheels and nearly to the wooden wheels. The rods are placed in three rows, one along the bottom of the scouring case,

and one on each side of the centre. The capacity of the machine is governed by the number of wheels employed. These wheels are made of three different grades of emery, first set being coarse, the next finer, and the third or finishing stone being the finest. The grain on entering the machine is acted on by the coarse sharp wheels, and as it advances toward the outlet, the finer emery gently scours and finishes it, and when discharged it is found to be smooth and round, and entirely free from the outer coating. There is a fan placed underneath the machine to remove the dust and scourings. The machine is made on the right principle, and should have an extensive sale. According to the general system for making the pot barley by the old method, after getting part of the skin stripped, the cases are emptied by a shute on the rim, some doing it by one charge and others by two. The dust from [the first charge is of a very dark color, and if put through once or twice again the color changes to white, but a complete decortication, by simply taking off the bran, is best, as then all the gluten is saved. An adaptation of this has often been tried for decorticating or pearling wheat, but it is much more difficult to detach the bran of wheat than barley, and in the case of most wheat it can only be effected with great waste.

Any miller can add to his profits by pearling barley, as the demand for it is constantly increasing, and the profit in its manufacture is much greater in proportion than that of flour, and quite a flourishing trade could be easily built up in any part of the country. This is a valuable suggestion, and should be taken advantage of by millers.—*Miller's Journal*

The Architecture of Machine Shops.

The old notion that any kind of a building was good enough for a machine shop or factory, is fast becoming obsolete, and most of our manufacturers are now realizing that it pays to construct their buildings according to approved architectural plans, and to so arrange all the appointments as to furnish the best possible facilities for the prosecution of the business. But to do this requires an intelligent idea of what constitutes a proper building and its accessories, as well as a careful study of the arrangements of its interior plans, in order to avoid extravagances in design and finish, while providing necessary room and appropriate modern conveniences. In erecting works, one of the most important considerations, and in many cases a vital one, is the matter of location. This must be made in reference to the receiving of the crude material and the shipment of the finished product. The most fortunate establishments are those which have direct communication with rail and water transportation, or are connected with the competing lines of railway. In designing a manufactory, the old question arises of what is or is not unnecessary finish. It is the same question that is constantly coming up in relation to the finishing of machinery. A factory of the plainest and cheapest materials will furnish a shelter for workmen, and in many lines business can be successfully carried on in a very poorly constructed shop. But is the amount of extra cost of finishing a building in an ornamental manner an absolute loss? It has been decided in case of machinery that extra finish is not a loss, because the beauty of the machine aids in selling it, even if it is of no practical use in its operation. There doubtless is a middle ground between extravagant ornamentation and absolute plainness, which may be advisedly taken.

Of course the dimensions and form of the works must conform to the requirements of the business to be undertaken in them. But a certain amount of beautifying can be advantageously done without incurring very much more cost than by building plainly. Thus, caps may be constructed over the windows almost as cheaply as without them. Pilasters may be run up with the walls, adding little to the expense but very much to the beauty of the building, and at the same time strengthening the walls at the points where the beams are inserted. It does not require many such departures from an absolute plain exterior to make an attractive building. If the works are extensive, or if they form part of a system of town construction, as in the case of the Pullman works at Pullman, Ill., then it would not be considered either extravagant or unwise to invest a considerable sum in exterior finish and diversity of design. It must not be forgotten that buildings often have a worth separate from their use—that finely constructed works will sell for more, and more readily, too, than though

they were but plainly and cheaply made. In planning a machine shop, provisions ought to be made for doing the heaviest work on the lower floor, while the whole structure should be made to stand the severest strains which the operation of the business would be likely to subject it to. The ground floors, in particular, should be made as solid as it is possible to make them. Opinions differ as to how this may best be done. Some think that by embedding the floor timbers in and laying the floors on a solid body of concrete makes the best flooring, while others believe in different plans. A very superior way may be found by filling in between the cross timbers with cinders, when they can be obtained, and after tamping them down smooth, to lay thereon a floor of heavy plank. What is needed is a firm and substantial floor for the heavy machinery, which is thus provided. The height of stories is another important matter. The experience of good builders demonstrates that 14 feet between the floors is a good average height. Twelve feet is about as high as a man can throw a belt to advantage, and if the hangers are higher than that, he is constantly bothered in fixing his belts. Fourteen feet is high enough for proper ventilation and light. There should be plenty of light, and for this purpose where from the nature of the building, a window could be placed as often as once in 8 feet, it would be desirable to have them so placed. That leaves 4 feet for windows alternating with 4 feet of wall. As to the width of shops, of course, plans will vary somewhat. Some make them fifty feet wide, while several recently constructed shops have been only 40 feet in width. Perhaps a fair average width may be placed at 45 feet, which allows of ample room for placing of machines and operating them to the best advantage. The upper floors of the shop must be substantially made, and how best to do this is no easy question. Some put up 2x12 or other sized joist, staying them with cross pieces, thus leaving the under side exposed, which makes an ugly looking, dirt catching ceiling, besides being unhandy for affixing hangers or main line shafts. The best way to make a solid and substantial floor for the above purposes, is to lay 2 by 4 scantlings on the beams and spike them close together. Plane the scantlings on three sides and leave them beaded at the bottom; on the top of the scantling inlay a covering of inch boards. This is a plan in vogue among many eastern manufacturers. The most desirable way for placing the beams is to have them 8 feet from center to center. This brings them the right distance apart for affixing the hangers and line shafts, at least in ordinary shops employing 2-inch shafts—the size in common use. It is well to locate the boiler house outside of the main building, so that in case of explosions the whole building will not be blown up. The chimney stack should also be run up independent of the building, because when made part of the main building it will settle by reason of its extra weight, thereby cracking and disfiguring the works. Modern chimneys are erected with hollow wall, providing an air space which effectually prevents cracking. They are also made with the hole largest at the top. Whoever thinks it an easy task to construct a machine shop will find that he is mistaken. He will find that those things which seem most simple require a great amount of care, research and experiment. But the improvement now being made in machine shop construction will materially aid him in his labors, by furnishing both plans and suggestions for his work.—*Manufacturer and Builder, New York.*

Minnesota Mechanics.

Wood and Iron gives its readers a recipe for the preservation of belts: Resin oil and ten per cent. of mica. Resin oil will make a belt grip for a little while and then put a glaze on it, making it necessary for another dose of oil, etc. If it is a leather belt, resin oil will make it stiff and harsh, and cause it to slip and crack. Resin oil is not a "grease," as stated by *Wood and Iron*. It is more of a varnish. It is used to make cheap grades of printers' ink; being ground up with lampblack in roller mills. Mica is recommended as a lubricant for heavy journals, and has no place on a belt. *Wood and Iron* says that a belt coated with resin oil and mica is not affected by "corrosion"—whatever that is. Our eastern belts never "corrode." Boilers sometimes do. We have known belts to rot, but never to "corrode." PITTSBURGH.

A \$20,000 mill is being built at Grandville, Minn., by Gravel & Goulet.

UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

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MILWAUKEE, JANUARY, 1882.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

C. C. ROGERMAN has succeeded Jesse Dorman as editor of the *Miller and Millwright* of Cincinnati.

MESSRS. G. M. MARSHALL & SON, of Kilbourn City, Wis., manufacturers of Improved Water Wheels and Power Corn Shellers report business lively, orders coming in rapidly and their machines giving entire satisfaction.

W. M. BRACKETT, chief of the fire department of Minneapolis, writes as follows: "Allow me to give my theory of the cause of the explosion. The fire in the Pillsbury B had so heated the covering of the dust-house on the Minneapolis as to set fire to the wood inside, the flames communicating with the dust therein exploded the dust-house (the first slight explosion heard), driving the dust and flame down through the mill, producing the main explosion. Now, you will see that thorough airing would not have prevented the explosion in this instance, as there was sufficient dust and fine air in this room or dust-house driven down the numerous spouts and openings, to thoroughly impregnate the air, making it in perfect condition for instantaneous combustion—hence the explosion. The other mills simply burned, as the air therein was comparatively clear and nothing occurred to produce the required combination of dust and flame. Finally, I believe that a flour-mill properly constructed and cared for is in no more danger of explosion than a planing-mill.

Cawker's American Flouring Mill Directory.

The above named, so valuable to all desiring to transact business with the milling fraternity, is completed, and is now in the hands of the printer. It will, without doubt, be ready for mailing to subscribers during the first week of the New Year. A great deal of skilled labor and considerable money has been employed in making the work as nearly perfect as could be, and the publisher has the pleasure of knowing that he has rendered the whole trade a service. CAWKER'S AMERICAN FLOURING MILL DIRECTORY is printed from handsome new type, on heavy paper, and substantially bound. It contains the names of nearly all the flour mill-owners in the United States and Dominion of Canada, arranged by states and provinces, and the post-offices are arranged in alphabetical order. The kind of power used is indicated by † or *, the former for steam power and the latter for water power. The capacity in barrels per day is placed opposite the address in plain figures, so that a glance down the column will enable the person using it to pick out the large or small mills or the mills run by water or steam power. Our labor has been facilitated by both the Bradstreet and the R. G. Dun commercial agencies. We have also to thank many mill-furnishers and a host of millers for information furnished us in answer to our circulars, advertisements and letters. The price of the Directory is ten dollars (\$10.00) per copy post-

paid to any address. All remittances should be made payable to the order of E. Harrison Cawker. Address all orders to the UNITED STATES MILLER, Milwaukee, Wis., U. S. A.

Care in Grain-Cleaning.

All millers who have a love for their trade, and those that have not should quit it at once, desire to use every known means of increasing the percentage of yield and the quality of the product. Too much attention cannot be paid to careful and thorough, yet wasteless cleaning of the grain before it is ready for reduction either by stones or rolls. Among the most important steps in the process of preparing wheat for flouring, is the removal of all substances that are not wheat. Among the most difficult problems to solve for a long time was the removal of the well known cockle seed. It could not be removed by the use of screens without also removing the small kernels of wheat, and all such machines were therefore a constant source of annoyance and downright loss. The peculiar shape of the cockle seed was at last taken notice of by the inventor, and the result was that a machine was made with a revolving cylinder or cylinders, having indentations (not perforations) into which the cockle and other weed seeds of similar shape only, would drop and be separated and carried off from the wheat, which being of a different shape from cockle, would slide back and be discharged by itself. The waste from a machine of this kind (Kurth's) is reduced to a minimum. Millers have found it out generally, and they are now in use in all of the best mills in every country pretending to manufacture a good article of flour.

Smooth Rollers.

An article was published in the UNITED STATES MILLER recently on the subject of "smooth rollers." It was subsequently translated and published in *Die Mühle*, published at Leipzig, Germany. It occasioned considerable comment in foreign milling circles and has called out a communication to *Die Mühle* which has been already translated and published by our esteemed contemporary the *Northwestern Miller* of Minneapolis and which we here reproduce:

The contest between smooth and rough rolls, between cast iron and porcelain (as prototypes of both, where the reduction of fine middlings is concerned), has been carried on for nearly a decade without much advance toward a final decision. It is not our purpose in the following communication to take part in the fruitless contest or to maintain that it can be authoritatively decided. We purpose only to oppose to the statements made by the author of the article from THE UNITED STATES MILLER, our experiences in the richest grain growing districts in Russia, in order to clear away some errors to which that article might give rise.

We fully agree with the theory that "the sharper the tool the better the work done with it;" it requires, however, a different application as regards milling, from that made. We are of the opinion that the above axiom applies only to the breaking of the grain and perhaps, also, to the first and second reductions of the middlings; here corrugated rollers, which have a cutting action, are perfectly suitable. For the fine middlings on the other hand, we consider the *ne plus ultra* of dullness, namely smoothly polished chilled iron rolls, far better adapted for the production of a fine, granular flour than the porcelain, because not only are the middlings powerfully acted upon by the porcelain rollers, in consequence of the fine pores which these contain, but the particles of bran which even the best purifiers fail to completely remove, are pulverized, and this pulverized bran imparts a reddish tinge to the flour. The smooth rollers, on the other hand, allow the particles of bran to pass through whole, so that they may be almost entirely removed by the subsequent bolting.

But when the author further maintains that smooth rollers have simply a crushing effect and that the flour made by them is soft and lacking in lustre and sharpness the assertion, is, to say the least, too sweeping when it is considered, for example, that in Saratoy,

which, as regards milling, bears the same relation to St. Petersburg that Pesth does to Vienna, only a single mill works with porcelain rollers, while the rest of the mills, some of which at least, in size and productive capacity will bear comparison with those at Pesth, use only smooth chilled iron rollers on middlings. To make the matter still clearer it may be mentioned that in Russia only coarse flour enters into the first grade, in fact flour that would be retained by Nos. 7, 8 and 9, of the bolting cloth. The superiority of this flour is undisputed and that Russia still exports grain instead of the finished product is simply owing to the fact that the roller mills so far established have hardly been able to supply the home demand, but that this state of affairs must and will be changed in a few years, we are firmly convinced.

This coarse flour (or more properly very fine middlings) is produced with smooth chilled iron rollers with equal facility and of at least as good quality as with porcelain, which, as need not be concealed, are also gaining some favor here. The superiority of the chilled iron rolls, however, lies chiefly in another quality, as will be shown further on. If now, in the short time since roller milling was introduced in Russia, one firm in Moscow has built some 2,500 reduction machines with smooth cast iron rollers, and the flour made with these machines already takes rank with the best in the world, how can the statements made by the author of the article in question be reconciled with these facts?

The scope of operation of smooth rollers generally with differential speed, is too well known to require more particular mention. When properly adjusted for the material passing through, their effects upon the middlings is to cause them to crumble or fall to pieces, and it is impossible that there should be an excessive crushing action, still less can there be any slipping of the rollers on the material. Caking of the product occurs only when the rolls are improperly adjusted or are overcrowded, which happens to small mills where a full roller system is not employed. This is equally true of porcelain rollers as with them also when too closely set or overloaded the product leaves them in the form of flakes, and in consequence of the excessive friction between the rollers and the material, heating occurs and we have observed that in such cases there was a formation of paste, making it necessary to wash the rollers. To be sure, with the smooth rollers detachours are employed, but in our opinion these are indispensable with any reduction mill, whether porcelain or chilled iron, and if detachours are not used with the former, their place is taken by the ordinary centrifugal dressing machines, which at the same time disintegrate and sift the product, which but confirms our assertion. The author of the article on "rough rollers" speaks of a cutting action of porcelain rollers, that is excessive and not at all desirable, unless indeed we have only abandoned the too severe action of stone in the reduction of middlings and are anxious to avoid a similar difficulty with rollers. The action of porcelain rollers can properly only be spoken of as a tearing or rather rubbing, which is also the case with chilled iron though in a much smaller degree, which with us is desirable, as the flour made here, is, as before mentioned, comparatively coarse. At the same time chilled iron rollers are not open to the reproach of hot grinding. The product is always cool as the friction between chilled iron and the material operated upon is not more than half as great as with porcelain, and where a full roller system is in use the pressure need never be so great as to cause heating of the rollers. To sum up, smooth chilled iron rollers produce a flour at least equal in color and sharpness to that made on porcelain rollers, and provided they are judiciously managed neither is excessive pressure necessary or the evil results attending it to be feared.

We come now to the consideration of some points in which smooth and rough rollers differ essentially from each other, although their manner of operation, as seen above, does not differ greatly. These lie chiefly in the wearing qualities of the two. While the possible duration of chilled iron rollers is as yet to be determined, it is already possible to give a variety of data respecting porcelain rollers. First, they must occasionally be washed, as even with the best oversight it is not always possible to prevent heating, so that the product becomes sticky or pasty; secondly, they sooner or later become worn so as to require regrinding. Many owners of porcelain roller mills already have experience of the resulting inconvenience and interruption to business. We will not even mention the destruction of the rollers from want of

caution, incompetent supervision, and carelessness of the persons in attendance, which so often occurs. It would be interesting and quite instructive if statistics could be obtained of all the broken, spoiled and worn-out porcelain rollers which have gone the way of all earthly things since the introduction of roller milling. In this respect, namely, as regards durability, chilled iron rollers are undoubtedly superior to porcelain. We know of only one case where a chilled iron roller has been cracked, and this roller, notwithstanding the fracture, is still in constant use. This no porcelain roller would be capable of, and the constant, unremitting care, and close attention which they require, make them too troublesome, and it is our firm conviction that on account of this defect, which is inherent in the nature of the material, porcelain rollers will gradually fall into disuse, especially if the conviction shall first have established itself that with the *ne plus ultra* of dullness, namely, smooth chilled iron rollers, at least as good a flour can be made as with the cutting porcelain rollers—a conviction easily arrived at by an inspection of results.

We close our communication with the remark that seldom have more claims been made for a new invention from its first appearance than for porcelain rollers. If, however, chilled iron rollers for the reduction of fine middlings gain ground from year to year, it is simply because of their superior operation and durability—advantages which cannot be set aside by any dogmatic claims.

A. MARCUSCHWITZ.
M. PLIER.

American Export and Import Trade.

The total value of the foreign commerce of the United States during the year, embracing both imports and exports of merchandise and specie, amounted to \$1,675,024,318, and was larger than during any previous year in the history of the country.

The total value of the exports of merchandise from the United States during the fiscal year amounted to \$902,377,346. It exceeded the value of such exports during the preceding fiscal year by \$66,738,688, and was also considerably larger than during any previous year.

The value of the imports of merchandise into the United States amounted to \$642,664,628, and was larger than the value of such imports during any preceding year, with the exception of the year ended June 30, 1880.

The value of the exports of the products of agriculture during the last fiscal year amounted to \$729,650,016. It exceeded the value of such exports during the preceding fiscal year by \$43,688,925, and it was larger than during any previous year in the history of the country. The value of such exports constituted 82.55 per cent. of the entire value of the exports of domestic merchandise from the United States.

The value of the exports of products of agriculture during the year ended June 30, 1881, was about seven times the value of such exports during the year 1850, nearly three times the value of such exports during the year 1860, and more than twice as great as the value of such exports during the year 1870.

The value of the exports of merchandise to Great Britain and Ireland during the year amounted to \$481,135,078, and constituted 53.32 per cent. of the total value of exports of merchandise from the United States.

The value of the imports of merchandise from the United Kingdom, amounted to \$174,493,738, and constituted 27.15 per cent. of the total value of the imports of merchandise into the United States.

Following parties have lately bought the well known cone shape Becker Wheat Brush, made by the Eureka Manufacturing Co., of Rock Falls, Ill.: A. Smith & Co., Bible Grove, Ill.; Henry Riehl, St. Louis, Mo.; P. H. Reither, Nashville, Tenn.; Henry Beckman, Neligh, Neb.; Sinker, Davis Co., Omaha, Neb.; Hatch & Mitchell, Grand Rapids, Mich.; Nordyke & Marmon, Indianapolis, Ind.; Waggoner & Gates, Independence, Mo.; J. N. Heater, Columbus, Neb.

THE MILLER'S NIECE.

I.

Somewhere on the great main highway going north by west from London, there lies a little town which once upon a time played a big part in English history. A great battle was fought in a meadow close by its now crumbling walls. A mile or two off, following the winding river past the park gates where the hounds meet, is the wreck of one of the chief cities of our Roman conquerors. So, what with bones and skulls ploughed up from the battle-field, and coins and fragments of earthenware vessels dug up from the grave of the dead and buried city, the museum at Battleborough (which is stuck in a back street, and fills some cheerless rooms approached by a naked wooden staircase,) is not a bad place wherein to pass an idle hour.

Mr. Josiah Smith, F. R. S. A., was musing on these matters one bright January afternoon as he sat at the open window of an old Battleborough hotel which looks down the High street.

The High street looked so sleepy and so peaceful, that if Josiah had not caught sight over the roofs of the houses of one of the ugly towers of the portentous Market Hall, he would have doubted whether any one ever spoke here in a voice above a whisper. Into this stillness suddenly strode a man who seemed of quite another race from that which peoples Battleborough. He came up the hill from the railway station, and of course might thence have come from any whither, supposing he had reached Battleborough by rail. But his soiled boots, and his mud-bespattered trousers showed that he had been walking, apparently a long distance, evidently through muddy lanes. The lithe, straight figure with the swinging walk seemed very familiar to Josiah, and as the new-comer partly turned his head to look up at the window where the caged bird was singing, he saw with surprise that it was Frank Fisher.

Frank was an old school-fellow whom Josiah had met in later years in London, where he was doing something more than studying for an artist. He was really selling his pictures, and seemed on a fair way to competence if not to fame. This was a long time ago, nearly ten years, and in the meantime Josiah had lost sight of him. They were both busy, and had other things to think of than old school-fellows and disappearances which, if sudden, were not attractively mysterious.

Josiah asked about him once or twice when he found an opportunity, and received replies which pointed vaguely to the certainty that "something had happened" in the country. Some said that Frank was married, others that he had loved and lost; whilst some were of opinion that he had loved and had failed to win. Information was vague, but the impression was precise.

Frank had chosen to go his own way, and it was at this moment leading him down the High street at a rapid, swinging pace, which caused the meditative tradesmen at their open doors slowly to turn their heads aside and gape at the phenomenon.

Josiah added to their perplexity and imparted something like an atmosphere of excitement to the street by presently rushing after Frank, catching him up just before he fell under the black shadow of the stupendous Market Hall. He was not quite so glad to see Josiah as that placid personage thought he should have been. But this feeling passed off in a moment. He had evidently debated in his own mind whether he should be friendly or forbidding. Old instincts prevailed, and Battleborough received another shock by the spectacle of two men violently shaking hands with each other, working away for their lives as if their arms were a pump and the house on fire.

Battleborough had had enough of excitement for one day, so Josiah suggested that if Frank were remaining in the town he had better come and stay at his hotel, where they could be as brisk as they pleased without bringing about fatal disturbance in the sleepy street.

Yes, Frank would stay in Battleborough. Such, indeed, had been his intention. He had arrived in town at some dead hour of the night by the mail train going north. He had left his luggage at the station and then gone for a walk.

After dinner, Frank, whose friendship had been rather spasmodic than soothing, began to settle down into something more like his own manner. He once more produced out of his trousers pocket the huge wooden piece of architecture which he called a pipe—a thing with a bowl large enough to serve as a store for a week's reserve of tobacco for an ordinary man.

After all, it did not come to much what he told Josiah of his life during the past ten years. He had been abroad, he said, studying. He had spent a good deal of time in Germany, and had learnt to drink thin beer and talk a thick language. He had seen all the picture galleries between Dresden and Madrid, Antwerp and Florence. He had sketched in them all, selling his pictures on the spot just for what they would bring. Sufficient for the day were the earnings thereof, and Frank—who, if he had only decently married, and embarked upon the Queen Anne house at Hampstead or St. John's Wood, would have speedily paid off the mortgage—probably had not at the present moment fifty pounds in hand. He had in his wanderings picked up a good deal of health, a little flesh and much muscle. His twenty-five mile walk after his night's journey in the train had apparently taken no more out of him than we suffer after adopting the great Johnsonian suggestion of taking a walk down Fleet street. He was scarcely as yet in the prime of life, being as nearly as Josiah knew, thirty-five years of age.

Frank had evidently had trouble. It may have happened years ago. It may have been the cause of his going abroad; or it may have come to him in foreign lands. But whatever it was or wherever it had chanced the memory of it had evidently come back recently with acute pain.

He was as restless as if he had the toothache or suppressed gout.

Among other of his peculiarities, Frank did not appear to have any notion of going to bed. Midnight had sounded from the old church tower close by. A deeper stillness had fallen on the solitude of Battleborough. The lights were put out in the passage, and Frank and Josiah were probably the only people awake in Battleborough.

"I know this place very well," Frank said, after a long pause, during which he had sat steadily staring at the fire and gradually disappearing amid a cloud of smoke. "The first ten-pound note I ever earned was for a sketch I made of a butcher's shop with the proprietor standing at the door."

"Did you paint anything else in Battleborough?" Josiah asked.

"Yes, I made a very good sketch of a Magistrate's Court, in a little room off the Market Place. There was not much to be got out of the room. Four bare walls; for furniture, three chairs, a table, and a little space railed off in which men stood, charged with all sorts of crimes, from killing a rabbit, to slaying a man. But I made very good portraits of the three sober, not to say stupid, men in the three chairs and of the clerk taking down the evidence."

"I suppose you did the prisoner?"

"Yes, I think I did him pretty well too, though that was naturally the hardest job."

"Have you got the sketch?"

"No, I could not bring it away."

"How was that?"

"Well, you see, I did it with a black-lead pencil on the wall of the cell to which I was removed after the three wise men in the three Windsor chairs had made up their minds to commit me for trial on a charge of wilful murder."

Frank said this so quietly, without the slightest variation from the low, almost sleepy tone in which he had been speaking, that Josiah thought it was all a joke.

"No," he said, positively yawning as he rose and thrust the pipe stem into its appointed receptacle. "It is no joke. Ten years ago I was tried for wilful murder in this charming old town, and I suppose very narrowly escaped being hanged. So now, good night. I will tell you all about it in the morning, if you care to know. But when a man has walked twenty-five miles, and only had eight pipes, he begins to feel in need of rest."

Josiah began to suspect that too much smoking had made Frank mad.

II.

Josiah came down to breakfast the next morning a little late, and with a general sensation of having taken in by the pores too much tobacco smoke. He rang the coffee-room bell, and asked if the gentleman had breakfasted.

"Oh, no, sir," said the landlady, evidently glad to get rid of Frank on any terms. "He would not have any breakfast, but paid his bill, and told me to tell you he had gone for a walk, and that you were not to wait for him, as he might be late."

"Paid his bill. Why, I thought he was going to stay here for some days."

"Well, I hope not, sir," said the bristling landlady, permitting the long-pending storm to break forth. "A gentleman who sits up till all hours of the night, and then smokes in

his bedroom, walking about in his boots till the gentleman underneath can't get a wink of sleep, is more free nor welcome."

Josiah felt that all this was a little hard on him. Life in Battleborough had been very pleasant till Frank burst in upon its silent scene. Josiah was exceedingly comfortable at the hotel, and was the object of several of those delicate attentions which landladies pay to quietly disposed gentlemen who go to bed at decent hours, and don't smoke in the coffee-room. He was getting on nicely with his great work on Underground England—which it may be desirable to explain has nothing to do with mines, but gives what Josiah trusts will be found an interesting account of archaeological vestiges of the entire denizens of these islands.

Josiah did not get on very well with his work, which required a cool head and undisturbed nerves. He was certain Frank would turn up again. It was impossible to sit down to write with the feeling of expectation that the silence would be broken by the sound of a heavy foot on the stairs, and that the faint scent of the crocuses would be smothered by the vile smell of a pipe.

Frank did not come. But the second morning after his departure there arrived a letter. It was dated "The Mill, Ellandale, Wednesday morning," and ran thus:

"Dear Jack,—I did not mean to run away from you the other morning. But after I had had my tub I felt a strong walking fit on, and not being quite certain where it might lead me, I observed the precaution of paying my bill. I am glad I did so, for I have settled down here for a bit, and have taken seriously to sketching again. It is a charming place and turns to me the face of an old friend. I used to stop here awhile, ten years ago, and find little change, though people, like myself, are older."

"I have my old room at the Mill, and, what is better, there is a room on the same floor for you. As you are one of those wretched creatures with nerves, and have, on reading thus far, vividly pictured yourself lying awake through the night listening to the roar of the mill stream flowing under your bedroom floor, I may as well dispel the pleasing allusion."

Sandy he belongs to the mill,

And the mill belongs to Sandy still:

but Sandy, or his forefathers, observed the wise precaution of erecting their house at a convenient distance from the mill.

"You would like to know this. But what is more to the point is the remarkable opportunity you will find here of adding a few particulars to 'Underground England.' I fancy that at one time Julius Caesar or some other distinguished person of that epoch must have lived a few feet underneath the present level of Ellandale. However that be, the plowmen here are always turning over cylindrical pottery, which I believe are the chimney-pots of the buried city."

"Come and dig it up, there's a good man, and for goodness' sake tell us who or what it is we are lying over. I had a talk yesterday afternoon with old Medge's plowman, whom I overheard using bad language about one of those things he had just turned up. He will have it they are old drain pipes. But I am sure they are Roman chimney-pots, and you would, after a short and inexpensive inquiry, be able to settle the question whether the Romans used patent flues."

"You need not walk unless you like. You can take train from Battleborough, which will land you at Ribston, where I will be to meet you on the arrival of the train at three to-morrow afternoon. So no more at present, from Yours truly, FRANK."

It is probable that if Josiah had, untrammelled, taken his own way, he would have declined this invitation and stayed where he was.

But this man Frank gave him no choice. He was like the centurion, saying to one Go, and he goeth, and to Josiah Come, "and," added Josiah with a comical air of perplexity, "he cometh. If he had only given me time to write and propose other arrangements! But he has fixed the hour, and the train, and the place; there is nothing left for me but to go."

To do justice to Josiah's native shrewdness, the bait about the ancient Roman chimney-pots had not the slightest weight with him. He did not know whether Frank meant this for a low joke, but was sure that if he were in earnest it did not matter, since his ignorance on all that related to tesselated antiquity was appalling.

Frank was at the station to meet him on the following afternoon, and took his arrival quite as a matter of course. He seized hold of Josiah's modest valise, and with a hearty "Come along, old man," trudged off down the

tane at a perfectly ridiculous pace. He seemed to be in high spirits, perhaps a little ostentatiously so, and talked so rapidly as they rattled along the measured mile that conveniently intervened between Ellandale and the railway station.

"If you don't like Ellandale," Frank said, "you had better not say so in my company. I thought when I first saw it ten years ago that it was one of the most charming spots in England; and coming back to it now, after seeing all the show places on the Continent, I think so still."

"Is he married—the miller?"

"No; I fancy he has been rather an odd chap—one of those fellows with a history, if we could only get at it."

"Does he live by himself, then?"

"No; his niece is his housekeeper."

"Ah!" said Josiah, with some animation, as if he had just discovered a fragment of a mosaic of undoubted Roman origin. "So there is a niece, is there?"

"Yes, and, what is even more remarkable, there was a nephew, but he is dead. Now, if you will be good enough to step into this field we shall be at the house in three minutes. You will observe that there is no fence to get over. We just walk off the high road into the field, and there we are; and there I perceive at the door to welcome you is the niece, the astonishing fact of whose existence has so greatly fluttered you."

Josiah of course had not experienced that marvel at the mere existence of Miss Hargraves which it suited his companion to enlarge upon. He had, as any one can see, ventured upon a little badinage, meaning to imply, when he said, "There is a niece?" "Ah, ah! my good friend Frank, this is what brings you down to this out-of-the-way place, making you start off in the dead of the night for what you call a country walk!"

But Josiah in the hands of a strong man had no more actual possession of his own jokes than in the case of a burly footpad he would have had of his valise with its assortment of memoranda and fine linen. His little joke had evidently missed fire, and he was not the man to load again.

Moreover, he felt that a much bolder man than himself would not have been inclined to make little jokes about Miss Hargraves in that lady's presence. She was only the miller's niece, and lived in the middle of a field, probably with such society as is usually commanded from millers' households in happy England. Yet she had that quiet self-possession which is supposed to come exclusively from what is called good-breeding. She had not many visitors in the course of a year, or even of ten years. Yet she was not a bit shy or reserved with Josiah, albeit Frank had told her he was a F. R. S. A., and had largely indulged in fable with regard to his universal fame and his memorable literary achievements. He must be a great man, though he did not look it, being much more embarrassed at the reception than was the miller's niece. To her he was a guest, a friend of an older friend, and as such he was straightway to be made at home.

Josiah liked Ellandale with its angularity. He liked his dainty chamber with its homespun linen, fragrant of lavender, and he decidedly liked the miller's niece. He had known her only for ten minutes but he came to the conclusion that she did everything well, lending to the commonest acts of daily life a grace all her own. He reckoned her age to be twenty-seven or twenty-eight, and would have wondered why she was not married if he had not felt sure that there was no one in Ellandale worthy of her.

She was not at the hour the guest had arrived what the female heads of households are accustomed to call "dressed." She had on only a plain black dress, for the better protection of which she wore an apron. But the apron was made after the fashion known as bib, and few things more ravishing had met the eyes of Josiah since he discovered that coin of the Emperor Hadrian which Tom Purvis, casting about for some means of giving pleasure to a valued friend, had purchased from a dealer and planted over-night under a cairn in Argyleshire, one summer when he and Josiah were having a little holiday at Oban.

The miller's niece was not a beauty after the style that we photograph, and can purchase at a shilling each, with a reduction on taking a quantity. Yet when Josiah came to reckon up her features when he sat in his bedroom, he could not quite understand how it was that she certainly failed in claiming such preeminence. Perhaps it was her mouth, that was a little too large, though when it was open to laugh, as occasionally befel, it was filled with

such pretty teeth that it seemed scarcely fair to complain that so full a view was obtained of them. She had soft brown eyes, surely made to laugh oftener than they did. Josiah did not permit himself to speculate as to what distance from her heels her hair might have reached if she had been thought worthy of being photographed with it combed out. But it was very abundant, its soft and glossy wealth being plainly brushed back from the forehead and brought up in a stupendous knot at the back of the head. Josiah was sure she had pretty hands, a little brown, but soft withal.

Perhaps she was not a beauty because she lacked assertion, either on the part of herself, or what is known in legal phraseology as her next friend. But she was a very pleasant presence in the house which could no more have gone on without her than the mill could have ground corn if the stream had suddenly run dry.

[TO BE CONTINUED.]

A New Oat Meal Mill.

After a short experience in the mill on Eleventh street, Messrs. Wallace & Christie find that they must have more facilities for making oat meal. They have therefore decided to build a larger establishment immediately at the foot of Fourteenth street, fronting the track of the Milwaukee & St. Paul Railway. The contracts have been let and the work commenced. Possibly they may get into the new quarters this winter, but probably not before next spring. The building is to be 50x90 feet and five stories high, and with the machinery will cost \$30,000. When finished it is expected to have a capacity sufficient to turn out daily 150 barrels of oat meal, and five car loads of feed. Twenty men will be required as employes, and it will probably be the peer of any mill of the kind in the state. Aside from the ground feed the product will consist of two classes of oat meal, one for American and the other for foreign consumption. The former is known as "steel cut," and the latter as "Glasgow cut" meal. Four grades of each cover the varieties.—*Dubuque Trade Journal.*

Buckwheat.

Four bushels of buckwheat will make 100 pounds of flour, leaving the remainder of the four bushels (200 pounds) in bran, which is excellent feed for milch cows and young animals. A hundred weight of flour will average in price \$2, and buckwheat bran is estimated in value to be half that of cornmeal. Buckwheat is variable in yield, and ranges from ten to fifty bushels per acre. If the straw is carefully stacked it can be made valuable in the winter for bedding, and also for feeding once a day. It is a good absorbent. I do not believe in the notion that it poisons the ground, but the straw should never be used for bedding pigs, as it causes an irritation of their skin, but it never affects other animals. The grain, however, is excellent for pigs.

We have the consolation of knowing that we have labored long and faithfully in endeavoring to impress upon the farmers of the Northwest the necessity of bestowing more attention to the cultivation of buckwheat, but as long as the wheat mania existed it was uphill business. Now a more hopeful prospect exists for its future cultivation in Minnesota.—*Gen. Curtis.*

LEGAL MATTERS.

Henry C. Bradley,)
vs.
J. L. Woy, et. al.)
For infringement of patent for adjustable elevator spout.

Testimony in an important case of demand for an alleged infringement of a patentee's rights is now being taken in Sparta, Wis., and at other places in the State. Elevator men in various parts of Wisconsin were notified recently by Flanders & Bottum, attorneys for Henry C. Bradley, of Milwaukee, that they would have to settle for the unauthorized use, in their business, of an adjustable elevator spout, of which the patent was issued to Chas. S. Hamilton in 1864, and reissued in 1866. Not responding, action has been brought in the United States Circuit Court, in behalf of Henry S. Bradley, against J. L. Woy, B. E. McCoy, Coates & Lytle, of Sparta, E. R. Roberts, of Bangor, and seventeen others, for infringement. The case against J. L. Woy has been selected for trial, as a test case, by the parties interested. Testimony has been already taken in Milwaukee, and Racine, and Sparta. Working models of devices like that claimed by patentee were introduced in behalf of defense, made by E. O. Jones as early as 1848, prior to the invention as claimed by

patentee. Also a book describing the same, published in 1818, owned by Mr. William Goodale, of Milwaukee. The defense seems to be complete. Testimony is yet to be taken at Janesville and Fond du Lac, in this State, and at Dubuque, Iowa, and at Chicago, Ill. By stipulation the trial will be had some time in February or March, before Judges Drummond and Bunn. The cases are of mutual interest to mill and elevator men generally.

Minnesota Miller's Association.

According to call and previous announcement, the Minnesota millers met in state convention at the parlors of the Nicollet, December 6. President W. P. Brown called the meeting to order, and upon a call of the roll the following gentlemen responded to their names:

F. S. Hinkle, F. Greenleaf, L. Fletcher, Albert Hoppin, G. Hinehine, F. R. Pettit, secretary, W. F. Cahill, John M. Cole, F. H. Holmes, Minneapolis; A. D. Ellsworth, Winona; W. P. Brown, Benj. Taylor, Red Wing; D. L. Bronson, vice-president, Stillwater; C. F. Nichols, Northfield; M. Doran, Le Sueur; J. H. Ackerman, Young America; J. W. Foss, Jordan.

The minutes of the previous meeting were read and approved, whereon Secretary Pettit presented his report, which was adopted. He stated that returns had been received from all the millers in the state association, and the assessments for the year on a total membership of eighty-seven, representing 697 run (on a basis of thirty-five barrels to each run). Of these, twenty-five members, representing seventy-seven run, have failed to respond.

Treasurer Cahill reported—

Cash on hand at last statement.....	\$1,979 00
Cash received since that time.....	6,842 16
Total.....	\$8,821 16
Paid incidental expenses.....	\$ 367 70
Paid Treasurer of National Association.....	3,410 00
Total.....	\$3,777 70
Cash in open account.....	\$ 543 46
Certificate of deposit.....	4,500 00

The election of officers for the ensuing year being next in order, it was decided to retain those in office, as follows:

President, W. P. Brown, Red Wing; Vice-President, David Brown, Stillwater; Second Vice-President, Geo. A. Pillsbury, Minneapolis; Secretary, Frank C. Pettit, Minneapolis; Executive Committee, E. V. White, L. Fletcher, Minneapolis, and E. L. Baker, Red Wing.

Mr. F. L. Hinkle expressed the opinion that there was no necessity of holding a meeting of the National Millers' Association this year, and on motion this sentiment was made that of the convention. It was subsequently moved by Mr. Fletcher that in case there is a meeting President Brown be empowered to appoint a delegation of five to represent Minnesota.

The question of the Denchfield patents was next discussed informally, and J. A. Christian stated concerning them that suits had been commenced against the Minneapolis millers, then the Milwaukee and after that the St. Louis millers. The owners of that patent were seen in Chicago but they would not meet this committee informally, and so far no official meeting has been arranged. Mr. Christian said he thought that the patent owners could not maintain their suits if the association would fight them. They do not seem desirous to press their suits and have recently asked for an extension of time to take testimony.

As there was no further business to be transacted, and many of the city millers were busy with insurance adjusters, the convention then adjourned without the usual banquet or afternoon session.

Translated from the Allgemeine Mueller Zeitung for the United States Miller.

Digestibility of Bread.

The readiness of assimilation in digesting bread depends on its greater or lesser porosity, which is also dependent on the nature of the breadstuffs employed and the treatment of the dough. The less gluten the flour contains, the more compact will be the baked loaf, and the more gluten it has the more porous it will become. The cereal flour containing the most gluten is wheat flour; rye flour has less. The starchy component of the kernels of cereals are principally all nutritious matter, being no chemical combination with nitrogen. The starchy matter is changed during the process of baking into starch-paste, and is thereby made more easily digestible. The crust is still easier to digest, as it is the starch paste converted into dextrine and sugar. It is perhaps advisable to have a little bran in the dough, or to have the kernels

ground coarsely, producing Graham flour for the branny particles, intermixed with the nutritious matter, mechanically irritates the inside lining of the stomach, inciting the peptine glands to discharge more of their digestive fluid.

As the nerves of the stomach lining of older persons are rather weakened, this mechanical irritation is decidedly to be preferred to the imitation induced by stimulant drinks or aromatic, spicy substances, which only produce a momentary increase of the discharge of the peptine fluid, while the branny particles of Graham bread act continuously and energetically. Bread must always be well salted, as it contains considerable quantities of alkalis which would withdraw a great portion of salt from the system by making chemical combinations therewith.

Next to porosity of bread, its contents of water influence, its digestibility. Dry, old bread is easier to digest, as it must be chewed more than fresh bread, hence it will be better masticated, and the stomach will have less work. It is supposed to be known that mastication is part of digestion, saliva being as well an assimilator as the fluid of the peptine glands of the stomach.

There is but little fat in the bread baked of cereal flour. Wheat contains 1.2, rye 1.6 per cent. of fatty substance. Corn contains very much of it, 4.6 per cent., this being the reason why corn bread is so recommendable for hard-working men.

For men of sedentary habits, corn bread would be hard to digest; wheat bread is better adapted to their requirements. The human body needs the daily supply of fatty substance which can be easily assimilated, thus the mixing of the dough with milk is very good, the digestion of such bread being rapid and easy.

Cleaning Brass.

The Government receipt for cleaning brass, used in the arsenals, is said to be as follows: Make a mixture of one part common nitric acid and one-half part sulphuric acid in a stone jar; then place ready a pail of fresh water and a box of sawdust. Dip the articles to be cleaned in the acid, then remove them into the water, after which rub them with sawdust. This immediately changes them to a brilliant color. If the brass is greasy it must be first dipped in a strong solution of potash and soda in warm water; this cuts the grease so that the acid has power to act. The *Manufacturer* says that rusted steel can be cleaned by washing with a solution of half an ounce of cyanide of potassium in two ounces of water, and then brushing with a paste composed of half an ounce of cyanide of potassium, half an ounce of castile soap, an ounce of whiting, and sufficient water to make the paste.

The Fifty Questions.

Ed. United States Miller: Long, long ago, when the purifier was in its infancy, and before the great Northwest was settled, there was commenced in the *Millers' Journal* a series of questions and answers on milling subjects. In order that the readers of that journal may not forget anything that is told them, everything is frequently repeated. Thus, for instance, in the sixth line of the eighty-ninth instalment of the fifty questions, occurs the statement that "smut converts the grain into a sooty powder, which is black and offensive in meal." In the eleventh line we are told that "the grain affected by smut is changed into a fine black powder, etc." Thus, "line upon line, and precept upon precept," do they inculcate words of wisdom.

"Aaron," who is responsible for these Socratic teachings, and who professes to be an old miller, says that "if wheat was properly cleaned, there would be no need of purifiers, or its duties (*sic*) would be greatly lessened, to say the least." We suppose that by "proper" cleaning, Aaron means peeling each grain carefully of the bran, polishing with basswood sawdust in a rattle-box, as gold coins are cleaned.

But when Aaron drops into mechanics, he is wildly original and grandly heterodox. When he says that the heavy grains acquire more momentum than the light grains or the impurities, which fall behind, he ignores the trammels of the text books and the traditions of the philosophers, which are to the effect that heavy bodies do not fall faster or acquire more momentum than light ones. We are told that bodies having exclusive surface in proportion to their absolute weight, move more slowly in the air than compact bodies; but when one gets started on "momentum" and such things, we ought to be careful.

A READER.

Written for The United States Miller.

Belting Facts and Figures.

Rubber belts drive better than leather, and leather better than unprepared canvas. Wooden pulley faces and those covered with rubber or leather drive better than cast iron. Large pulleys drive better than small ones having same rim speed, because they have longer belt wrap, hence more area of contact. This increase of driving power is not directly proportional to the increase of pulley diameter. Wide belts drive better than narrow ones, because they have wider contact, hence more gripping area. This increase in driving power is not in all cases proportional to the width of belt. The greater the arc of contact the better the drive, because of the increased gripping area. The driving power is not directly proportional to the arc of contact. Double belts will carry more power without being strained than single ones of the same width, but not twice as much. The larger the pulley, the greater the proportional increase of driving power of double over single belts. The greater the tension, the greater the driving power, but the driving power is not in direct proportion to the tension. When belt is too slack it flaps and loses driving power by slipping, but the loss of motive power—that is, the fuel or water used—is not as great as the loss of driving power.

Beyond a certain tension it is not desirable to go. Excessive tension, while increasing the power of the belt, causes wear of the journals and bearings, waste of oil and loss of power. The best average practice seems to be 45 pounds of tension per inch of width of single leather belts. Where there is too little bearing surface there can be less tension than where there is ample bearing surface of proper character. No kind of oil should be allowed to touch rubber belts. Leather belts are best greased with castor oil.

CORNISH WORKING-WOMEN.—Picking our way through the purplish mud and stones below the Karn, we discovered a little old woman laboring over a pile of unmilled copper ore. We had to look twice before we could assure ourselves of her sex; not only was her dress perplexing, but there was an unreality and weirdness in her person. She was very small, almost dwarfish, with bent shoulders and wrinkled hands and face; her skin had the texture of parchment, and was curiously mottled with blue; her hair was thin and wiry. She seemed very old, but her eyes had a shrewd and penetrating quickness, and her movements were utterly without decrepitude. Indeed, she applied herself to her work with the willing vigor of a strong young man, and the work consisted of shoveling the heavy blocks of ore into a small wagon resting on a temporary tramway. Shovelful after shovelful was thrown in with an easy muscular swing, and with much more activity than the average "navy" ever exhibits. Her petticoats ended above the ankle, and were stained with the hue of the copper ore; her shapeless legs were muffled up in woolen wraps, and her feet encased in substantial brogans. She was not apparently uncomfortable bodily, but her face had in it a look of uncomplaining suffering, of unalterable gravity, of a habituated sorrow which had extinguished all possibility of a smile. Not understanding a question which we put to her, she used the words, "Please sir?"—a form of interrogation which we often heard in the neighborhood of Redruth. "You seem to be old for such hard work," we repeated. "Deed, sir, I don't know how old I am, but I've been at it this forty years. I'm not young any longer, that's sure," she answered, in a clear voice with scarcely any accent. "Are you married?" "No, sir; nobody would ever have me," she continued, without relaxing from her gravity or delaying her work for a moment—"nobody would have me or go with me, as I was always subject to fits—terrible they are, still have 'em once or twice a week sometimes, always with a change in the moon." "How do you account for it?" "Why, before my twenty-fourth year I was in the service of a lady, who threw me down stairs, and that changed my blood; so, when the moon changes, I have the fits. Little can be done for them when the blood's changed." This superstition was a matter of profound faith with her, but otherwise her manner was remarkably intelligent. She told us that her wages were fourteenpence—twenty-eight cents—a day; and when we unnecessarily said that she must be tired of work at such a price, she answered, in a bitter tone, "No use being tired; when you are tired, there's the work-house for you."

She had nearly filled the wagon by this time, and two younger women, dressed as she was, but more vigorous-looking, came to help her, and after spitting on their hands, which were as large and as hard as any man's, they applied themselves with shovels to the heap of ore, falling into a machine-like swing of the body as they scooped up the heavy rock. Two men afterward joined them, and when the wagon was loaded they propelled it along the track toward the mill, the women sharing the work equally with the men, if, indeed, they did not use even greater exertions.

The employment of women underground is now

forbidden by law, the degradation resulting from it having been perceived by English legislators only when it had become flagitious; but of thirteen thousand persons engaged in the mines, about two thousand are women, who are employed in various parts of the process of dressing the ore. In the simpler operations very young girls are useful, and at the mill we found a large number of them—the daughters of miners usually—some of them pretty, and all of them neatly clothed and intelligent, even pert in manner. They can all write, and they have an appetite for literature of the Adolphus-Adelina sort, which they devour in penny instalments when their work is slack—*W. H. Rideing, in Harper's Magazine of November.*

Items of Interest.

FLOUR BARREL LINING.—Wm. H. Bailey, of Minneapolis, Minn., the inventor and patentee of a paper lining, claims for his device the following important advantages when it is used in flour barrels: Brands or trademarks put in the head of the paper lining cannot be erased or substituted, the flour can be packed in a more cleanly manner than is usual; no loss of weight can occur so tightly is each barrel sealed; the flour will be preserved an indefinite length of time in any climate, will be guarded against dampness, and kept free of worms, insects, etc. The lining is also guaranteed to be well adapted for barrels packed with sugar, chemicals, drugs, paints, buckwheat, oatmeal, starch, seeds, corn meal and similar articles.

FAST WORK IN CLOTH MAKING.—Governor's Day at the Atlanta Exposition was signalized by the manufacture of two complete suits of clothes from growing cotton, all the processes being finished within twelve hours. A large crowd watched the skillful workmen. The gathering, ginning, picking, carding, spinning, weaving and dyeing were successively completed with great rapidity and perfection, and at 12:55 o'clock in the afternoon the cloth went to the tailor. That evening at 7 o'clock Governor Bigelow, of Connecticut, arrayed in one of the suits, was receiving a delegation from the Atlanta University at the residence of Director-General Kimball, while in the other Governor Colquitt was submitting himself to admiration at the Executive Mansion.

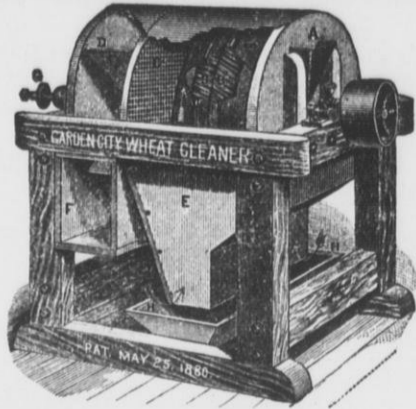
LUMINOUS PAINT.—The following method of procedure will, it is said, give a very satisfactory luminous paint: Take a number of oyster shells cleaned from organic matter as thoroughly as possible, and burn them in a strong coal fire for about half an hour, at the end of which time take them out and allow to cool. When quite cold pound them fine, removing during this operation any particles of gray matter that may show themselves, as these are useless. When finely powdered, make an intimate mixture of this with flowers of sulphur. Introduce the mixture into a crucible, luting on a lid to the vessel with clay, or other convenient luting material. When this has dried, place the crucible in the fire and allow it to remain for an hour; then remove, and allow to cool before opening. The mixture then should appear pure white. Any gray particles that have escaped removal at the first preparation, should be removed now. The resulting powder should be mixed with gum water to a thin paint, as two thin applications are better than one thick one. This paint will remain luminous far into the night, provided it is exposed to the light during the day.

HOW TO RENDER WOOD FIRE PROOF.—Mr. P. Folbarry, of New York, has devised a method of making wood incombustible without in any way altering its outward appearance. Wood prepared in accordance with this process may possibly be charred just at the surface, but the heat to which it is exposed, though ever so intense, can never penetrate right into the wood and touch its fibres. Timber petrified in this way is particularly suitable for staircases that are to resist a conflagration. The composition devised by the inventor is as follows: fifty-five pounds of sulphate of zinc, twenty-two pounds of potash, forty-four pounds of alum, twenty-two pounds of sesquioxide of manganese, twenty-two pounds of sulphuric acid at 60°, and fifty-four pounds of water. The whole of the solid substances are put into an iron vessel containing water at a temperature of 1,138 Fah. When all this solid matter is dissolved, the sulphuric acid is poured in slowly until the whole is saturated with it. The solution is now ready, and, in order to prepare timber with it, the pieces must be put on an iron grate in a suitable recipient, in accordance with the size of the pieces and the object for which they are intended, care being taken to leave half an inch between any two pieces. The composition is pumped into the recipient, and, after the whole of the spaces have been filled up, it is left there in a boiling state for three hours. The wood is then taken out and placed on a grate-like wooden stand in the open air to make it dry and firm. When thus prepared, the impregnated wood may be used for shipbuilding, and building in general, for railway carriages, scaffoldings, posts, wooden pavements, and generally for all purposes where it is desirable that the material should be able to resist fire.

JACKSON & CALLENTINE, of Peru, Ind., are remodeling their mill to the new process system of milling, and have bought the required machinery of Nordyke & Marmon Co., of Indianapolis, Ind.

"BEST IN THE WORLD."

GARDEN CITY WHEAT BRUSH!



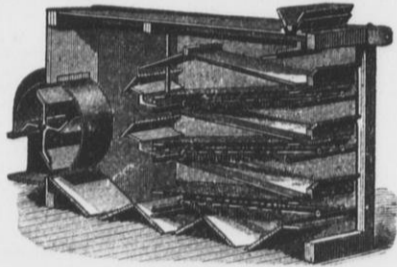
Gathmann's patent "inclined bristles" prevents all clogging when the brushes are run close together. This is the

ONLY DOUBLE BRUSH

Which can be set up close so that it will Thoroughly Brush Wheat.

It don't break or scratch the grain. Removes all the dust. Very light running. Send for circular and prices.

GARDEN CITY MIDDINGS PURIFIER!



Travelling Cloth Cleaners.

Our improved Purifier has every device requisite to make it perfect, and every one in use is giving the greatest satisfaction to the users. The Cloth Cleaners are guaranteed to clean the cloth better than is done on any other purifier. Send for our new circular.

We are agents for the

BODMER BOLTING CLOTH,

Which has long been acknowledged as the best made, and which has lately been further improved, making it now beyond competition. We make it up in the best style at short notice. Send for prices and samples.

Garden City Mill Furnishing Company, CHICAGO, ILL.

Mention this paper when you write us.

OWNERSHIP

OF AN

Important Milling Patent Decided.

The United States Circuit Court has again decided that I am sole owner of patent No. 162,157—for crushing middlings. This time the suit was brought against Edward P. Allis direct, as in the Yaeger mill suit, in which Judge Dillon decided I was the sole owner of the patent. Mr. Allis claimed he was not a party to that suit and advertised in the papers telling the millers that the decision of Judge Dillon didn't affect him, thereby influencing a great many millers to purchase roller mills from him. I therefore brought suit against E. P. Allis, before Judge Dyer, of the United States Circuit Court in Milwaukee, and below give the decree of the court against E. P. Allis:

UNITED STATES OF AMERICA, }
EASTERN DISTRICT OF WISCONSIN. } ss.

At a stated term of the Circuit Court of the United States of America, for the Eastern District of Wisconsin, begun and held according to law, at the City of Milwaukee, in said District, on the first Monday (being the third day) of October, A. D., 1881, present and presiding the Honorable Charles E. Dyer, District Judge.

On the sixth day of the said term, to wit: on the eighth day of October, A. D. 1881, the following proceedings were held, to wit:

Robert L. Downton }
vs. Edward P. Allis. } In Equity—Original Bill.
Edward P. Allis }
vs. Robert L. Downton. } Cross Bill.

This day came the parties by their counsel and these causes having been heretofore heard upon the pleadings and proofs, on consideration thereof and the arguments of counsel thereon, it is ordered, adjudged and decreed by the court, that Edward P. Allis, during the year 1876, was doing business under the firm name of Edward P. Allis & Co., and that the paper writing executed by Robert L. Downton, dated the third day of January, 1876, in the words and figures following, to wit:

"For and in consideration of the sum of one hundred and twenty-five dollars to me in hand paid by Edward P. Allis & Co. of Milwaukee, Wisconsin, I hereby sell, assign and set over to said Allis & Co., their successors and assigns, the exclusive right to manufacture and sell rolls for crushing grain or middlings or other substances, which right or process is secured to me under United States patent, number 162,157, dated April 20th, 1875, for the full life of such patent and any reissues, extensions or improvements thereon, except that a shop right to manufacture and sell the same in the State of Minnesota, but not elsewhere, is granted to O. A. Pray, of Minneapolis, said Allis & Co., having equal right to sell in said State of Minnesota. Dated at Milwaukee, Wis., this third day of January, A. D. 1876," and duly recorded in the patent office of the United States on the 27th day of January, 1876, does not assign to Edward P. Allis any title whatever in and to Letters Patent No. 162,157, dated April 20th, 1875, granted to said Downton, but that the right and title thereto still remain in said Downton, and so far as it is claimed by said Allis, that said paper writing assigned to him any title in and to said patent, the same is void and of no effect.

And it is further ordered, adjudged and decreed by the court that the said Edward P. Allis, his agents and employes, be and hereby are enjoined and restrained from claiming in any manner any title to said patent, or from authorizing or licensing any person whatever to use the process covered by said patent by virtue of said paper writing.

And it is further ordered, adjudged and decreed by the Court that the cross bill of Edward P. Allis filed herein, be and the same is hereby dismissed at the costs of said Allis, and that the said Robert L. Downton have his costs herein both in the original and cross bill to be recovered of said Edward P. Allis, for which execution as at law shall issue.

CHAS. E. DYER, Judge.

UNITED STATES OF AMERICA, }
EASTERN DISTRICT OF WISCONSIN. } ss.

I, Edward Kurtz, Clerk of the Circuit Court of the United States of America, for the Eastern District of Wisconsin, do hereby certify that I have compared the foregoing with its original now on file of record in my office, and that the same is a true and correct copy of the final decree in the suit of Robert L. Downton vs. Edward P. Allis (original bill), and Edward P. Allis vs. Robert L. Downton (cross bill).

In testimony whereof, I have hereunto set my hand, and duly affixed the seal of the said court at the City of Milwaukee, in said District, this 13th day of October, in the year of our Lord one thousand eight hundred and eighty-one, and of the Independence of the United States, the 100th.

[SEAL.]

EDWARD KURTZ, Clerk.

I now again most emphatically warn millers from purchasing rolls from other parties, and using them under my process. Never mind the smooth-tongued persuasion of the salesman or millwright; he is probably more interested in his commissions than in your welfare. There can be no excuse for millers purchasing rolls from other parties than us. We supply millers with all classes of smooth or corrugated roller mills, any size required, in single or double frames, run with gear or by one or two belts, making the most perfect roller mills in the market.

As to the merits of our smooth roller machines, it suffices to say, during the pending of the suit against E. P. Allis we have not advertised; nevertheless our sales have been very large, and our milling friends have kept us crowded with orders for roller mills. Messrs. C. A. Pillsbury & Co., having a large number of our machines in all of their mills, have ordered forty machines for the last half of their magnificent "A" mill, which from their great experience with all roller mills in their different mills, speaks volumes in favor of our machines. We shall soon issue catalogues and circulars with cuts of machines, including the celebrated Dawson Corrugated Roller Mills—(covered by the Cranson patent, which we own)—for reducing wheat to middlings, and cleaning bran. These machines are in use in the large flour mills of Messrs. Schoelkopf & Mathews, Niagara Falls, the Freeman mill at La Crosse, the mills of the Gambrill Mill Co., Baltimore; Homer Baldwin, Youngstown, Ohio, and many others with the best results.

Millers, by sending their orders direct to us, will get the best roller mills in the world, and will avoid the trouble and expense of having purchased from parties who have no right to sell them. Send to us for prices and particulars.

R. L. DOWNTON, DOWNTON MANUFACTURING COMPY.

411 Merchants Exchange Building, ST. LOUIS, MO.

P. S.—Rolls for cleaning bran and scratch rolls for reducing middlings a specialty.

E. P. Bacon & Co.,

Rooms 27 and 28 Chamber of Commerce,

MILWAUKEE.

L. Everingham & Co.,

No. 130 LaSalle Street,

CHICAGO.

COMMISSION MERCHANTS!

GRAIN, SEEDS, PROVISIONS, ETC.

Special Attention given to the Purchase and Shipment of Grain for Milling Purposes.

We have an experienced man in attendance at each elevator constantly, to see to the inspection of grain when loaded into cars for shipment, and the interests of parties ordering through us will be carefully protected in every way.

Orders for Purchase and Sale of Grain for Future Delivery will be Promptly and Carefully Executed.

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THE UNITED STATES MILLER, Milwaukee, Wis.

ELECTRIC PURIFIER COMPANY,

—OF—

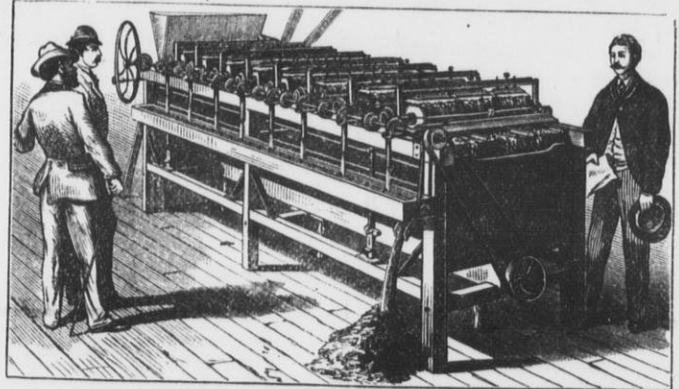
New Haven, Conn.

Factory, New Haven,

New York Office, 17 Moore Street.

This Company was Organized at New Haven on the first of March, 1881, with a Capital of \$300,000.

Electric Middlings Purifiers.



HAVING PURCHASED THE SMITH-OSBORNE PATENTS GRANTED BY THE

United States, Great Britain, France, Belgium, Austria and Canada.

The first Machine manufactured was put up soon after the United States patent was granted, in February, 1880, in the ATLANTIC MILLS, BROOKLYN, and has been in almost constant practical use since, demonstrating beyond a question that it possesses the following advantages:

- It Purifies Middlings Absolutely Without Waste.
- It Purifies Middlings with Greatly Reduced Power.
- It Purifies Middlings with Greatly Reduced Space.
- It Purifies Middlings with Spring and Winter Wheat Equally Well.
- It Purifies Middlings from Spraying and Winter Wheat Equally Well.
- It Purifies Middlings with the Best Results.
- It Dispenses with the Use of Air Blasts.
- It Dispenses with the Use of all Dust Houses.
- It Dispenses with the Use of all Dust Collectors.
- It Dispenses with the Dangers of Explosion and Fire.
- IT PURIFIES DUST HOUSE MATERIAL OF ALL KINDS.
- IT PURIFIES THE FINEST MIDDINGS OF ALL KINDS.
- It is Remarkably Adapted to Custom Mills.
- It is Excellently Adapted to Manufacture Farina.

WHERE THE ELECTRIC PURIFIERS MAY BE SEEN IN OPERATION:

Atlantic Mills, Brooklyn, N. Y.; Archibald Schurmeier & Smith, St. Paul, Minn.; F. L. Johnston & Co., St. Louis, Mo.; Washburn, Crosby & Co., Minneapolis, Minn.; Norton & Co., Chicago, Ill.; Sanderson & Co., Milwaukee, Wis.; M. C. Dow & Co., Cleveland, Ohio; James K. Hurlin, Cincinnati, Ohio; Mosely & Motley, Rochester, N. Y.; Chas. Tiedman, O'Fallon, Ill.; Lyman & Co., Norfolk, Va.; Texas Star Flour Mills, Galveston, Texas; Zenith Milling Co., Kansas City, Mo.; C. Hoffman & Son, Enterprise, Kansas; Richter & Co., Williamstown, W. Va.; Kinney & Hobart, Burron, Kansas; Parkville Milling Co., Parkville, Mo.; Norton & Co., Lockport, Ill.; Ballard, Isom & Co., Albany, Oregon; Niederhammer & Walton, Buena Vista, Ind.; Kimberly & Clark Co., Appleton, Wis.; Cyrus Hoffer, Lewisburg, Pa.; Roberts & Briggs, Seneca Falls, N. Y.; Phillips & Thomas, Kennedy, N. Y.; Hillsdale City Mills, Hillsdale, Mich.; Susong, Logan & Co. Bridgeport, Tenn.

SOMETHING NEW.

A Combination Electric Purifier—A Complete System of Three Purifiers in One.

Samples of work will be sent upon application, by mail, and all inquiries answered from the New York Office. Parties contemplating building new mills, or reconstructing old ones, should see the superior working of the ELECTRIC SYSTEM before making contracts for Purifiers elsewhere.

No. 17 Moore St., NEW YORK.

JOHN RICE, General Manager.

GUNN, CROSS & CO., Minneapolis, Minn., Manufacturers and Agents for the Northwest.

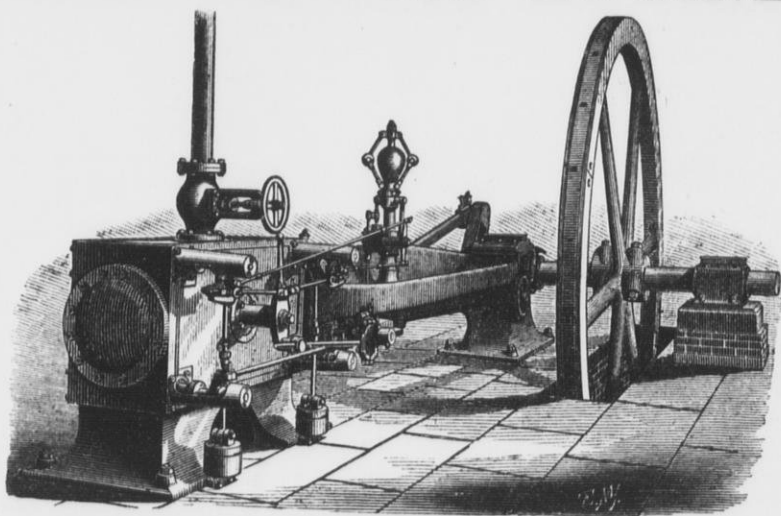
GEO. G. SMITH, San Francisco, Cal., Manufacturer and Agent for the Pacific Slope.

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ATLAS-CORLISS ENGINE.

Will Replace Ordinary Engines Guaranteeing to Save One Third Fuel.



WRITE FOR ENGINE PAMPHLET.

ATLAS ENGINE WORKS, INDIANAPOLIS INDIANA, U. S. A.

BUILDERS OF ALL CLASSES OF

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We Build The Best Farm Engines and Small Engines for warehouses and elevators. [Mention this paper when you write us.]

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DAYTON, - - - OHIO.

MANUFACTURERS OF THE

American Turbine Water Wheel,

Best Quality French BURR MILLSTONES.

Sole Agents in Dayton for the sale of

DU FOUR & CO'S CELEBRATED BOLTING CLOTHS.

Flour and Paper Mill Machinery, Best Chilled or Porcelain Rolls for Crushing Wheat and Middlings and

GENERAL MILL FURNISHINGS.

The AMERICAN TURBINE, as recently improved, is unequalled in the power utilized from a given quantity of water, and is decidedly the BEST PART GATE Water Wheel ever known. It has also been otherwise greatly improved.

Large Illustrated Catalogue Sent Free on Application.

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ACME WHEAT STEAMER AND HEATER, PRICE \$15. OVER 900 IN USE.

This is the Cheapest and Best Steamer ever offered. It is strongly made, easily regulated, steams and heats evenly and is sold at a price low enough to place it within the reach of all millers.

READ THE FOLLOWING TESTIMONIALS:

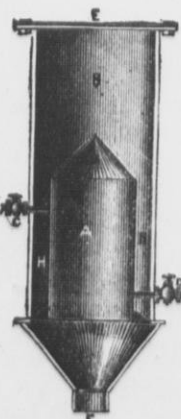
ATLANTA FLOUR MILLS, ATLANTA, Ga., April 18, 1881.
G. W. McNEIL, JR., AKRON, O.: Dear Sir—Yours of 4th inst. at hand, and in reply would say the three steamers purchased of you are working to our entire satisfaction.

H. LEWIS, Proprietor, D. M. WELCH, Head Miller, FELIX, Iowa, March 22, 1881.
G. W. McNEIL, JR.: Dear Sir—The Acme Wheat Steamer is all that it claims to be, steam being better than hot dry pipes to make good clean bran and white flour.
Truly,
W. MARRIAGE & SON, CANTON, Ohio, Oct. 4, 1880.

G. W. McNEIL, JR.: Dear Sir—In answer to your inquiry, would say that I have used your Acme Wheat Steamers and Heaters for the last six months, and it does its work well. I create my steam in a small boiler holding twelve gallons, and heated by three gasoline burners.
Yours Truly,
O. I. BROWNING.

SEND FOR CIRCULARS AND TESTIMONIALS.

GEO. McNEIL, Jr., No. 113 North Broadway, Akron, Ohio.



RICHMOND MANUFACTURING CO., LOCKPORT, N. Y.,

Manufacturers of

RICHMOND'S CELEBRATED

Smut Machines,

Brush Machines,

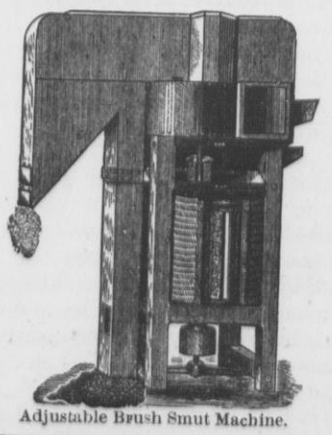
Grain Separators,

and Bran Dusters.

Nearly Two Hundred of these Machines are now in operation in the city of Minneapolis, Minn., alone, and more than sixty in the city of Milwaukee, Wis. They are also extensively used in many other sections, both on Winter and Spring Wheat.

SEND FOR DESCRIPTIVE CATALOGUE.

[Mention this paper when you write.]



Adjustable Brush Smut Machine.

Illinois State Millers' Association in Convention.

The Illinois millers met in convention at the Leland House, Springfield, Ill., Dec. 7. There was a fair attendance.

After transacting some routine business, it was resolved that the secretary be instructed to withhold the license of the Consolidated Middling Purifier Company from all members of the association who are in arrears. Messrs. Huntley, Holcomb & Heine, of New York, owners of the William R. Middleton patent, having recently sent circulars to different Illinois millers calling their attention to the fact that all the Geo. T. Smith Purifiers used by them are an infringement on their machine. A committee, composed of E. C. Kreider, Eisenmeyer and R. H. Whitmore, was appointed to indicate a course of action in the matter. The committee, after stating the matter as given above, presented a resolution, which was adopted, to the effect that the secretary be directed to respectfully request Messrs. Huntley, Holcomb & Heine to prosecute a suit as a test case to determine the validity of such claims, and that they be requested not to bring any other suit until said test suit be decided. It was further resolved by the association that this advice is not prompted by a desire to take any advantage of the manufacturers, but by a desire only to avoid the expense and annoyance of litigation, and to ascertain what claims are legally valid. A committee of three, with the president and secretary added, was appointed to take steps toward securing a modification of the United States patent laws to the end that millers and others may be secure against claims for infringement of patents. The committee was instructed to work in harmony with the National Association.

Mr. Underwood was appointed a committee of one to wait upon Governor Cullom and invite him to attend the session of the association. The secretary was instructed to demand payment of the assessment made by the National Committee of \$10 per annum.

The following officers of the association for the ensuing year were elected: W. B. Sparks, of Alton, president; C. E. Kreider, of Jacksonville, vice president; C. H. Seybt, secretary and treasurer.

The association then adjourned *sine die*.

Another Side of the Middlings Purifier Question.

THE GARDEN CITY PURIFIER DOES NOT INFRINGE THE MIDDLETON PATENT.

OFFICE OF GARDEN CITY MILL FURNISHING CO., CHICAGO, December, 1881.

Ed. United States Miller: DEAR SIR—I have been an admirer of the independent spirit in which you handle all questions relating to either millers or their mills, and the fearless way in which you at times even attack the statements of paid advertisements in your own paper. For this reason I have faith that you will allow me to correct a false and misleading statement or two in an advertisement of the Excelsior Purifier, which appeared very recently. It was *misleading*, because after reciting the claims of the Middleton re-issued patent, which mentions among other elements of the combination "a shaking screen having a rising and falling motion," they say: "All purifiers with a reciprocating shaker have this rising and falling motion," with the evident intention of having millers believe that all such were infringing. But for fear this would not have the full effect which was intended, they add: "and nine-tenths of all purifiers infringe this patent." Now you are well enough versed in patents to know that their re-issued patent covers only a certain combination, all the elements of which, or their equivalents, must be present to constitute an infringement, and that the use of a "shaking screen having a rising and falling motion" is not an infringement. They are smart enough to not directly claim that it is, but send forth the statement in a form calculated to mislead. "Nine-tenths of all purifiers infringe this patent." Our purifier does not, and there are a number of others which do not. As we alone have sold (thanks to THE UNITED STATES MILLER and other papers) several hundred more than the one-tenth which would be left, we are compelled to consider it a false statement. Last, but not least, they say, "this patent antedates all existing purifier patents." An examination of the patent office reports will show you that a Chicago man named Barker took out a patent for the first middlings purifier or separator in 1869, a year before the Middleton patent was issued. In the Barker machine this same "shaking screen, having a rising and

falling motion," was used. This nails false statement number two. Now, Mr. Editor, we have paid out some thousands of dollars for old patents and for licenses in order that our customers should have "none to molest them or make them afraid," and that they, as well as we, might sleep well at night and enjoy the tranquility of those who are satisfied that no "shark" or "bulldozer" is in waiting to pounce upon their fairly won earnings. After all that, don't you think we were justified in being a *little* mad, and in *almost* swearing that we would bring suit against every paper that had that advertisement in. But we are over all that, and now we only ask that in justice, not alone to us, but to your readers who may have been deceived, you kindly state the facts as they are.

Yours truly,
JOHN W. COLLINS,
Pres. Garden City Mill Furnishing Co.

Richmond's Improved Horizontal Combined Beater and Adjustable Brush Smut Machine.

THE UNITED STATES MILLER presents herewith an illustration and brief description of a new machine built by the Richmond Manufacturing Company, of Lockport, N. Y., which they term Richmond's Improved Horizontal Combined Beater and Adjustable Brush Smut Machine. A number of these machines are in successful operation in some of the best mills in the country, doing, we are told, very excellent work. In reference to their construction and operation the manufacturers say:

The wheat first enters a separating spout which takes out the dust, chaff, light stuff, etc., and from this it falls into a hopper, which

points the machine is superior to any other now in use:

First—The grain enters the conical-shaped scouring-case and is distributed in such a manner, that the grain has to work itself past the combined beaters and brushes, which, being put in conical shape, make it impossible for any part of the grain to pass without being thoroughly scoured and brushed alike.

Second—The scouring mechanism is so thorough that one of these machines will do as good work as two ordinary smut machines.

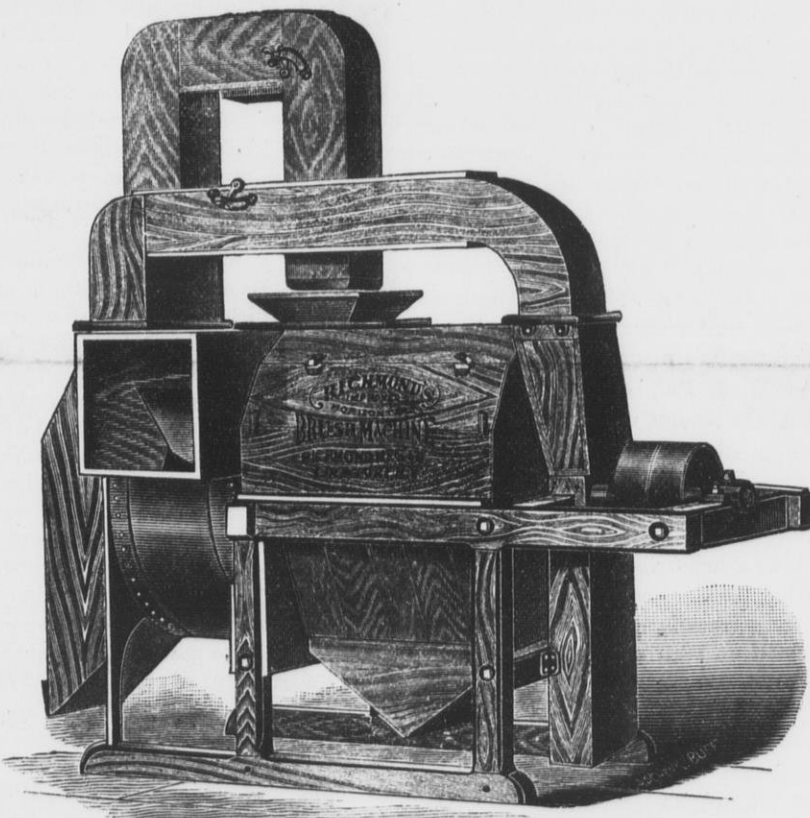
Third—The wheat can be thoroughly scoured without breaking the bran, thus leaving the berry in best possible shape for grinding.

Fourth—The brushes can be adjusted in a moment to any desired distance from the scouring-case, without opening the machine or altering the position of the shaft or beaters, thus placing the scouring at all times, completely under the control of the miller.

Fifth—The ventilation of the machine is perfect, all dust and scourgings are separated from the wheat, the moment they are detached from the berry of the grain, and the cleansed grain cannot become smeared over with any portion of the scourgings, as sometimes occurs in other machines.

Sixth—This machine is very durable, and after years of constant use, will scour and polish the grain in as good and efficient manner as when first started.

Experiments to show that wheat does not shrink from evaporation in the bin when put up perfectly dry were made by Professor Sheldon in two consecutive years. A long sack was prepared for the first experiment, and



RICHMOND'S HORIZONTAL COMBINED BEATER AND ADJUSTABLE BRUSH SMUT MACHINE.

conveys the wheat directly to the head of the scouring-case, where it is operated upon by the action of the combined beaters and brushes.

The perforated scouring-case is made of the best sheet-steel and is conical in shape, free from all rings and corrugations.

The perforations are put in at an angle, and as both scouring-case and brushes are conical, better and more even work can be done than by using rings or corrugations. The action of the combined beaters and brushes draws a strong current of air into the inside of the scouring-case and expels it through the perforations from whence it is immediately carried into the fan, thus taking away all scourgings, etc., as soon as they are detached from the berry of the grain, a very important feature.

The brushes can be adjusted to any desired distance from the scouring-case without opening the machine, by means of a rod, which projects through a plate at the tail end of the scouring-case, which can be easily turned with a wrench, which is sent with each machine. One revolution of the rod will move the brushes one-twelfth part of an inch, in a perfectly even manner, either to or from the scouring-case, as may be desired, and the brushes can be moved up to the scouring-case until they are entirely worn away, while the beaters may remain stationary. After leaving the scouring-case the wheat falls into a separating leg, which removes from it any screenings, etc., that may be in it in the usual way. The manufacturers claim that in the following

filled with exactly 200 pounds of wheat. This was sunk into a bin containing 150 bushels of winter wheat, where it remained six months. It was then weighed and gave a slight fraction over 200½ pounds. The second experiment, in which a similar sack of grain was sunk in a bin of grain for seven months, resulted in an increased weight of one pound. Professor Sheldon does not offer an explanation of this increased weight, but accepts the results as proof that the wheat does not shrink in the bin when stored in a dry condition.

The Golden Grains, or Palestine wheat, advertised by a Philadelphia seed firm two years ago at \$125 per bushel, and offered this year at \$75 per bushel, is in the opinion of the editor of the *Rural New-Yorker*, identical with the Black-Bearded Centennial that was shown at the Centennial and later distributed by the Department of Agriculture. The Black-Bearded Centennial has a large white kernel, but the grain is soft and deficient in gluten. The heads are large, bearing long beards, which generally fall off at maturity, leaving the heads beardless.

To obtain light bran and a good color wheat should be cut in the thick dough, and well cared for, as it is more liable to sprout in the stack during wet or damp weather than when cut later. While in the dough stage the harvester or binder is the best machine. The header is the most economical. It is not profitable to thrash without stacking, as it frequently becomes musty and cakes while in

bulk, which greatly lessens its value. Sweating in the stack causes it to retain its weight and regain its plump appearance, which is very desirable in the market.

New Publications.

MILLS' DIRECTORY OF STEAM USERS FOR NEW YORK AND NEW JERSEY, 1881 edition, published by J. N. Mills Publishing Co., 165 Broadway, New York. Price, \$5.00.

The title of the above book indicates what it is, and all parties desiring to reach steam users in New York and New Jersey will find it very useful. A similar directory for Pennsylvania and Ohio will be issued by the same publishers soon.

FARM FESTIVALS, by Will Carleton. Illustrated. Published by Harper & Brothers, New York, N. Y. Price, \$2.00.

The quaint and touching poems by Carleton are known throughout the land, and this collection of them in such a beautiful shape, with numerous illustrations, is a most desirable one. The poems go right to the heart. This book is an excellent one for a gift to a friend.

THE FRANKLIN SQUARE SONG COLLECTION, containing 200 favorite songs and hymns. Published by Harper & Brothers, New York. Price, 40 cents.

Lovers of song will greet the collection with pleasure. The words and music of each song are complete on one page, which is very convenient. Send for it, and you will be well pleased.

HARPER'S MAGAZINE for January, 1882. Published by Harper & Brothers, N. Y. Subscription price \$4.00 per year.

This magazine starts out the New Year with a number surpassing any former one in beauty and general excellence. Among the most notable articles, we name the following: "King Coal's Highway," by G. F. Muller, with illustrations by half a score of artists; "Ancient and Modern Venetian Glass of Murano," by James J. Jarvis (illustrated); "With the Van-Guard of Mexico," by W. H. Bishop (illustrated); "Journalistic London," by Joseph Hatton (illustrated); "Political Aspects of Mormonism," by Hon. George F. Edmunds, etc.

THE CENTURY MAGAZINE (Scribner Monthly) for January, 1882. Published by the Century Co., N. Y. Price \$4.00 per year.

The January number is one of rare excellence. It contains a full page portrait of Thiers as frontispiece, and the following articles: "A Provincial Capital of Mexico," Mary H. Foote (illustrated); "The Revival of Burano Lace," by Catherine Canaro (ill.); "English and American Song-Birds," by John Burroughs; "Oriental and Greek Sculpture," by Lucy M. Mitchell (ill.); "The Increase of Divorce," by Washington Gladden; "The Chartists," by W. J. Linton (ill.); "Legal Aspects of the Mormon Problem," by Arthur G. Sedgwick, and numerous poems of merit and other contributions of pleasing interest.

NEWS.

Everybody Reads This.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

Y. M. Rizer, of Franklin, Tenn., is building a 125 barrel gradual reduction mill on the Jonathan Mills system.

A combined merchant and custom mill, driven by two turbines, is being built at Cadiz, Ky., by Mr. J. M. Boyd.

Minnesota flour will make about 270 pounds of bread per barrel of 196 pounds of flour, and Michigan flour only about 240 pounds.

Seck Bros.' reduction system is being tried in the Washburn A mill at Minneapolis. If it gives satisfaction we shall soon hear much more about it.

The New Orleans Wharf Co. will light their wharves by electricity, and have ordered a 125-horse-power Atlas Corliss engine from Indianapolis to furnish the power.

The Atlas engine works, of Indianapolis, shipped a pair of large locomotive boilers yesterday, to Palestine, Tex. They are to go in the new water works that are being erected at that point.

An effort has been made for several years by the merchants of Chattanooga, Tenn., to secure the erection of a first-class flouring mill at that place. They have at last been successful. A fine large combined stone and roller mill will be erected, driven by steam.

A Millersburg, O., young lady recently made an awkward mistake. She was sent to a store in a hurry for some flour, and took what she supposed was a clean pillow slip from the drawer. When she bounded into the store and handed the bag, with a sweet smile, to be filled, the storekeeper didn't notice anything wrong until a scoopful of flour went through. Then he held the article up and found it

edged with lace. Then the damsel "lit out," and the storekeeper laid the bag away to await her return, which has not yet "eventuated."

Smith Bros. are busy in placing machinery in the new malt house of Jos. Schlitz' Brewing Co., of Milwaukee.

Peter Anderson, of Xenia, Ill., has commenced the erection of a three-run new process steam flouring mill.

Abbott & Framer, of Spring Station, Ind., are building a complete mill driven by 35 horse power engine at that place.

Covey & Bro., at Southwest City, Mo., are enlarging their mill with machinery made for them by Nordyke & Marmon Co., of Indianapolis, Ind.

A water-power flouring mill is being built at Smyrna, Tenn., on the bank of Stone river, by Mrs. Lizzie Jones, who owns a fine site there for a mill.

The Cackle Separator Manufacturing Co., of Milwaukee, recently shipped one of their largest sized combined machines to James Bruce, Tymern, New Zealand.

Nordyke & Marmon Co., of Indianapolis, lately received through their agent at the quarries in France, fifteen car loads of selected French burr stone used in constructing their millstones.

G. M. Marshall & Son, manufacturers, at Kilbourn City, Wis., have a great demand for their power corn shellers from millers all over the northwest. They are giving great satisfaction.

W. W. Rathbone has just purchased a 50-inch improved Jonvil water-wheel of G. M. Marshall & Son, manufacturers, at Kilbourn City, Wis., for his saw-mill on Bear creek, in Sauk county, Wis.

E. M. Beach & Co., now operating the mill at Adairville, Ga., are about to build a much better and larger mill in the same town, and have decided upon the combined stone and roller system, as the result of their extensive trip among the leading mills last summer.

The Hilgen Manufacturing Co., of Cedarburg, Wis., are building a large addition to their establishment, and are also putting in a 75-horse power Corliss engine, manufactured by Weisel & Vilter, of this city. Smith Bros., of Milwaukee, are making the plans for the buildings.

The Atlas engine works, of Indianapolis, recently received an order from the Chicago Lumber Co. for a 26x60 Atlas Corliss engine, with a fourteen ton band-wheel; also four steel boilers five feet in diameter and sixteen feet long, with all accessories to form a complete steam outfit.

Nordyke & Marmon Co., of Indianapolis, Ind., are getting out the machinery for a four-run new process flouring mill, using rollers to finish up with, at La Grange, Ga. The proprietor is Mr. T. C. Crenshaw, Jr., a gentleman well known in business circles throughout Georgia.

Stewart & Ward, of Bellaire, O., are remodeling their mill to the combined roller and stone system, capacity 75 barrels per day. The work is being furnished by Nordyke & Marmon Co., of Indianapolis, Ind., who have just finished a gradual reduction mill on the Jonathan Mills system for Alex Ault in the same town.

The Chicago Lumber Co. have concluded to purchase for their new mills at Chicago a 26 x 60 Corliss engine, with a fourteen ton band wheel for a thirty-six inch belt; also four boilers, to be made of Otis steel, five feet in diameter, sixteen feet long, and all accessories to form a complete steam outfit. The order has been placed with the Atlas Engine Works, of Indianapolis.

G. M. Marshall & Son, of Kilbourn City, Wis., have recently placed one of their 60-inch turbine water wheels for the miller, John Kellogg, at Reedsburg, Wis. The head and fall is 9 feet, but often, and more especially during recent months, the mills on the Baraboo river have been troubled with back-water, but the improved Jonvil wheels have run the mill right along when there was only 4 feet head.

Burnham Bros., York, Pa., successors to N. F. Burnham, have in the past few weeks shipped their celebrated Standard Turbine wheel to the following named gentlemen: William Cleckley Aiken, S. C., one 30-inch wheel; Wm. & A. Steele, Muffetts Creek, Va., one 24 inch wheel; J. E. Ladd, Gardiner, Me., one 36-inch wheel; R. G. Bourne, Independence, Va., one 15-inch wheel; Frank Holmes, Kingston, Mass., one 36-inch wheel; M. H. Spitzer, Mt. Clinton, Va., one 27-inch wheel; B. F. Starr & Co., Baltimore, Md.,

one 30-inch wheel; John M. Taylor, Olive, W. Va., one 24 inch wheel; J. A. Blaker, Alderson, W. Va., one 24-inch wheel; Robt. L. Mordock, Vaiden, Miss., one 27-inch wheel; Hubbard & Blake Mfg. Co., West Waterville, Me., two 54-inch and one 48-inch wheel, making five wheels shipped them in the past sixty days; J. M. McGuire, Abingdon, Va., one 18-inch wheel; W. A. Bowen, Quitman, Ga., one 21-inch wheel.

The Minneapolis flouring mill, owned by Messrs. Crocker, Fisk & Co., which was destroyed by the recent fire, is to be rebuilt at once. The new structure will be much larger than the old mill, 60x150 in dimension, with a capacity of 1,000 barrels a day. Every new improvement known among mill-owners will be introduced in the new mill, which will be completed at the earliest possible day. Messrs. O. A. Pray & Co., have the contract.

Observant persons note that commencing with this year a better class of flour mills are being erected in the south, and northern millers who have heretofore found their best market in that part of the United States, look somewhat with alarm upon this march of improvement. Among the largest of these mills may be noted the gradual reduction mills: Beach's at Adairville, Ga., and Y. M. Yizer's at Franklin, Tenn. Two very large high grinding mills are also being built, one for Col. Crenshaw, at La Grange, Ga., and one for Rice & Freeman, at Chattanooga, Tenn.

The Independence (Kas.) *Tribune*, Dec. 14, sadly says: We know of a great deal of complaint concerning the treatment of farmers by our millers. It seems almost impossible for them to get any good flour at any of the mills in this region. In fact it seems to be a grab game. We ourselves were skinned at one of the mills a few days since. We pride ourselves on having as good wheat as grows, or was grown in the country the last year. Now for that wheat we got a return of 29 pounds of flour (they say 30) per bushel, and it is black enough for rye flour. This after telling us we had good wheat and would have good flour. Our neighbors are most of them going elsewhere to do their milling. They think their treatment by the millers of Independence a little too grasping, to say the least.

N. F. BURNHAM, manufacturer of water-wheels at York, Pa., is succeeded in business by his two sons, under the firm name of Burnham Bros.

C. M. GILBERT, representing the Richmond Manufacturing Co., of Lockport, N. Y., made us a brief visit. He reports business as being very good.

Death of William C. Durant.

A PROMINENT MILWAUKEE MILLER.

It is our sad duty to announce to the readers of the UNITED STATES MILLER the death of William C. Durant, one of Milwaukee's oldest and most prominent millers. Mr. Durant, while conversing with Mr. Ilsley in his bank at about the hour of noon on the 10th of December, suddenly expired from a stroke of heart disease.

Mr. Durant was born in New England sixty-five years ago, and at an early age moved to Albany, N. Y., and engaged in the milling business, in which he continued up to the time of his sudden taking off.

He moved to Milwaukee about the year 1870, and has ever since been engaged in operating the City Mill; with the assistance of two of his sons. He leaves a family, consisting of the widow, four sons and one daughter. Mr. Durant was a very quiet, unassuming gentleman, and was highly esteemed by all with whom he came in contact. His remains were taken to Albany, N. Y., his old home, where he was finally laid to rest in the Rural Cemetery, near that city.

Questions for Every Manufacturer.

Are your fuel and oil bills low enough to suit you? Does your boiler steam rapidly and uniformly? Is it lined with scale or corroded? Does it foam or prime?

Has your engine power enough? Does it run steadily under varying loads, or uniformly under varying boiler pressures? Does it "pound," and is the exhaust quiet or noisy and forcible.

Have you a flickering electric light or any machines that run unsteadily, or any

slipping belts, hot bearings or gear wheels?

If you have any of the above noted troubles it will probably pay you to have your establishment overhauled from the boiler room to the last running shaft, to have all losses prevented or lessened and all irregularities suppressed. Almost any reputable expert or engineer or millwright will do this for you either on a fee basis, so many days' work for so much money, or as an interested party, saving you so much fuel, affecting a given increase of power or lessening the variation to a certain per cent. for payment proportional to the improvement effected as measured by known accurate methods.

MARKET REVIEW.

Prepared expressly for the "United States Miller," by Messrs. E. P. Bacon & Co., of Milwaukee, Wis.

The wheat market has been comparatively steady during the past month, fluctuations having been within a range of 4 cents for January delivery, the principal trading having been in that delivery. The range for cash or December delivery has been larger, owing to the fact that a considerable short interest has been developed, and this delivery has consequently ruled at a premium of 1½c to 4½c over January, varying according to the prospects of the market being cornered. Indications of a similar movement in the January "deal" are apparent, and this delivery now commands a premium of ½c over February, for this reason. The same parties who were manipulating the market for December are now buying January and selling February largely. The increase in the stock in store, however, which now exceeds a million bushels, will render the working of any "squeeze" much more difficult than heretofore. Receipts are likely to continue liberal also through the month of January, should the roads in the country be in tolerable good condition.

There is a more general feeling of confidence in wheat on its merits than prevailed thirty days since, and a growing conviction that the northwest has but little if any good wheat beyond the requirements of local mills. A large proportion of the wheat arriving here during the past month has been in a most deplorable condition. Nearly a quarter of the receipts for the past two weeks has graded "condemned" in consequence of dampness, and a large share of the remainder has graded No. 3 in consequence of being bleached, swollen and grown. Much of this is worked over by "mixers," and a good share of it is so improved as to pass into the elevators as No. 2 under the most rigid scrutiny of the inspectors. Fully four-fifths of the No. 2 wheat now in store here consists of wheat that has been worked up by this industrious class of the trade, and is to all appearances better than other wheat of the same grade. The mixing establishments of this city have capacity for handling about fifty thousand bushels per day of ten hours.

We have had a steady upward movement in prices since Christmas, and an advance of 3½c has been reached, closing on noon 'Change to-day at \$1.30 for No. 2 cash or January, and \$1.29½ February.

The lower grades are sold almost wholly by sample, on their merits. We quote No. 3 at \$1.18@1.25, according to test, soundness and hardness; No. 4, \$1.10@1.18; and rejected, 95c@1.05. Condemned wheat ranges all the way from 90c to \$1.20, according to test, soundness and condition.

Dec. 30, 1881.

Observations on Conical Rollers.

BY W. VON PEIN.

Formerly I took part occasionally in the discussion over the materials for cylindrical rollers and their suitability for milling purposes, but now there can hardly be a difference of opinion as to the superiority of smooth rollers for regrinding. The experience gained since that time has helped every roller miller forward a long distance. If a difference of opinion arises now it can only be as to the form of the roller, since many millers are not yet sufficiently acquainted with conical rollers.

The cylindrical form for rollers is the most obvious, and for that reason has, until recently, been almost exclusively used. It is true that when cylindrical rollers are made of suitable materials they give very good results, but with these rollers, gear or belt transmission is necessary, which makes the me-

chanism complicated, and moreover the reduction is accomplished by a direct pressure rather than by a cutting action. These facts are known to every one.

If a conical form is given to the rollers the manner of operation is essentially different. The manner of operation of the conical rollers depends upon a variety of conditions which at first sight can hardly be understood, and therefore these rollers have been unjustly criticised by superficial judges. I myself, and probably many others, at first regarded the theory of conical rollers with distrust, but a nearer acquaintance with the facts show that this form possesses great advantages over the cylindrical rollers. The particular advantages of the conical rollers are, first, that with them the differential speed is produced by the form of the roller itself; second, that the form of rollers causes an oblique pressure upon the material passing through, by which the disintegration is more easily accomplished; the conical form of the rollers causes a lateral distribution of the material. By this lateral distribution the particles are separated from one another so that when they reach the point of nearest contact between the rolls the resistance is greatly diminished, so that the reduction is accomplished on these rollers with a much lighter pressure than with cylindrical rollers. The result of these conditions is that conical rollers not only grind better but the entire machine is simpler, requires less power and runs more quietly than machines with gears or similar arrangements.

After I had become acquainted with the good properties of conical rollers, I had a four roller machine sent me by the representative for Schleswig-Holstein, Mr. Schaffenberg, of Pinneberg. I have closely observed the operation of this machine for a long time, and have made various experiments with it. The disintegration is so perfect that the product leaves the machine free from flakes or cakes and can be bolted on any ordinary reel. I have tried these rollers on hard and soft middlings made from the wheat of this section, and the results in both cases were uniformly good.

I found by experiments that when the driving roller had a speed of 200 revolutions per minute, the other roller ran about 50 revolutions per minute slower. From this difference in speed, together with the oblique pressure and lateral distribution, results a grinding effect which cannot be obtained with cylindrical rollers. Moreover, the surface of the rollers in this machine is of a uniformly biting quality, whereby these rollers have already obtained a great advantage over smooth porcelain rollers.

It is evident that the rollers, whether iron or porcelain, which will perform the greatest amount of work are to be preferred. Porcelain rollers have the disadvantage that they wear out faster, and besides the shells cannot withstand the heavy pressure, and become loose. From this cause many porcelain rollers have broken, which is certainly not a recommendation for these rollers. A head miller in whose mill only porcelain rolls are used for the reduction of middlings, told me not long ago that his employer intended to abandon the use of porcelain rollers because the business was too often interrupted by the loosening and breaking of the shells.

The conical rollers are made of a peculiar granular and finely porous cast iron, and seem to fulfill every requirement, not only as to quality of work, but also in point of durability. The surface of the rollers possesses the necessary biting quality, and so far as my experience goes I have observed no wearing out.—[Translated from *Die Muehle* for the *Northwestern Miller*.]

She Took No Risks.

"Have ye any gud piannies?" she asked, as she stepped into a piano wareroom on East Fourteenth street the other day, displaying a prosperous-looking pocket-book. "I want one for me datter, who is comin' home from the semetary wid a finished eddication."

"What style of instrument do you prefer?" said the clerk, displaying an upright. "This piano is the double-patent-quadruple-stringing-board-never-stay-in-tune and celluloid keys."

"Och! niver a happert do I care about the sthoile, so long as its a strong case. Have ye any wid iron cases?"

"No, ma'am, but all our cases are made extra strong."

"How much'll you take for that piannie?"

"Four hundred dollars, ma'am."

"Do you sell on the slow-pay plan?"

"Yes, occasionally we sell to reliable purchasers on the installment plan. The installment on this piano would be \$15 a month."

"Will ye throw in a cover and sthule?"

"Hardly fair to ask it, ma'am; we'll throw in these articles this time."

"An' a buk o' music?"

"Yes; we won't be mean about it."

"Now, if ye'll insure the piannie I'll take it."

"Well, really, ma'am, the purchaser usually insures the instrument; but to close the bargain, we'll insure this piano and agree to take all risks."

"Ye see, betwane me and you," said she, after she had made her mark on the necessary papers and deposited the first installment receipt in her bosom, "I'm glad to be aisy about the insurance, as I want to get the better of me ole man, who took an oath that if I brought a piannie into the house, he'd smash it up wid an ax. An' faith he's the bi to do it the next time he gets dhruunk!"

Fire Risks of the Electric Light.

In the *Sanitary Engineer*, Prof. Henry Morton gives quite a clear summary of the causes which may lead to fires by the use of the electric light. He says that the sources of danger are essentially two: from the conducting wires and from the electric lamps. As long as the electric fluid or electric energy is conveyed by a sufficiently good conductor, it is perfectly harmless, resembling a river flowing in its natural channel, and powerless to rise above its banks; it is only when some easier channel into surrounding objects is offered, or some partial obstruction of a certain character impedes its regular flow that trouble may arise. The conditions of these difficulties are, moreover, very peculiar. Thus, for example, if two electric conducting wires forming the outgoing and returning paths of a powerful current are placed near each other, but are separated by a bad conductor, as, for example, when both are tacked on to a board partition-wall, the current will follow the wire from end to end, with no development of heat in the same, or tendency to leave the conductor or pass into any adjacent object. If, however, between the two conducting wires we introduce some imperfect conductor, such as a small wire, some metallic dust, or a film of water containing mineral matter in solution, then a portion of the current will be diverted into this "short cut" from wire to wire, and may heat the fine wire or the metallic dust or the wood wetted with the aqueous solution, so as to cause the ignition of inflammable matter. Accidents of this nature have already occurred. Thus, a telegraph or telephone wire having fallen, across one or more of the conductors used for street-lighting purposes, has been fused, or itself escaping, has caused the fusion of finer wires connected with it. Again, two wires, being the outgoing and return circuits of a powerful current, have been nailed side by side, without other insulation, on the same board of a floor, partition, or ceiling; and though used safely for a long time, while the wood-work was in its normal state, have developed a very dangerous activity when the wood between them was wet with dirty or impure water. In that case, the water offers a circuit through which a cross-current is established, which first heats the damp wood, then chars it, and finally establishes a series of minute arcs or electric sparks along this charred surface, which would soon develop a conflagration if left uncorrected. Again, two such wires as above, insecurely attached near each other, may be brought into momentary contact and then separated, in which case an electric arc, with its intense light and heat, will be established between them. In like manner, a conducting wire itself may be insecurely connected at some point, and if the abutting ends are separated slightly during use, a similar "arc," with its intense heat, may be there developed.

Turning to the dangers which might be expected from the electric lamp, it is to be remarked in the first place, that these in the case of the arc lights depend much upon the number of lamps operated on the same circuit. Thus, if thirty or forty lamps are operated in series, the electro-motive force of the current must be sufficient to maintain a corresponding number of arcs; and therefore, if by any means many of these arcs are closed out, the electro-motive force of the current available for the remaining ones would be so excessive that their arcs might become excessively long, and even the metallic carbon-holders and other parts of the lamps constitute poles between which the arc would spring, melting the metal work and establishing a very dangerous center of combustion.

To avoid this class of dangers, two provisions should be made. In the first place, some arrangement in the lamp itself, by which, whenever the arc exceeds certain safe limits, the current will be automatically diverted from it and carried through a good and sufficient conductor; and in the second place, some apparatus in connection with the electric generating machine by which the electro-motive force of its current should be varied automatically in correspondence with the resistance of the circuit, so that any diminution of such resistance, as by the closing out of several arcs, should cause a corresponding diminution in the force of the current generated. Numerous contrivances for both of these purposes have already been carried to greater or less perfection and efficiency, and it is manifestly possible by such means to secure immunity from risks of this sort.

Berry & Gale, millers at La Valle, Wis., have recently purchased an improved Jonvil wheel from G. M. Marshall & Son, the manufacturers, at Kilbourn City, Wis.

1882.
Harper's Magazine.
ILLUSTRATED.

"Always varied, always good, always improving."—CHARLES FRANCIS ADAMS, JR.
Harper's Magazine, the most popular illustrated periodical in the world, begins its sixty-fourth volume with the December Number. It represents what is best in American literature and art; and its marked success in England, where it has already a circulation larger than that of any English magazine of the same class—has brought into its service the most eminent writers and artists of Great Britain. The forthcoming volumes for 1882 will in every respect surpass their predecessors.

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The THREE above publications.....	10 00
Any TWO above named.....	7 00
Harper's Young People.....	1 50
Harper's Magazine }.....	5 00
Harper's Young People }	
Harper's Franklin Square Library, One Year (52 numbers).....	10 00

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Redfield's Combined Elevator and Purifier.

The Cheapest and the Best. Machine will Elevate its Own Material any Height and Distance, thereby Saving the Expense of Building Elevators. Also

REDFIELD'S PORTABLE BOLTING CHEST for SCALPING or DUSTING PURPOSES.

Send for Catalogue and Price List before purchasing. It will pay you.

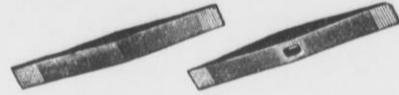
Address J. H. REDFIELD, Salem, Ind.

[Mention The United States Miller when you write.]

John W. Rogers,

MANUFACTURER AND DRESSER OF

MILL PICKS



313 Cedar St., St. Louis, Mo.

30 or 60 days' trial to any responsible miller in the United States or Canada, and if the picks are not finer and thinner than anything they ever used, there will be no charge for the same, and I will refund all express charges both to and from St. Louis, Mo. When ordering new picks state weight and kind. Send for prices before buying. References from every State and Territory in the United States.

P. S.—No Mill Pick manufacturer who does poor work can get such letters as the following:

Office of James Leffel & Co., Springfield, Ohio. }
September 9, 1880.

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: We herewith inclose draft, \$21.85, to pay your invoice of August 9th. Please acknowledge. Yours respectfully,
JAMES LEFFEL & CO.

Office of James Leffel & Co., Springfield, Ohio. }
November 26, 1880.

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: Enclosed find bill of lading covering a shipment of mill picks made you to-day. Please dress the blades on one end and return to us at your very earliest convenience. The last lot of blades sent are giving good satisfaction. Yours truly,
JAMES LEFFEL & CO.

Office of the Williams & Orton Mfg. Co. }
Sterling, Ill., October 7th, 1880.

John W. Rogers, Esq., St. Louis, Mo.—Dear Sir: Inclosed find Chicago draft No. 85,660, amount \$44.00, in full account. Please acknowledge receipt and oblige. Yours respectfully,
WILLIAMS & ORTON MFG. CO.
G. M. Robinson, Secretary.

The Nordyke & Marmon Mill Works, }
Indianapolis, Ind., September 10, 1880.

John W. Rogers, St. Louis, Mo.—Dear Sir: We inclose our New York check No. 334 for \$72.25, in full of our account. You will please acknowledge receipt of same, and oblige. Yours respectfully,
NORDYKE & MARMON CO.

Asey Mills, Scott Co., Ill. }
November 9, 1880.

John W. Rogers, St. Louis, Mo.—Dear Sir: Please find enclosed order on T. C. Taylor & Co., St. Louis, in pay for the Mill Picks, with thanks for your liberal offer to try which we have done, and take pleasure in saying that we find them a superior Pick to any we have had from Chicago or St. Louis, and will add that I have had 35 years' experience in milling.
J. J. HAYCRAFT.
[Mention this paper when you write us.]

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Made entirely of STEEL. ONE MAN with it can easily move a loaded car. Will not slip on ice or grease.

Manufactured by E. P. DWIGHT, Dealer in Railroad Supplies, 407 Library St., Philadelphia, Pa.

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A MONTHLY JOURNAL, published at London, England, devoted to the interest of Millers. For the convenience of Millers in this country, we will receive and forward subscriptions for all who wish. The subscription price is \$1.50 per year, post paid. Address

UNITED STATES MILLER, Milwaukee, Wisconsin.

CHOICE BEVELED EDGE

FLOUR BRANDS

For two dollars and upwards. Also RUBBER STAMPS, BURNING BRANDS, SEALS, STEEL NAME STAMPS, LETTERS AND FIGURES, Etc. Orders promptly attended to.
CHAS. H. CLARKE,
82 Wisconsin St., Milwaukee.

FOR SALE.

A good water power and mill with two run of stone at Stone Bank, Waukesha County, Wis. Mill is doing a good business, which with a moderate amount of improvements, could be largely increased. One half or the whole will be sold to the right party. For full particulars, address,
U. S. MILLER, Milwaukee, Wis.

IMPORTANT NOTICE TO MILLERS

The RICHMOND MILL WORKS, and RICHMOND MILL FURNISHING WORKS are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery, and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to
NORDYKE & MARMON CO., INDIANAPOLIS, IND.



This Riding Saw Machine cuts off a foot log in 2 minutes, and warranted the best and cheapest that is made. We will not be undersold if we know it. We want the address of every one who intends to cut logs, wood or ties. The person sending us such names can buy our machine at wholesale price. Circular free.
United States Man'g Co., Washington, D. C.

CAWKER'S AMERICAN

Flour Mill Directory

NOW READY.

Price, \$10. Address "The United States Miller," Milwaukee, Wis., U. S. A.

The "Nonpareil" Mill Pick Company,
Manufacturers and Dressers of

MILL PICKS.



We use the best quality of double-refined English Cast Steel. We have had thirty years' experience and guarantee satisfaction. Our product speaks for itself. Our picks are equal in quality to any made, and are excelled by none. Can furnish testimonials by the hundreds from millers in all parts of the country. To responsible parties we give thirty days' trial, and if we do not give entire satisfaction we will pay express charges to and from Chicago. Send for our latest Circular and Reduced Price List to

O'CONNELL & MAHONEY,
3 Dunn Street, CHICAGO, ILL.

[Mention this paper when you write us.]

MAX. HAUSER,

(Brother of Adolph Hauser, the Jeweler.)



PRACTICAL OPTICIAN (Lately from Vienna).

469 EAST WATER ST., MILWAUKEE, WIS. Keeps a large stock of Spectacles, Eye, Opera and Marine Glasses, Microscopes, Telescopes, Barometers, Thermometers, and pays special care to a scientific adjustment of all kinds of Glasses to the eye. Any of the above glasses made to order and repaired.

Blanks, by means of which parties residing in the interior of the State may order spectacles as suitable as if they had personally selected them, will be mailed free on application.

Millers in need of magnifying glasses for any purpose can have their wants supplied at a reasonable price. Address as above.

[Mention this paper when you write to us.]

Agents wanted for the Life and Work of

GARFIELD

The only complete story of his noble life and tragic death. Fresh, brilliant, reliable. Elegantly printed in English and German; magnificently illustrated; handsomely bound. Fastest selling book ever published. By John C. Ridpath, LL.D.

CAUTION Do not buy the cheap, penny, re-camped campaign books with which the country is flooded. They are utterly worthless; an outrage upon the memory of the great dead, and a base fraud on the public. This book is entirely new. The only work worthy the theme. Send 50c. in stamps for Agent's Outfit. JONES BROTHERS & Co., Chicago & Cincinnati.

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Manufacturers of the Purest and Best

Lubricating and Burning OILS, GREASES, ETC.,

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MILLERS'

Castor Machinery Oil.

A compound oil, warranted better than Lard or Sperm Oil for machinery uses, and will last longer. Guaranteed not to heat or gum, and to give satisfaction when used on steps, spindles, etc.

MILLERS' LAMP OIL.

Warranted free from Petroleum. Burns equal to Lard or Sperm Oil. Will not chill at 32° above zero, and much cheaper than Lard Oil.

Globe A. Natural W, Virginia Rock Oil,

A perfectly natural Oil, just as it comes from the earth. Thoroughly settled and refined of high fire test, and will not congeal at zero. It is the best Black Oil produced.

Peerless Mill Doap,

A compound Grease for use on cogs and all heavy gearing. Put up in kegs, half barrels and barrels.

CAPITOL CYLINDER OIL,

Manufactured for Steam Cylinders, especially for use in Patent Lubricators. Warranted not to foam, heat or gum, and endorsed by manufacturers of Corliss Engines.

We also have all grades of Sperm and Golden Machinery, Lard, Engine, and several grades of Cylinder and Black Oils, Plumbago, Cotton Waste, etc., etc., which we will offer at prices that defy competition, when quality is considered. Orders and correspondence solicited.

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130 West Water St., Milwaukee, Wis.

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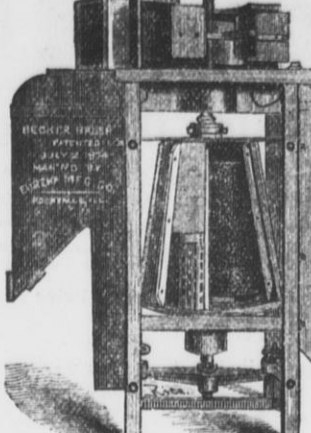
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Thermometer
Attachment
For Wheat Heaters

PATENTED AUG. 17, 1880.

Sample Thermometer
\$2.50.

For Circulars, etc., Address
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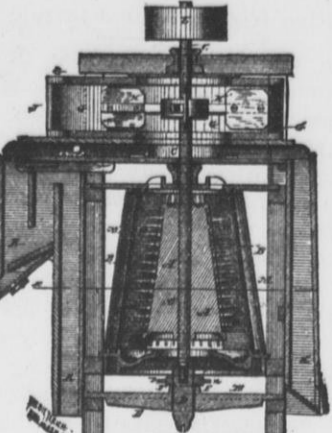
BECKER BRUSH.



EUREKA MANUFACTURING CO.,
Manufacturers and Sole Proprietors of the
BECKER BRUSH,
—AND—
Galt's Combined Smut and Brush Machine.
The Only Practical Cone-Shaped Machines in the Market, and for that Reason the Best.
ADJUSTABLE WHILE IN MOTION.
Nearly 1,000 of these Machines in Use.

In the United States and foreign countries, and so far as we know all that use them are pleased. Millers, millwrights, and milling experts claim the Cone Shape Solid Cylinder Brush is the true principle to properly clean grain. All machines sent on trial, the users to be the judges of the work. For price and terms apply to
EUREKA MAN'G CO., ROCK FALLS, ILL., U. S. A.
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Galt's Combined Brush and Scourer.



HOWES, BABCOCK, & EWELL.

LATE HOWES, BABCOCK & CO.,
Silver Creek, New York.
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THOS. TYSON, Melbourne, Victoria,
General Agent for the Australian Colonies and New Zealand.

Sole proprietors and manufacturers of EUREKA Wheat Cleaning Machinery, consisting of "Smut Machines," "Brush Machines," Separators for mills and warehouses, and Flour Packers.

Also the Magnetic Separator for removing substances from grain automatically, and dealers in the genuine Defour & Co. and Dutch Anchor brands Bolting Cloth, and mill furnishings generally.

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FOR 1882:
Is Now Ready for Delivery, January 1st, 1882.

It has been compiled with the utmost care, and will contain
Several Thousand More Names Than Any Previous Edition.
It will give the Capacity and Motive Power of Mills wherever obtained.

MILL FURNISHERS, FLOUR BROKERS,
And Every one Desiring to Reach the Trade,
WILL FIND THIS WORK SIMPLY INVALUABLE.
PRICE, TEN DOLLARS PER COPY.
Address **THE UNITED STATES MILLER, Milwaukee, Wis.**
Will be sent to any part of the world by Mail, REGISTERED, on Receipt of Price.

STEEL CASTINGS


FROM 1-4 to 10,000 LBS. WEIGHT.

True to pattern, sound and solid, of unequalled strength, toughness and durability.
An invaluable substitute for forgings or cast iron requiring threefold strength.
Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for Locomotives, etc.
15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over all other steel castings.
CRANK SHAFTS, CROSS-HEADS and GEARING, specialties.
Circulars and price list free. Address
CHESTER STEEL CASTINGS CO.,
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Works, CHESTER, PA.
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Calls your attention to the following REASONS WHY, if about to make a Journey to the GREAT WEST, you should travel over it:

As nearly absolute safety as is possible to be attained. Sure connections in UNION DEPOTS, at all important points. No change of cars between CHICAGO, KANSAS CITY, LEAVENWORTH, ATCHISON or COUNCIL BLUFFS. Quick journeys because carried on Fast Express Trains. Day cars that are not only artistically decorated, but furnished with seats that admit of ease and comfort. Sleeping cars that permit quiet rest in home-like beds. Dining cars that are used only for eating purposes, and in which the best of meals are served for the reasonable sum of seventy-five cents each. A Journey that furnishes the finest views of the fertile farms and pretty cities of Illinois, Iowa and Missouri, and is afterwards remembered as one of the pleasant incidents of life. You arrive at destination rested, not weary; clean, not dirty; calm, not angry. In brief, you get the maximum of comfort at a minimum of cost.



That the unremitting care of the Chicago, Rock Island & Pacific Railway for the comfort of its patrons is appreciated, is attested by its constantly increasing business, and the fact that it is the favorite route with delegates and visitors to the great assemblages, political, religious, educational and benevolent, that assemble from time to time in the great cities of the United States, as well as tourists who seek the pleasant lines of travel while en route to behold the wonderful scenes of Colorado, the Yellowstone and Yosemite. To accommodate those who desire to visit Colorado for health, pleasure or business, in the most auspicious time of the year, the Summer season and months of September and October, the Company every year puts on sale, May 1st, at all coupon ticket offices in the United States and Canada, round trip tickets to
DENVER, COLORADO SPRINGS AND PUEBLO,
At reduced rates, good returning, until October 31st. Also to San Francisco, for parties of ten or more, good for ninety days, at great reduction from regular fares.
REMEMBER, this is the most direct route for all points WEST and SOUTHWEST. For further information, time-tables, maps or folders, call upon or address
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BOTTLED BEER.

VOECHTING, SHAPE & CO.,
SOLE BOTTLERS OF
JOSEPH SCHLITZ BREWING COMPANY'S
CELEBRATED MILWAUKEE LAGER BEER,
Cor. Second and Galena Streets,
MILWAUKEE, WISCONSIN.
BOTTLE SUPPLIES CONSTANTLY ON HAND.
[Parties corresponding will please state where they saw this advertisement.]

ESTABLISHED 1877.

THE HOWE

Mill Elevator Cups.
NEAT, STRONG, DURABLE and CHEAP.

CIN.			IRON.		
BELT.	END.	PRICE.	BELT.	END.	PRICE.
2 1/2	2 1/2	3 Cents.	4 1/2	4 1/2	7 Cents
3	2 1/2	3 1/2 "	5	4 1/2	7 1/2 "
3 1/2	3 1/2	5 "	5 1/2	4 1/2	8 "
4	4	6 "	6	4 1/2	8 1/2 "
4 1/2	4	6 1/2 "	6 1/2	4 1/2	9 "

GEORGE W. WHITE & CO.,
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James Leffel's Improved
WATER WHEEL.

NEW PRICE LIST FOR 1881.

The "OLD RELIABLE" with Improvements, making it the Most Perfect Turbine now in Use, comprising the Largest and the Smallest Wheels, under both the Highest and Lowest Heads used in this country. Our new Pocket Wheel Book for 1881 and 1882 sent free to those using water power. Address
JAMES LEFFEL & Co., Springfield, Ohio,
and 109 Liberty Street N. Y. City.
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ROLLS! ROLLS! ROLLS!
For the Entire Reduction of Wheat to Flour.

GRADUAL REDUCTION HAS COME TO STAY.

C. F. MILLER, of Mansfield, Ohio, representing John T. Noye & Sons, is prepared to furnish Roller Mills complete of any desired capacity.

The Stevens System of Gradual Reduction a Success Everywhere.
Plans furnished when desired. Correspondence Solicited.
C. F. MILLER, Mansfield, Ohio.

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We continue to act as Solicitors for Patents, Caveats, Trade Marks, Copyrights, etc., for the United States, Canada, Cuba, England, France, Germany, etc. We have had **thirty-five years' experience.**
Patents obtained through us are noticed in the SCIENTIFIC AMERICAN. This large and splendid illustrated weekly paper, \$3.20 a year, shows the Progress of Science, is very interesting, and has an enormous circulation. Address **MUNN & CO., Patent Solicitors, Publishers of SCIENTIFIC AMERICAN, 37 Park Row, New York.** Hand book about Patents sent free.

Over 1,050 of these Turbines IN USE.

It has tight shutting and easily operated Gate; gives more power for the water used, and will last longer than any other Turbine. Large shop with improved tools for making this wheel and machinery. Illustrated Pamphlet and Catalogue with prices sent free by
BURNHAM & BROS.
[Please mention this paper when you write us.]
OFFICE YORK/ PENNA

HARRIS-CORLISS ENGINE.
—BUILT BY—
WM. A. HARRIS, Providence, R. I.

Built under their original patents until their expiration. Improvements since added: "STOP MOTION ON REGULATOR," prevents engine from running away; "SELF-PACKING VALVE STEMS" (two patents), dispenses with four stuffing boxes; "RECESSED VALVE SEATS" prevent the wearing of shoulders on seats, and remedying a troublesome defect in other Corliss Engines; "BABBITT & HARRIS' PISTON PACKING" (two patents). "DRIP COLLECTING DEVICES" (one patent). Also in "General Construction" and "Superior Workmanship."

The BEST and MOST WORKMANLIKE form of the Corliss Engine now in the market, substantially built, of the best materials, and in both Condensing and Non-Condensing forms.
The Condensing Engine will save from 25 to 35 per cent. of fuel, or add a like amount to the power and consume no more fuel. Small parts are made in quantities and inter-changeable, and kept in stock, for the convenience of repairs and to be placed on new work ordered at short notice.
NO OTHER engine builder has authority to state that he can furnish this engine
The ONLY WORKS where this engine can be obtained are at PROVIDENCE, R. I., no outside parties being licensed.
WM. A. HARRIS, Proprietor.
[Mention this paper when you write us.]

WEGMANN'S PATENT

PORCELAIN ROLLS

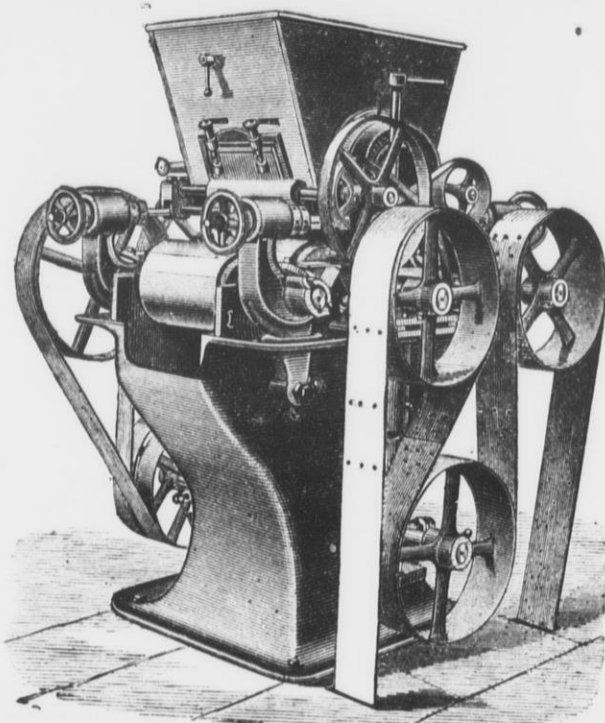
THE BEST ROLL

FOR

MIDDLINGS

IN THE

WORLD!



THE BEST ROLL

FOR

MIDDLINGS

IN THE

WORLD!

"AWARDED SPECIAL PREMIUMS."

OVER 6,000 OF THESE ROLLS IN USE

IN THIS COUNTRY AND EUROPE.

The Superiority of Porcelain over Chilled Iron for Reducing Middlings for Tailings is as under:

CHILLED IRON ROLLS, whether polished at first or scratched with fine grooves, soon become, through wear, smooth and glassy, and will only squeeze instead of grinding.

PORCELAIN presents a continual inherent sharpness, which no art can give to any other material in equal fineness and regularity, which enables it to act upon the smallest particles of flour and to separate them.

CHILLED IRON discolors the flour, by reason of the carbon that exudes from it, and also by its liability to rust.

PORCELAIN does NOT discolor the flour and is entirely indifferent to any and all chemical influences.

CHILLED IRON ROLLS are smooth and "cake" the meal; more especially is this the case on soft material.

PORCELAIN ROLLS possess a certain porosity, and no matter how finely ground, or how long they have been used, still re-

tain this granular and porous texture, and will reduce the middlings without "caking."

CHILLED IRON can be cut with steel.

PORCELAIN can ONLY be cut by the best black diamonds.

CHILLED IRON ROLLS require great power to reduce middlings to the proper fineness on account of their smooth surface.

PORCELAIN ROLLS will do the same amount of work, on account of the slight pressure required, and the gritty nature of the Porcelain, with one-half the power. The flour produced by Porcelain Rolls is sharper, whiter, stronger and more even than that produced by Iron Rolls.

No remarks need be made as to the superiority of Porcelain Rollers over Millstones, as it is a recognized fact by all. Porcelain Rollers are the only Rollers that will entirely supercede Millstones and Metal Rollers.

THESE MACHINES RECEIVED the FIRST PREMIUM!

At the late Millers' International Exhibition, Cincinnati.

Gold Medals at Nuremberg, 1876; Paris International Exhibition, 1878;

Lille International Concours, 1879; First Gold Medal of the State, Berlin International Exhibition of the German Millers' Association, July, 1879; and Gold Medal Le Mans, 1880.

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GENERAL MILL FURNISHERS

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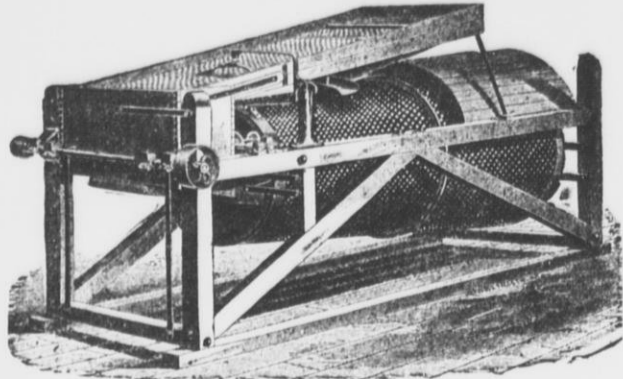
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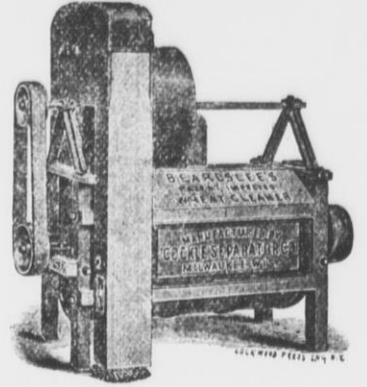
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We will contract to furnish entire Wheat Cleaning Machinery for mills, and guarantee the best results.



PLAIN COCKLE MACHINE.



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Perforated Zinc at Bottom Figures.

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Minneapolis, Minn., Aug. 22, 1881. Cockle Separator Mfg. Co., Milwaukee, Wis.: Gentlemen—We are using two (2) No. 2 4 1-2 M. D. Beardlee Grain Cleaners. Our average use is 5,500 bushels of wheat per day, all of which passes through the two Cleaners. We are well satisfied with their working, and take pleasure in saying that they are just what we wanted, and give satisfaction in every respect. Very respectfully,

SIDLE, FLETCHER, HOLMES & CO.

Minneapolis, Minn., Aug. 24, 1881. Cockle Separator Mfg. Co., Milwaukee, Wis.: Gentlemen—We are using the first Beardlee Grain Cleaner that came to this city; have had said machine in constant use for three years,

and to all appearances it is as good as ever, and has given entire satisfaction. Very respectfully,
RUSSELL, HINELINE & CO.

Herman, Minn., Dec. 2, 1881. Cockle Separator Mfg. Co., Milwaukee, Wis.: Gentlemen—The Cockle Separator bought of you a year ago is giving us entire satisfaction, the greatest feature being that it separates the cockle, buckwheat and other seed from the wheat WITHOUT ANY material WASTED. Respectfully,
C. A. SMITH & CO.

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ers at hand. In reply would say that we have now run them for three months. We consider them the BEST CLEANING MACHINES we have ever used, and they are not requiring more power than any others doing the same amount of work. Yours respectfully,
A. A. FREEMAN & CO.

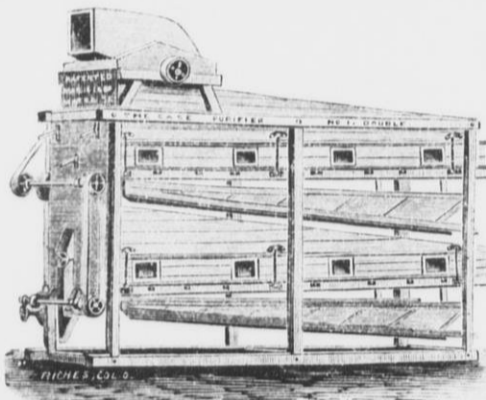
La Crosse, Wis., Dec. 2, 1881. Cockle Separator Mfg. Co., Milwaukee, Wis.: In reply to your favor we are pleased to say that the two double, four Cylinder Cockle Machines furnished by you some time ago work to our entire satisfaction, and with great economy. We don't know of any other machine that pretends to compare or compete with yours, and thought that was so generally well known as to ren-

der any testimonial from us unnecessary, or otherwise we should have sent it voluntarily directly after starting the machines. Very truly, etc.,
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The best device for regulating the FEED ON ROLLER MILLS, PURIFIERS, and other machines requiring a regular feed, spread out the full width. Very cheap and simple. Sent on trial upon application. Write for circulars with illustrations. Perforated Zinc of all sizes at low rates. Send for Illustrated Catalogue.

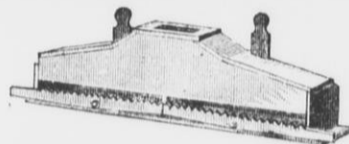


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COSTS LESS AND HAS MORE CAPACITY THAN ANY in the MARKET.

IT IS THE KING OF PURIFIERS. ADDRESS, CASE MFG CO., Columbus, O. WM. E. CATLIN & CO., 68 LAKE STREET, CHICAGO, Chicago Agents.

The Perfect Feed Box.



It insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address, CASE MANUFACTURING CO., COLUMBUS, OHIO. W. E. CATLIN & CO., 68 LAKE ST., CHICAGO, ILL., AGENTS. [Please mention this paper when you write us.]

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Is furnishing Mills and Elevators in all parts of the country with their superior BUCKETS. They are UNEQUALLED for their SHAPE, STRENGTH and CHEAPNESS. Leather, Rubber, Canvas Belting and Bolts at lowest market rates. We have no traveling agents. Sample Buckets sent on application. Large orders will receive liberal discounts. Send for sample order. Address all inquiries and orders to L. J. MUELLER, 197 Reed St., Milwaukee, Wis. [Mention this paper when you write us.]

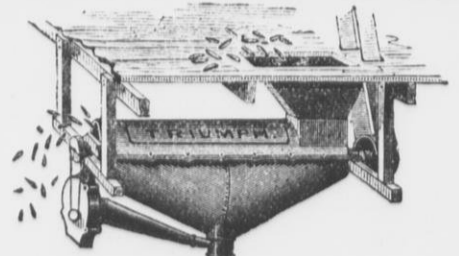
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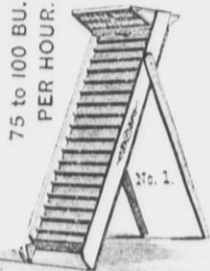


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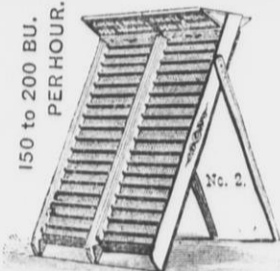
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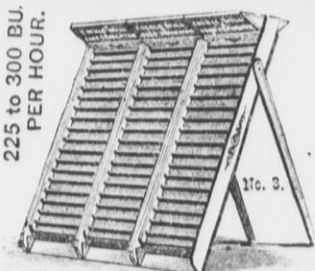
KING COCKLE MILL AND SEED SEPARATOR!



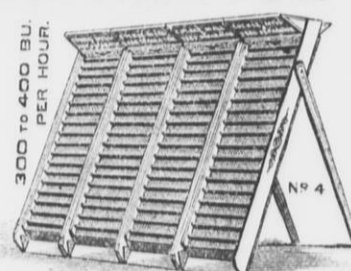
75 to 100 BU. PER HOUR.



150 to 200 BU. PER HOUR.

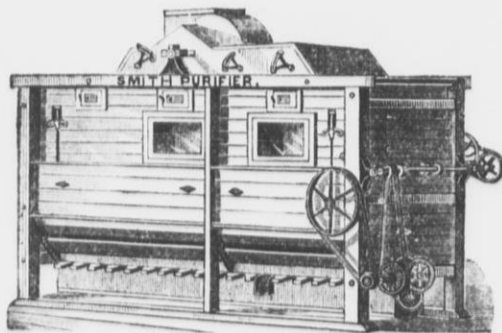


225 to 300 BU. PER HOUR.



300 to 400 BU. PER HOUR.

Pat. November 9, 1880. Gives 25 Grades of work by Change of Elevation. No change of Screen. Requires no power. When used in Connection with Kurth Cockle Mill your cleaning capacity is more than Doubled. When used alone you have more Merit for the money than in any device yet invented. Write for circulars to La Du & King, Manufacturers, Rochester, Minnesota.



SIMPLE, DURABLE, ECONOMICAL. Cheaper than any other of EQUAL CAPACITY. Licensed under all patents owned by Consolidated Middlings Purifier Co. Eight sizes single and three sizes double machines.

THE LOCKWOOD MEDAL, awarded to the Geo. T. Smith Purifier, as the machine making the greatest progress and profit, in the manufacture of flour and mill-middlings, invented within the last ten years. Millers' International Exhibition, Cincinnati, Ohio, 1880.



THE GEO. T. SMITH MIDLINGS PURIFIER

Was awarded THE HIGHEST PRIZE ever offered for the competition of milling machinery — THE LOCKWOOD MEDAL — at the great Exposition. Competition and comparison with every other known Purifier only established it more firmly in the esteem and approval of millers and mill-owners.

It was UNANIMOUSLY awarded the FIRST PREMIUM in its class by a jury of five of the ablest, most successful and experienced mill-owners in the United States, men who represented the milling of every variety of wheat, and the use of all the latest and most approved methods of new process and gradual reduction milling.

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The United States MILLER

Published by E. HARRISON CAWKER. { Vol. 12, No. 4. }

MILWAUKEE, FEBRUARY, 1882.

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American correspondence solicited.

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AMERICAN FLOUR A SPECIALTY.

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We are the first introducers of the Chilled Iron Rollers for milling purposes, and hold Letters patent for the United States of America. For full particulars address as above.

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STEVENS ROLLER MILLS,

UNDER THE PATENTS ISSUED TO JNO. STEVENS.

The work done by the Mills is far superior to that of any other machine known in this country or Europe.

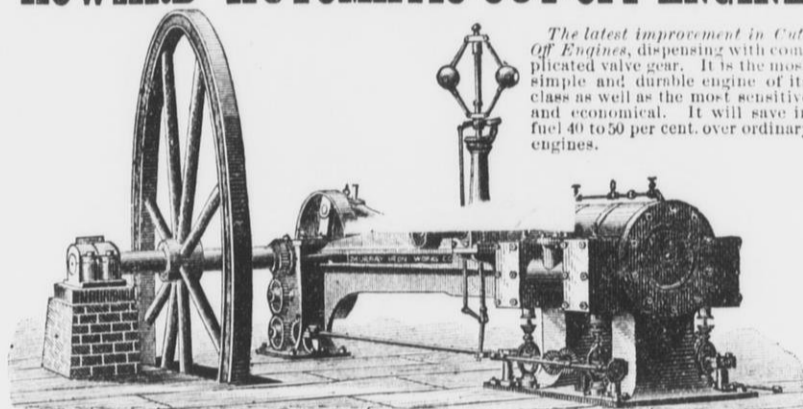
License to use the machine and process will be issued by the patentee for each mill furnished by us.

Old rolls, or those with inferior dress, recut with the Stevens dress at reasonable prices.

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Built only by the **MURRAY IRON WORKS CO., BURLINGTON, IOWA.**

BUILDERS OF ALL KINDS OF ENGINES AND MACHINERY.

Millers, Attention!

You can successfully purify the chop from either Stone or Rolls with the

Wheat Meal Purifier.

Satisfaction Guaranteed or No Sale.

THIRTY DAYS' TRIAL.

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Abernathey's New Book.

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The Latest, Best and Only Exclusively Flour Mill Work in Print.

Every Miller, Millwright and Millwright's Apprentice should have a copy.

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I have had twenty-two years experience in the manufacture and dressing of Mill Picks, and can and do make as fine Mill Picks as can be made by anybody anywhere. I use only the best imported steel for the purpose. My work is known by millers throughout the country, and is pronounced to be first class by the very best judges.

We have hundreds of the most gratifying testimonials from nearly all the States. We solicit your orders and guarantee satisfaction. Address as above.
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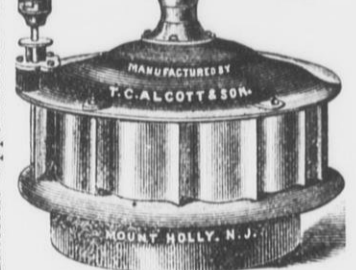
We have the BEST GATE in EXISTENCE and by it the Most Direct and Efficient Application of the Water to the Wheel.

MEDAL & PREMIUM AWARDED TO

ALCOTT'S TURBINE WATER WHEELS

Most Perfect Turbine in Use.

ALCOTT'S TURBINE WATER WHEEL.
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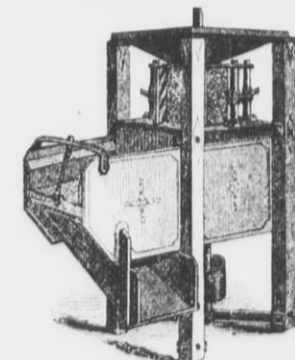
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Picks will be sent on 30 or 60 days' trial to any responsible miller in the United States or Canada, and if not superior in every respect to any other pick made in this or any other country, there will be no charge, and I will pay all express charges to and from Chicago. All my picks are made of a special steel, which is manufactured expressly for me at Sheffield, England. My customers can thus be assured of a good article, and share with me the profits of direct importation. References furnished from every State and Territory in the United States and Canada. Send for Circular and Price List.

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SHELL MIXED CORN

FAST AND WELL,

And that will clean it THOROUGHLY.

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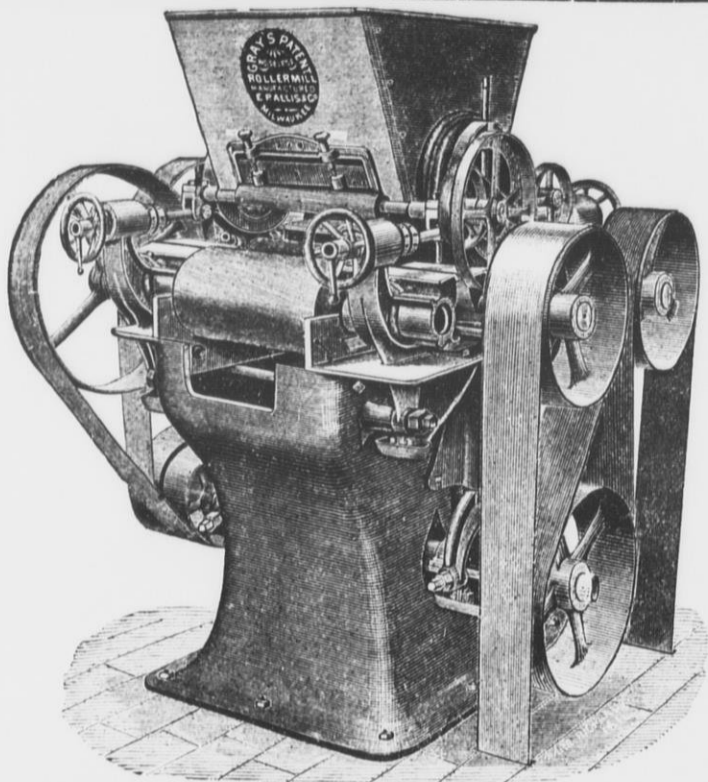
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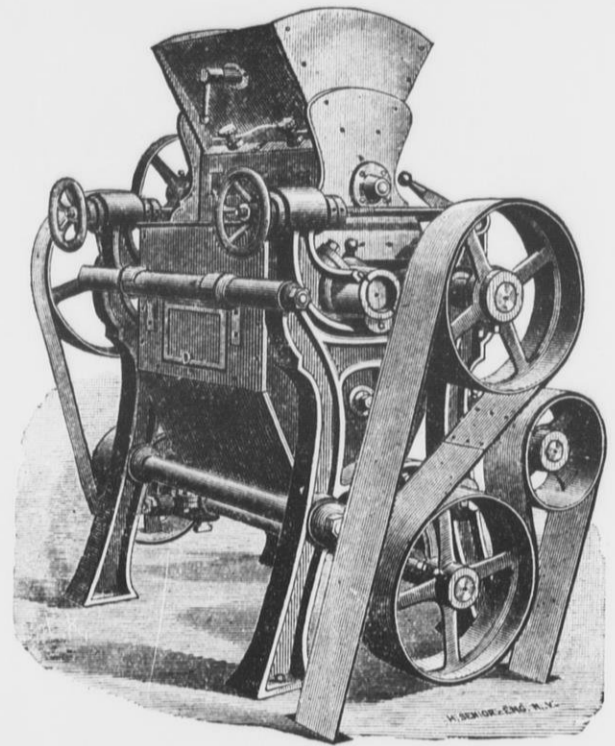
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GRAY'S PATENT NOISELESS ROLLER!



DOUBLE MACHINE.

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SINGLE MACHINE.

WITH

CORRUGATED CHILLED IRON ROLLS.

CORRUGATIONS CUT OF ALL DESCRIPTIONS.

OVER 5,000 IN USE.

First Premium Awarded at Millers' International Exhibition.

These Machines require little power, are perfectly noiseless, being driven entirely by belt; are simple in construction; strong and durable; perfect in every adjustment; adapted to both soft and hard wheats.

We refer to the following prominent millers who are each using from 50 to 150 of these machines:

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Jesse Ames' Sons, Northfield, Minn.
 J. B. A. Kern, Milwaukee, Wis.
 Edw. Sanderson, "
 Daisy Roller Mill, "
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 Commins & Allen, Akron, Ohio,
 L. H. Gibson & Co., Indianapolis, Ind.
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 Waggoner & Gates, Independence, Mo.
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 And Hundreds of others.

To all parties purchasing our Rolls we give full information regarding the system of Roller Milling.

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EDW. P. ALLIS & CO.,

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MILWAUKEE, WIS.

The United States MILLER

Published by E. HARRISON CAWKER. { Vol. 12, No. 4. }

MILWAUKEE, FEBRUARY, 1882.

{ Terms : \$1.00 a Year in Advance. Single Copies, 10 Cents. }

Total Destruction of the Deptford Bridge Flour Mill, London.

We regret to have to report the total destruction by fire of the Deptford Bridge Flour Mill, Greenwich, the property of Messrs. J. & H. Robinson.

The mill was built in 1870, and was one of the handsomest structures of the kind in the metropolis, its extreme length being 92 feet, with a width of 66 feet, a height to the eaves of 56 feet, and to the apex of the roof of 76 feet. The building was composed of seven stories, the two first from floor to floor being 10 feet, and the others 9 feet respectively. The floors were supported on cast iron columns, 9 in. in diameter, and strong timber beams, which in the granary division were strengthened by trussed wrought-iron girders firmly fastened into the side walls. The building was in two divisions, that to the west being the mill proper, the eastern portion constituting the granary. The two were divided by a strong brick wall, through which access was found by means of double iron doors, and the wheat cleaning department, which occupied two floors of the building, was isolated from the mill and the granary by similar means. In short, the greatest care had been exercised in constructing the building with the view of minimizing the risk from fire, to which it has ultimately succumbed.

At about half past five o'clock a. m., Dec. 22, 1881, when the day shift was about entering upon its duties, a fire was discovered in the third floor of the mill. An effort was made to extinguish it by means of buckets of water, and the use of a hose attached to a hydrant on the premises. The flames, however, had made such headway that the effort was unsuccessful, more especially as the hose burst, and the men had to leave the building for their lives. A messenger was at once sent to the local fire brigade station, and in a few minutes the steamer attached to it was on the spot playing upon the burning building. In the meantime telegraphic calls had been made at other stations, and thirteen steamers were eventually and early at work with the view of extinguishing the conflagration. Owing to its being low tide, the river steam engines could not get up the creek on which the mill stands;

but as there was an abundant supply of water from the creek and the water company's mains, all was done that possibly could be effected by the means at the disposal of the fire brigade. Unfortunately, however, all was in vain, and about 7 a. m. the roof of the mill fell in with a tremendous crash, and in two hours from the discovery of the fire the mill was entirely gutted. Soon after the falling in of the roof, the flames communicated with the upper floors of the granary, three of which were destroyed at an early hour, and although the engines continued during the day and night to play upon the granary, it also was ultimately destroyed. The cause of the fire is supposed to have been the firing of a pair of mill-stones running without feed, the flame developed by the friction communicating with the exhaust trunk. Two pairs of stone only were working into this trunk, the other seven pairs in operation at the time

working with Seck's Exhaust. At the time of the fire a portion of the mill was being fitted with Gray's Gradual Reduction System, and the valuable machinery connected with this, which had been put in position, including two sets of rollers, six G. T. Smith middlings purifiers, &c., together with eleven sets of other roller mills, all the flour dressing and wheat cleaning machinery were entirely destroyed. Fortunately the engines and boiler, located in a separate building, escaped without injury, except by water. The loss to the firm is very large, but it is insured in the Millers' Mutual, Millers' and General, The Equitable, The Standard, and the Hand-in-Hand Fire Insurance Offices.

Great sympathy is felt by the trade for the

tor. If iron or porcelain rollers are used, it is necessary that these should be covered in from the air, so that the flour dust does not spread outside. The same observation applies to the bran dusters, bolting reels, detacheurs and certain purifiers. The greatest cleanliness and order should be observed in a mill; dust should not be allowed to accumulate on the machines, nor the sweepings in the corners. If these instructions are observed there will be but little dust in the air and less chances of explosion. In many mills considerable quantities of wheat are ground without separating the bran, which is thrown aside in a heap; in such cases it is forgotten that

ITEMS OF INTEREST.

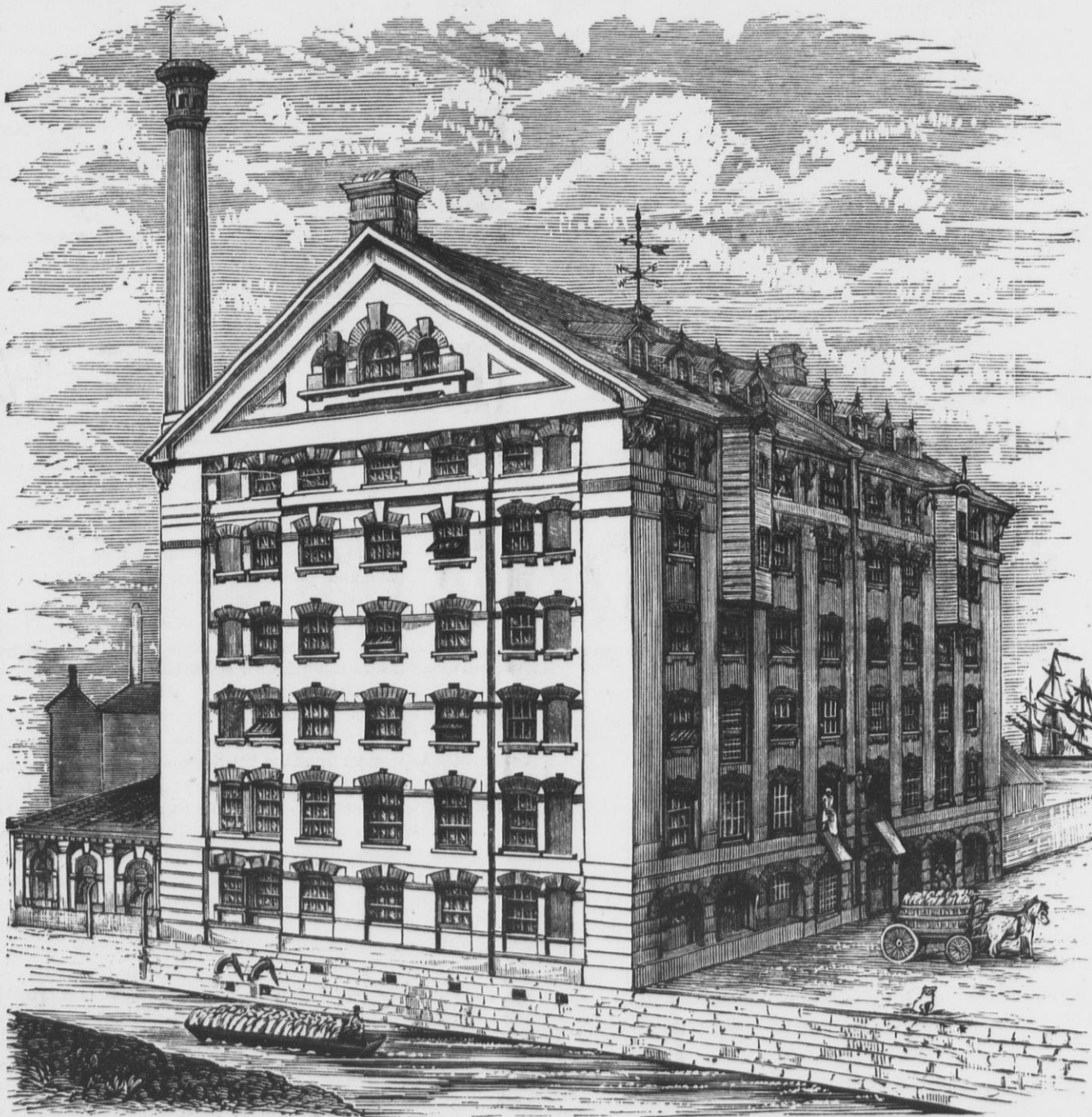
COL. JAMES H. REDFIELD was somewhat taken by surprise Saturday morning when there came by express a new suit of clothes worth about sixty dollars, a Christmas gift from the Ewing Mill Company, of Ewing, Jackson County, for whom he built and furnished a large new mill the past summer. It is a very flattering compliment to Mr. Redfield and shows how well pleased are the parties for whom he superintended the work.—*Salem (Ind.) Democrat.*

WHERE THE GLUCOSE GOES.—The *Boston Journal of Chemistry* thus accounts for the disposition of the millions of pounds of glucose manufactured in the western states every month. It is used mostly as an adulterant to the manufacture of table syrups and in adulterating the dark, moist sugars used largely by the poor. Its next largest use is in the manufacture of candies. All soft candies, waxes, taffies, caramels, chocolates, etc., are made of glucose. Children are, therefore, large consumers of the substance; the honeybees are also fond of it and will carry it away by the ton if it is placed within their reach. The honey made from it is no better than the pure glucose, as it is stowed away in the cell without change. Human ingenuity, it is said, has reached the point of making honey and storing it in the comb without the intervention of the bee. By appropriate machinery a nice looking comb is made out of paraffine, and after the cells are filled with glucose syrup this fictitious "honey" is warranted true white clover honey from Vermont.

The *London Times* prints an interesting letter from its Philadelphia correspondent, who writes that there has come gradually stealing over the American people a vague impression that the period of prosperity is approaching an end. He says that they feel that it is so; they cannot tell why, and hope it will not be. But they point to recent bank and other failures as indicating that speculation has produced undue inflation and the customary accompaniments of bad defalcations. They also point

to the very high prices prevailing for almost everything—especially food—short harvests and unemployed immigrants, as signs that a turning point must soon be reached, and with the downward turn, an abatement of prosperity. The feeling of evil is apprehensive, and not produced by present actual experiences beyond the high food prices. Trade is good, and the railroads can hardly carry the traffic offering, though the return is not very remunerative. That the United States will succumb or wince under one bad harvest is not, of course, for a moment to be supposed; but the fear is, that the vast artificial accumulation of high prices, and the speculation resting on this inflation may, with an adverse turn, produce a partial relapse.

Merrill & McCourtie, owners of several mills in Kalamazoo, Mich., and vicinity, have dissolved partnership. The name of the firm continuing business is D. B. Merrill & Co.



THE DEPTFORD BRIDGE MILL, LONDON, J. & H. ROBINSON, PROPRIETORS, BURNED DEC. 22, 1881.

loss that the Messrs. Robinson have sustained.—*The Miller*, (London).

The *Miller's Gazette and Corn Trade Journal* estimates the loss at \$175,000.

Fires in Flour-Mills.

Mr. P. Kramer, in writing on the above subject for *Die Muehle*, says in regard to fires caused by explosions:

To diminish the chances of explosion it is recommended to hermetically close all machines in which the flour is rapidly moved about, such as bolters, mixers and certain purifiers. If a miller work with stones it is necessary that they should always be kept fed, for besides the injurious effect of running empty stones, the friction of the stones produces sparks, which may easily lead to fire in the aspira-

tion. Bran absorbs dust, and might very easily give rise to an explosion. When the bran is gathered together to be re-ground, care should be taken to accumulate it in a closed chamber, or better still, by sacking. Bran heaped up in a mill might in a very short time become heated and take fire spontaneously. A fire taking hold under such circumstances is all the more difficult to check as it cannot be easily quenched with water. In spite of all precautions, however, there will always be dust in flour mills, which is not only injurious to the health of the workmen, who so often contract throat diseases, but it is always dangerous from the fire point of view,

Collins & Co. succeed A. N. D. Butz, Jr., in the milling business at Liberty, Ill.

UNITED STATES MILLER.

PUBLISHED MONTHLY.
OFFICE NO. 118 GRAND AVENUE, MILWAUKEE, WIS.
Subscription Price.....\$1 per year in advance.
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MOST MILLERS of late have had plenty of time to read the papers and think about "fixing up" so as to be ready for lively work when the next harvest comes in.

WHERE, O where is that new Iowa milling paper? Perhaps "tis born to blush unseen, or to waste its fragrance on the Hawkeye air", or words to that effect.

WE CALL the attention of our readers to the new advertisement of Rumsey & Co., Seneca Falls, N. Y., manufacturers of steam pumps and fire engines and apparatus.

MESSRS. POOLE AND HUNT of Baltimore, Md., report business booming down in Maryland. They are running a very large force on full time. See their advertisement on another page.

SMITH BROS., the well known firm of millwrights, are commencing the erection of a large new shop on the East Side in order, to be able to keep up with the ever growing demands of their business.

MR. BIRKHOLZ's articles will again begin to appear in our March number. Mr. Birkholz has been so busily engaged during the past two months in perfecting some of his inventions that he has been unable to furnish us with his usual contributions which are so eagerly looked for.

WE HAVE been favored with the annual reports of the Millers National Insurance Co., the Illinois Mutual Insurance Co. and the Western Manufacturers Mutual Insurance Co. in all of which companies many millers are interested. From the figures given we should judge that all of the companies named are doing a prosperous and paying business.

GEORGE G. SMITH, the well known Milwaukee mill builder is now doing a flourishing business at 114 Mission street, San Francisco, Cal. He takes contracts for building mills anywhere on the Pacific slope. He is also the western agent for all kinds of flour mill machinery. Millers of the Pacific coast have an able assistant in Mr. Smith in developing their special industry.

Our Visitors.

During the month of January the UNITED STATES MILLER was favored with calls from the following gentlemen connected with the trade: C. M. Gilbert, representing the Richmond Manufacturing Co. of Lockport, N. Y.; S. H. Seamans, Secretary of the Millers National Association; J. E. Loomis, St. Louis, Mo., the general western representative of the Electric Purifier Co. of New York; A. Zinn, Secretary of the Nunnemacher Milling Co.; L. R. Hurd, Manager of the Davis Roller Mills; L. E. Mann, Madison, Wis., representative of the George T. Smith Middlings Purifier Co.; R. Birkholz, mill-engineer with Edw. P. Allis & Co.

A Mammoth Malt House.

The Ph. Best Brewing Co., of Milwaukee, are now preparing the plans for a new malt house to be built in this city during the present year which will be one of the very largest in America. The building will be 100 feet wide by 225 feet in length and nine stories in height. It will be capable of storing and handling over 500,000 bushels. Its cost will be from \$250,000 to \$300,000 exclusive of the value of the ground, on which it will stand. The Company now has a malt house with a capacity of 400,000 bushels, and the necessities of the rapidly increasing business demands the additional malt house as soon as it can be built. The present out turn of the Ph. Best Brewing Co.'s plant is 500,000 barrels of beer per annum.

E. Hayward Noye.

It is our sad duty to record the death of E. Hayward Noye, junior, member of the well known firm of John T. Noye & Sons. He was thirty-four years of age. He leaves a family consisting of wife and one child. The numerous friends in all parts of the country, which this whole souled young man had made, will sincerely mourn his loss and sympathize with his bereaved family.

AT A MEETING of the employees of Noye & Sons, the following resolutions were adopted:

Whereas, In His inscrutable wisdom it has seemed good to the Almighty Ruler of the Universe to remove from our midst our friend and employer, E. Hayward Noye; and

Whereas, We desire to give expression to our thorough recognition of his unwavering courtesy and kindly interest in our welfare while in life; therefore,

Resolved, That in his decease we are bereft of one whom we loved as a friend as well as employer.

Resolved, That our heartfelt sympathy is hereby tendered to his bereaved wife and brother in this hour of deep affliction.

Resolved, That in mingling our tears and expressions of grief, at his untimely demise, with those of his family, we sincerely believe, that their loss is his eternal gain.

Resolved, That a copy of these resolutions be sent to his family and brothes, and to each of the city papers for publication.

IRA WESCOTT,
J. S. KARNES,
S. R. CAMPBELL,
Committee.

Piper, Gibbs & Co., owners of the water-power and mills at Pipersville, Wis., were sued for damage on account of overflowage last spring. The case came on for trial at Watertown January 29, and the jury rendered a verdict in favor of the defendants. Messrs. Piper, Gibbs & Co. are to be congratulated.

Agriculture in Austria-Hungary.

The American competition is being felt severely in other countries besides our own. The last volume of consular returns issued contains a remarkable paper by Consul Faber on the trade and commerce of Fiume, in which he gives a very gloomy account of agricultural affairs and of the results of the American competition throughout Austria-Hungary. The first part of his report deals with the serious decline in the exports of Hungary in consequence of the deficient crops last year—a decrease amounting in value to no less than 3,318,696 florins in the total value. On ten of the principal articles of export, and which include grain, flour, bran, and beech timber, there is a decrease of 5,482,708 florins; but this is partly compensated by an increase in eleven other articles, which include wine, sugar, charcoal and mineral waters. The chief decrease is in flour, of which article only 50,808 tons were shipped from Fiume in 1880-81, as against 69,748 in 1879-80. This is a serious decrease of 27 per cent. That this decrease is more or less general, so far as Hungarian flour is concerned, is shown by the tables of exports via Hamburg and Bremen, via Trieste, and via Fiume—in each case to Great Britain alone; the decrease on the year being 8 per cent. in the former case, 11 per cent. in the second case, and 27 per cent. in the latter case. In all, 71,000,000 kilogrammes were exported last year, as against 88,596,000 kilogrammes in 1879-80. Of this quantity 48,500 tons were shipped by the Buda-Pesth mills, or a decrease of 30 per cent. "This quantity," we are told, "represents only 27 per cent. of the total produce of numbers '0-6,' the proportions being 60 or 70 per cent. of the total produce of '0-3,' which are the qualities of flour for which the preponderance of Hungary in the English markets yet remains uncontested by America." The entire product of the Buda-Pesth mills, Mr. Faber points out, was for the year 1880 only 358,000 tons, as against 430,000 tons in 1879. We thus see a decrease on all sides, and one which cannot be fully accounted for by a deficient crop in Hungary; for if the circumstances of the case be taken into consideration, we see that in any case, whether the harvest be good or bad, 50 per cent. of the produce of the Hungarian mills consists of high-class flours, whose sale mainly depends upon the demand for exportation, and on looking further into the matter, it is declared that it will be found that the chief obstacles Hungary has to contend with in this respect are the American competition and the prohibitive and protective duties in Germany.

The American competition is being felt severely in the English and Dutch markets—in England alone it has risen from 700,000 barrels in 1877 to 3,000,000 barrels in 1879, and although Hungary has a monopoly for the finest qualities of flour, yet the quantities of American flour thrown upon the English markets and the consequent difference of price in favor of American flour, which amounts to as much as 2s. to 3s. per sack, cannot fail to tell in the end, even on those qualities of flour which are and probably will remain the specialite of the Hungarian mills. Owing to the new import duty of 2 marks per 100 kilos, the exports to Germany have ceased altogether, and Mr. Faber points out here that although Germany has by protective duties tried to foster its own mills, this has not been the case. Instead of flourishing, they have declined, and American competition has here also exerted an influence which has almost entirely killed the export trade. In 1879 over 200,000 tons of flour were exported, and in 1880 less than half that amount.

Having thus shown the great decrease in the production, agriculturally, of Hungary, Mr. Faber proceeds to point out that the country is suffering from the occurrence of a succession of bad harvests, heavy taxation, usury, under which the peasantry are suffering, enforced military service, and absentee landlordism. These causes are all at work, intending fast to impoverish the country. Of the future, the Consul says: "A succession of good harvests might do a good deal to remedy these evils for the time being, but even then there is the American competition to deal with, and to meet which is becoming a matter of existence to Hungary. The American competition can only be met by a general improvement of agriculture, on a systematic instead of an arbitrary system, such as now prevails, and by adopting a rational policy of railway tariffs, regardless of such considerations as centralization, which may yet prove the ruin of Hungary as an agricultural State."—British Mail.

Oil.

There are various methods by which the manufacturer can protect himself against the foisting of impure, diluted and mixed oils upon him in lieu of the genuine article. The simplest manner is, probably, to have at hand some of the many well known methods for the detection of the adulteration and educating himself in the use of them. Persons thoroughly experienced in the handling of oils can test satisfactorily by taste or smell, and very readily, by heating, in the latter manner, the odor being more strongly produced by heat. There are, of course, many methods open to an analytical chemist by which to arrive at its absolute purity, such as by the addition of chemicals to produce reaction, etc.; but the most simple and practicable for every day use, if not absolutely perfect in its definition, is by the assistance of the densimeter, the use of which is the preliminary step in chemical analysis. This instrument is a glass cylinder, about one inch in circumference and from 6 to 10 inches in length, having at one end a small bulb loaded with shot, and the other closely sealed; and by placing it in the oil to be tested, it floats the heavy end downward and sinks to a depth that the figures on the stem determine the specific gravity of the oil, which, of course is in proportion to its density. In this manner an exactly measured quantity is weighed; and having been previously provided with a similar quantity of standard oil of known purity, nothing remains but a comparison, care being taken that both oils are of the same temperature, to determine readily the quality and value of the oil tested.

New Publications.

HARPER'S MAGAZINE for February, 1882. Published by Harper & Brothers, N. Y. Subscription price \$4.00 per year.

HARPER'S for February, contains for a full page frontispiece, a portrait of Victor Hugo. The following articles are profusely and finely illustrated: "A Clever Town, built by Quakers;" "French Political Leaders," by A. Bowman Blake; "The American Life Saving Service;" "The Wilson Industrial School and Mission," by Miss F. E. Tryatt; "Henry Irving at Home," by Joseph Hatten; "Mexico," by W. H. Bishop. This number also contains several select poems and the usual number of good things in "The Drawer."

THE CENTURY MAGAZINE. The Century Co., New York, Publishers. Subscription price, \$4.00 per year.

THE CENTURY MAGAZINE may now be considered fairly started on its way under the new name, and with the February (Midwinter) number, and the adoption of the new cover design, by Elihu Vedder, the name of Scribner's Monthly will no longer be continued as the sub-title. Since the change of the name there has been a decided increase in the sale of recent numbers of this magazine. The average edition during the last year of Scribner's Monthly was 120,000, while of the first four numbers of the CENTURY it has been more than 132,000. Of December, a new edition of 9,000 was printed, and a new edition of the January issue is now called for. In England, 20,500 copies were sold, against an average of 16,530 for the twelve months preceding. The recent growth of ST. NICHOLAS in England has been even greater in proportion; for while 3,000 copies were sufficient there a year ago, 8,000 and 10,000 copies are now needed every month.

COAL—A weekly journal devoted to the interests of the coal trade. Published by the Scientific Publishing Co., No. 27 Park Place, New York. Subscription price, \$2.00 per year.

This paper will be highly valued for the information it contains to dealers in coal in all parts of this country, to manufacturers who use considerable quantities of it, and to all interested in coal mining.

THE PAPER WORLD. Published by Clark W. Byran & Co., Holyoke, Mass. Monthly. Subscription price, \$2.00 per year.

THE PAPER WORLD is one of the handomest papers coming to our table, and is ably edited. It is of value to all interested in the trade, either as dealers or manufacturers. It is a credit to the trade it represents.

LIFE AND WORK OF GARFIELD.—We have heretofore referred to this remarkable book by Dr. John Clark Ridpath, published by Jones Brothers & Co., Chicago. Its success is almost phenomenal. It is doubtless having a larger sale than any other book now before the public. It seems to possess the rare quality of responding to the popular want in every detail—in matter, illustration, paper, printing, binding, and price. As it concerns Garfield's life and the events which makes him illustrious, this book will ever remain the standard popular biography.

The Howard Automatic Cut-off Engine

It is well known that the power imparted to the driving shaft of all high-pressure engines is variable. The aim of modern inventors has therefore been to produce such mechanical devices for this class of engines, as will most economically secure at all times a definite ratio between the duty performed by the engine and the supply of steam to the cylinder. Uniformity may be secured to some extent by allowing the steam to follow the piston head during as large a part of the stroke as possible; this it is obvious (and especially with a high piston speed) requires that the exhaust valves open freely before the completion of the stroke, and necessarily involves much waste of steam. By using steam expansively we reduce this waste to a minimum. The load to be driven by an engine is necessarily variable, and in most cases it is greatly so; while the boiler pressure is subject also to variation. In order, therefore, to obtain the best results from the engine using steam expansively, it is necessary to have a mechanical device that will secure quick motion of the valves without wear and tear, and which will correct the variation by maintaining at all times a uniformity of piston speed. The best method adopted thus far to obtain these results, is to so attach the governor to the movement of the receiving valve as to instantaneously cut-off the steam supply; the valves being opened by a positive motion and closed by the action of the governor.

We present in the accompanying engravings front and back views of the Howard Automatic Cut-off Engine, embodying the latest improvements in variable engines, by which the best economical results are obtained, while the simplicity and accessibility of its working parts secure a freedom from wear and tear hitherto unknown in this class of engines, and it is claimed makes the "Howard" a far more durable engine than the "Corliss" or any other of its compeers.

The speed of the engine is regulated by the fly ball governor, connected by lever and crank with a sliding bar, which imparts a sliding motion to the revolving cams; these cams are cut away spirally from the lead line at one end, to the point of full stroke on the other end; the point of full stroke being always directly under the valve stem, when the engine is at rest, and drawing from under the valve stem, with the motion of the governor, until the required point of cut-off is reached. This ranges from full stroke to zero, and in no way controls the lead, which remains the same at whatever point the engine may be cutting off.

The engine has four "grid" valves, giving large area of opening, in proportion to the amount of movement. The induction valves are on the same side with the crank shaft, the two exhaust valves on the opposite side. The mechanism for operating the valves is all on the outside of the steam chest; each valve has its own cams, works independently of the rest, and is in motion only during that part of the revolution in which it performs its proper duty—diminishing the wear of valve and seat to a minimum.

The valve seats have a projection on the wearing side, and being separate from the cylinder, are readily taken off for refitting.

The valve gearing is extremely simple, all the cams are hardened steel, and the yoke on valve stem carries a hardened steel roller, working on face of cam, for lifting the valves, which drop of their own weight, assisted by the pressure of steam.

Motion is imparted to the valve shaft through a train of gearing, which insures a positive movement.

The lower parts are on a line with the bottom of the cylinder, making a free passage for water in case the boiler foams. The practical results obtained from these engines have more than realized the expectations of the inventor and the builders.

The Murray Iron Works Co., of Burlington, Iowa, are putting in additional plant, in order to meet the demand. They are now negotiating with an Indianapolis firm to build for them an engine of 400 horse power for elevator purposes, and will be prepared to build them of any size required.

Messrs. Peters & Bernhard, millers of Ft. Madison, Iowa, make the following statement with regard to their 100 horse "Howard" which certainly shows remarkable performance of the engine:

"We are now running on less than half the fuel we used with our old engine, and on 40 lbs. very boiler pressure. The engine does not vary one revolution whether we carry 40 lbs. or 100 lbs. steam. With our old engine we required a fireman, and used six cords of pine wood to make 100 bbls. of flour. With

the "Howard" our engineer does his own firing and we use but three cords pine wood to make 100 bbls. flour. The engine will pay for itself in saving of fuel. We would not exchange it for any engine we ever saw or heard of."

N. R. Derby & Co., of Burlington, Iowa, have one of the "Howard" engines, which they say "will pay for itself in fuel saved in one year."

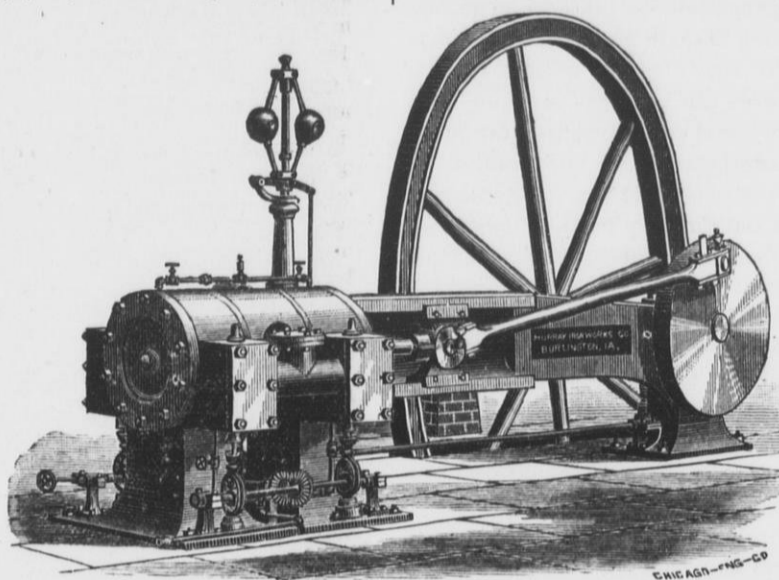
Breadstuffs in Germany.

Leonhard Simion, of Berlin, has just published a pamphlet on Germany's "Cereal production and its consumption of breadstuffs" on the basis of the average of 1878-1880 inclusive. During these three years it is shown that there were harvested in that country on an average 5,800,000 tons of rye, 4,400,000 tons of oats, 2,450,000 tons of wheat, 2,200,000 tons of barley, 4,500,000 tons of spelt, and 150,000

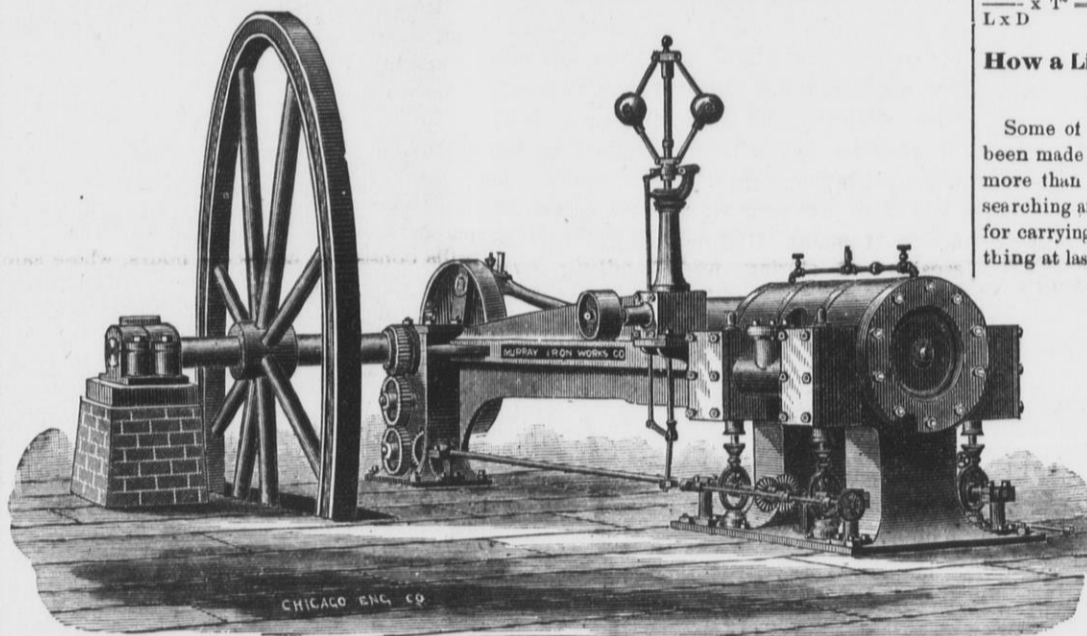
per capita would therefore more than suffice to cover the home demand.

Mr. Simion is, however, of opinion that this assumption would be erroneous, inasmuch as bread consumption is much greater in the agricultural and other rural districts than in the cities in Germany. The city population being, on the whole, better off than the peasantry in that country, the former consume more meat and fish than the latter and the villages. He thinks, that as to actual individual consumption, the garrisons, educational establishments, prisons and hospitals afford a better criterion. According to the statistics furnished from this source, it is shown that the average annual German consumption of breadstuffs may be safely estimated at 210 kilogs per capita, so that 44 3-10 kilogs. have to be imported in a year in which the domestic yield is equal to the average of 1878-80, i. e., 165 7-10 kilogs.

Estimating the population of Germany at



THE HOWARD AUTOMATIC CUT-OFF ENGINE—FRONT VIEW.



THE HOWARD AUTOMATIC CUT-OFF ENGINE—BACK VIEW.

tons of buckwheat. Deducting therefrom the amount of grain for seeding, there were available for the population of the country, 4,050,000 tons of rye, 3,600,000 tons of oats, 2,000,000 tons of wheat, 1,850,000 tons of barley, 490,000 tons of spelt, and 100,000 tons of buckwheat. In other words, per capita of the population, the average supply of domestic grain was of rye, 110 kilogs; of oats, 87; of wheat, 47; of barley, 42; of spelt, 8, and buckwheat, 3.

As food only wheat, spelt and rye are to be counted as of paramount importance, for barley is used in Germany chiefly for malting oats for horse feed, and buckwheat nearly all for fodder for cattle. From barley, large amounts of pearl barley are made and consumed in the country; from oats a good deal of oatmeal, and to some extent oats and barley are used for bread making. On the other hand, not inconsiderable quantities of wheat are converted into starch, and also used for brewing, while rye is extensively consumed for distilling purposes. Taking, therefore, wheat, spelt and rye, as material for bread making alone, and excluding therefrom barley, oats and buckwheat, it will be tolerably safe to put down the domestic breadstuff production of Germany for home use at 165 7-10 kilogs. per head on an average for three years, 1878-1880 inclusive.

The actual requirements of breadstuffs for food, taking the Prussian cities for a basis to go by, as shown from their town dues during the years 1847-73, may be computed at 47 7-10 kilogs. wheat, and 113 kilogs. rye, together 169 7-10 kilogs of breadstuffs per head. Judging from this Prussian city consumption, an annual domestic production of 165 7-10 kilogs

45,000,000 souls, there would consequently have to be imported in a normal crop year, 1,993,500 tons of breadstuffs, or, at 60 pounds per bushel, about 74,424,000 bushels—Miller's Journal, N. Y.

Formulas for United States Boiler Inspectors and Manufacturers.

The special committee, to which the duty of reporting rules for the determination of the working-pressure allowable, in order to guard against the collapsing of cylindrical riveted boiler-flues, reported to the board of the United States Steam Boiler Inspectors the following formulas for the guidance of inspectors and the information of boiler manufacturers:

The following formula shall be used by inspectors in determining the pressure to be allowed for riveted cylindrical flues of sixteen (16) inches and upward, viz:

$$\frac{1760}{D} = \text{a constant (C.)}$$

D = diameter of the flue in inches.
T = thickness of flue in decimals of an inch.

FORMULA.

$$\text{Constant} \frac{C \times T}{.25} = \text{lbs. pressure allowable.}$$

Example: Given a flue twenty (20) inches in diameter, and thirty seven one-hundredths (.37) of an inch in thickness. Required, pressure to be allowed by the inspector.

$$\frac{1760}{20} = 88 = \text{constant (C.)}$$

$$\frac{C \times T}{.31} = \frac{88 \times .37}{.31} = 104 \text{ lbs. pressure allowable.}$$

For cylindrical flues of less than sixteen (16) inches in diameter, the following formula for determining the pressure to be allowed, shall be used by inspectors, viz:

$$\frac{1760}{D} = \text{a constant (C.)}$$

D = diameter of flue in inches, and T = thickness of flue in decimals of an inch.

FORMULA.

$$\text{Constant} \frac{C \times T}{.25} = \text{lbs. pressure to be allowed.}$$

Example: Given a flue ten (10) inches in diameter and twenty-two (22) inches in thickness. Required, pressure to be allowed by the inspectors.

$$\frac{1760}{10} = 176 = \text{constant (C.)}$$

$$\frac{C \times T}{.25} = \frac{176 \times 22}{.25} = 155 \text{ plus lbs. pressure allowable.}$$

The following formulas shall be used by inspectors to determine the pressures allowable for cylindrical riveted flues used as furnaces, viz:

Let D = diameter of flue in inches.
T = thickness of flue in decimals of an inch.
L = length of flue in feet, (not to exceed eight (8) feet.
89600 = a constant.

FORMULA.

$$\frac{89600 \times T^2}{L \times D} = \text{pressure to be allowed.}$$

Example: Given a flue of forty (40) inches in diameter, seven (7) feet long, and five-tenths (.5) of an inch in thickness. Required, the pressure to be allowed by the inspectors.

$$\frac{89600 \times T^2}{L \times D} = \frac{89600 \times .25}{7 \times 40} = \frac{22400}{280} = 80 \text{ lbs. pressure.}$$

Provided, That if rings of wrought iron are fitted and riveted properly on, around, and to the flues, in such manner that the tensile strain on the rivets shall not exceed six thousand (6000) pounds per square inch of section, the distance between these rings shall be taken as the length (L) of the flue in the formula:

Example: Given a flue forty (40) inches in diameter, eight (8) feet long, and five-tenths ($\frac{5}{10}$) of an inch in thickness, having one ring at the middle of its length. Required, the pressure to be allowed by the inspectors.

$$\frac{89600 \times T^2}{L \times D} = \frac{89600 \times .25}{4 \times 40} = \frac{22400}{160} = 140 \text{ lbs pressure allowable.}$$

How a Little Girl Suggested the Invention of the Telescope.

Some of the most important discoveries have been made accidentally; and it has happened to more than one inventor, who had long been searching after some new combination or material for carrying out a pet idea, to hit upon the right thing at last by mere chance. A lucky instance of this kind was the discovery of the principle of the telescope.

Nearly three hundred years ago, there was living in the town of Middelburg, on the Island of Walcheren, in the Netherlands, a poor optician named Hans Lippersheim. One day, in the year 1608, he was working in his shop, his children helping him in various small ways, or romping about and amusing themselves with the tools and objects lying on his work-bench, when suddenly his little girl exclaimed:

"Oh, Papa! See how near the steeple comes!"

Half-startled by this announcement, the honest Hans looked up from his work, curious to know the cause of the child's amazement. Turning toward her, he saw that she was looking through two lenses, one held close to her eye, and the other at arm's length; and, calling his daughter to his side, he noticed that the eye-lens was plano-concave (or flat on one side and hollowed out on the other), while the one held at a distance was plano-convex (or flat on one side and bulging on the other). Then, taking the two glasses, he repeated his daughter's experiment, and soon discovered that she had chanced to hold the lenses apart at their exact focus, and this had produced the wonderful effect she had observed. His quick wit and skilled invention saw in this accident a wonderful discovery. He immediately set about making use of his new knowledge of lenses, and ere long he had fashioned a tube of pasteboard, in which he set the glasses at their exact focus.

This rough tube was the germ of that great instrument the telescope, to which modern science owes so much. And it was on Oct. 22, 1608, that Lippersheim sent to his government three telescopes made by himself, calling them "instruments by means of which to see at a distance."

Not long afterward another man, Jacob Adriaens, or Metius, of Alkmaar, a town about twenty miles from Amsterdam, claimed to have discovered the principle of the telescope two years earlier than Hans Lippersheim; and it is generally acknowledged that to one of these two men belongs the honor of inventing the instrument. But it seems certain that Hans Lippersheim had never known nor heard of the discovery made by Adriaens, and so, if Adriaens had not lived we still should owe to Hans Lippersheim's quick wit and his little daughter's lucky meddling, one of the most valuable and wonderful of human inventions—St. Nicholas for February, 1882.

Carthage, Mo., has three flouring mills, aggregating 17 runs of burrs.

UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

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We respectfully request our readers when they write to persons or firms advertising in his paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

FLOUR MILL DIRECTORY.

Cawker's American Flour Mill Directory for 1882, is now complete and ready for delivery this 31st day of January, 1882.

It shows that there are in the United States 21,356 flour mills and in the Dominion of Canada 1488. The mills in the United States are distributed as follows:

Alabama, 388; Arizona, 17; Arkansas, 234; California, 209; Colorado, 52; Connecticut, 309; Dakota, 44; Delaware, 96; District of Columbia, 7; Florida, 81; Georgia, 514; Idaho, 18; Illinois, 1258; Indiana, 1163; Indian Territory, 3; Iowa, 872; Kansas, 437; Kentucky, 642; Louisiana, 41; Maine, 220; Maryland, 349; Massachusetts, 363; Michigan 831; Minnesota, 472; Mississippi, 297; Missouri, 942; Montana, 20; Nebraska, 205; Nevada, 10; New Hampshire, 202; New Jersey, 445; New Mexico, 28; New York, 1942; North Carolina, 556; Ohio, 1462; Oregon, 129; Pennsylvania, 2786; Rhode Island, 47; South Carolina, 205; Tennessee, 620; Texas 548; Utah, 129; Vermont, 231; Virginia, 689; Washington Territory, 45; West Virginia, 404; Wisconsin, 780; Wyoming, 3; Total, 21,356.

The directory is printed from new Burgeois type on heavy tinted paper and is substantially bound. It makes a book of 200 large pages. The post offices are alphabetically arranged in each state, territory or province. The name of the mill, the kind of power used and the capacity of barrels of flour per day of 24 hours are given wherever obtained which is in thousands of instances. This work is indispensable to all business men desiring to reach the American Milling Trade.

Price Ten Dollars per copy on receipt of which it will be sent post paid to any address. Remit by registered letter, post-office money-order or draft on Chicago or New York made payable to the order of E. Harrison Cawker, publisher of THE UNITED STATES MILLER, Milwaukee Wis.

Mr. L. SANIAL, formerly editor of the *American Protectionist* has assumed editorial charge of the *Industrial Monthly* of New York. Mr. Sanial's well-known ability will doubtless prove of great advantage to the future prosperity of the *Industrial Monthly*.

On the 7th of January orders were received at New Orleans to provide freight room in March and April for 180,000 bushels of wheat from California destined for Great Britain. The wheat will be shipped from California to New Orleans by the Southern Pacific Railroad and thence by steamer direct to British ports. If this first shipment of a large quantity of grain by this route should prove successful there seems to be but little doubt that the grain trade of California will receive a decided impetus.

The population of the United States has been increased during the year 1881 nearly half a million by immigration from Europe. We have room for 500,000,000 more immigrants from Europe, but we

want the best they have got. The immigration from Great Britain during the year 1882 will be unprecedentedly large especially from the middle classes. The young Englishman of enterprise and spirit feels hampered by the circumstances with which he is surrounded in a country so thickly settled and is anxious to go to an English speaking country where the possibilities of the future are pleasing to contemplate. The Americanized Englishman very often takes a more heartfelt interest in our national and private matters of welfare than many "Yankees" of the oldest stock.

About Small Flour Mills.

A well-known milling engineer says that small mills if properly constructed can make a proportionate profit to large ones. By building the mill right, with the proper number of runs of stone or sets of rolls, custom work can be done and one dollar more per barrel can be realized for all the flour made by the mill and sold on the market. A small mill can do good work and turn out the very best quality of flour if the wheat is good. "But" continues the writer, "to do this it must have, first sufficient bolting surface to bolt out all the clear flour made by the first grinding; second, sufficient bolting capacity to rebolt all the returns and dustings from middlings; third, sufficient bolting capacity to bolt out all the flour from the ground middlings; fourth, sufficient bolting capacity to dust and rebolt dustings from second middlings; fifth, sufficient bolting capacity to bolt out all the flour from the reground bran and separate any fine middlings from it, if any should result from each bolting and grinding; sixth, at least one set of rolls and sufficient bolt to bolt and separate their products. This any mill must have in order to do good work. No less will accomplish the work.

Recent Milling Patents.

During the past month the following patents were granted on the dates specified to the parties named:

December 27th, 1881:—Attrition Mill, Henry A. Duc, Jr., Charleston, S. C.; grain-spout, James M. Hendershot, Atchison, Kan.; grain-drier, Eugene Louis, Montgomery, Ill.; flour-packer attachment John P. Ward, Minneapolis, Minn.

January 3, 1882:—Roller-mill for grinding grain, Charles G. Burkhardt, Buffalo, N. Y.; crushing and grinding machine, George Duryee, Rahway, N. J.; grain-cleaner, William C. Holmes, Indianapolis, Ind.; reducing and separating maize, Martin L. Mowrer, Dayton, Ohio; flour-bolt, Charles Schacht, Marine, Ill.; grain-cleaner, William Williamson, Rio Vista, Cal.; dust collector for middlings purifiers, Augustus Wolf, East Hempfield, Pa.

January 10, 1882:—Feed-regulator for grinding-mills, Gilbert S. Graves, Buffalo, N. Y.; grain-scourer, Daniel Mann, West Winfield, N. Y.; dust-collector for middlings purifiers, William S. Russell, Northfield, Minn.; machinery for dressing and sifting flour, W. H. Williamson, Wakefield, England; grinding-mill, Stephen P. Walling, South Edmeston, N. Y.; feed grinding mill, Oswald E. Winger, Freeport, Ill.

January 17, 1882:—Attrition mill, Henry A. Duc, Jr., Charleston, S. C.; grain-separator, Jefferson Grube, Auburn, Ind.; grain elevator, Edward C. Hinckley, Delmar, Iowa; millstone driver, Louis P. Weaver, Jr., New Harmony, Ind.

Mr. F. HARDOUIN, a French milling engineer, of great experience in his work just published, entitled, "L'Art de Moulin" ("The Art of Grinding") says:

"If, instead of sending bad stones to Germany, England and the United States, as we have done for forty years, we had furnished the best stones, the roller system would not even have been attempted. Instead of foolishly destroying existing mills, let us improve, but preserve our present system, for it will lead to that perfection which is necessary to preserve our ancient superiority.

Practice vs. Theory.

R. JAMES ABERNATHEY.

Whether or not the people, as a rule, become more practical and less visionary or theoretical as the world grows older, is perhaps a question. But, certain it is, that those engaged in the development of vast industrial interests, are interested in knowing by actual practical demonstration and test what is true and what false. The leading questions to be answered are, has it the power, the strength, the efficiency, the capability in every way to do the work represented. If the questions cannot be satisfactorily answered, all interest in the matter ceases with the inquiring practical mind. Dynamometer, or other instrumental measurements of useful effect, are not held in very high esteem by this same practical mind. He does not fully understand the working of such instruments; or, if he does, he thinks there are too many chances for "slips" to entirely depend upon them for measurements of efficiency. My dynamometer friend might say to him that a certain belt was transmitting eight horse power. "How do you know?" "Have just measured it with the instrument." He admits at once that the measurement may be true, and the result correct, but he is in doubt about it and unwilling to accept it without additional proof. On the contrary, however, I will go to him and say a certain belt is capable of transmitting 10 horse power. "How do you know it is?" is again abruptly asked. I have just raised a 10,000 pound weight 33 feet high in one minute." Being satisfied that I am telling the truth, no further questions are asked, or doubts expressed. Such a test is regarded as eminently practical, because the thing tested is made to do the work in a positive way. If a mangoes on the market with a machine of any kind and offers it for sale he must know by actual working tests that the machine will do what it is designed to do, and the party he offers to sell to must be satisfied of the fact, otherwise the machine will not be touched except on trial on its merits. It does not matter how thoroughly a machine may be constructed, or how complete theoretically it may seem, it must be tried at work before it will be accepted. This is the seemingly severe ordeal that all new machine appliances or processes must go through before receiving due recognition.

It matters but little how practical the inventor, designer, or builder may be, his efforts are deemed theoretical until they have been tested at work. This is especially true with makers of machines combining a number of different and simple elements or principles. All may be satisfied that each of the elements independent of the other is well understood and all right, but are not satisfied that the combination will work all right until it has been tried and well tried. After a trial has been made and proven successful all ideas of theory in connection with it ceases, and it is accepted as practical. Other machines built precisely like the first and for the same purpose are accepted without question. And there is really no question about the practicability of larger or smaller machines built on the same general plan and for the same purpose.

The combination has been thoroughly tried and found to work well, and that is all that is cared for. With this full understanding of the facts, the maker of the machines can go ahead and get up all sizes and as many as can be placed taking care only that no defects in construction are permitted. This by some might be considered going ahead on theory, but it is not, any more than it would be to calculate by rule the hypotenuse of a triangle the base and perpendicular being given instead of making a triangle for the purpose of measuring it.

The idea of theory ceases after actual tests have been made, and the combination and the relations that elements bear to each other are fully understood. Nature is true to herself at all times, and after man has discovered that certain elements combined in a certain way produce certain results, he can always depend upon it that if he adheres strictly to the plan in construction, combination and apportionment, the results will be precisely the same. What is true of machines and processes, is true of all other artificial appliances where nature or the laws thereof take a prominent part in the performance of the duties required.

If as has been said, the doubting man is satisfied that a certain belt of a given width and running at a given speed with a given arc of contact on pulley is transmitting ten horse power, he is also satisfied if the belt is made twice as wide, all the other conditions remaining the same, it will transmit twice the power. There is nothing truer than this proposition. It is not theoretical, but eminently practical

and can never fail except when faulty in construction. Deductions made from thoroughly tried and well known principles, or elements, or combinations of the same, are not theoretical but practical, and where or whenever the same cannot be reduced to practice it is the fault of construction or arrangement. It is true though, that no man is well calculated to make working deductions unless he is reasonably well acquainted with the practical workings of the causes from which he intends to produce results or effects. And the greater his knowledge, the longer his experience in the working results and effects of the mechanical combinations, the more certain are his calculations in reasoning from cause to effect. A man who has had no practical experience, has found out by reading or otherwise, that a combination of air and riddles is an excellent method of cleaning wheat or other grain. He supposes that he knows all about it and proceeds to construct his machine. But to his astonishment he finds the machine will not do the required work. The trouble was he knew nothing about harmony in the matter. He understood the plan in general but knew nothing about fixing the details. He did not know how large the fan should be nor how fast it ought to run, did not know what size to make his riddles, nor what angle or pitch to give them, nor what size the perforations should be. All of these things had to be afterward learned by practical experience before success could be obtained. That man's work was purely theoretical, and hence not successful. On the contrary a man who has had abundance of experience in riddling grain and in blowing it with fans and is a good practical mechanic as well, goes to work to combine these elements into one machine and with perhaps the exception of some minor details that may need re-arranging, his machine works successfully from the start. That man's work was practical. The difference between the two is, one went to work intelligently on the basis of a good practical knowledge, the other blindly on a basis of mere theory. And right here is where we want to draw the line of distinction. The great industrial interests of the world demand that all mechanical appliances be rigidly tested at work before they are willing to accept. The same interest and all interested demand that the man or set of men who attempt to make appliances, to teach or instruct must themselves first be tested in the crucible of hard practical thought and experience. By that means only can any reasonable degree of certainty be arrived at. Purely theoretical men should be dropped out, compelled to learn somewhat by practice what they attempt to teach.

It is true that practical men make mistakes. All classes of men do that, but it is a thousand times safer to have a good practical knowledge than have none at all. And I would like to say right here to all young beginners as they learn practically to also contract a habit of thinking, learn to trace the workings of causes to their effects, and effects back to causes. In other words, become students, and continue to be students. If you run into difficulties think and study yourselves out. It will pay you in the future and be of inestimable value to mankind. The writer has always been a student, and is a student to-day but he been by no means as studious as he should have been; much valuable time has been wasted and an ignorance of many things of which he should have been well informed now stares him in the face. Avoid this and you benefit yourselves and the world at large as well.—*The Millstone (Indianapolis, Ind.)*.

It will be painful news to the millers of Indiana to read the announcement of the sudden death, on the 15th inst. of Mr. R. L. Thompson, of Terre Haute. Mr. Thompson was one of the most extensive millers of the state, and one of the most active and energetic men in any movement looking to the advancement of the milling interests of Indiana. He was a prominent and influential member of the millers' state association, and usually represented the state in the councils of the national body. His mill at Terre Haute had been lately enlarged and improved with the newest class of machinery. He died very suddenly with rheumatism of the heart.—*Millstone*.

THE Bureau Valley flouring mill, located one mile south of Bureau Junction, Ill., burned Jan. 20th. The fire originated in a hot box. The loss is at least \$10,000, and the property was insured for \$3,000. The owners will at once rebuild. The mill was one of the old land marks in that section of the country, and was generally called the "old Red Mill."

THE MILLER'S NIECE.

III
(Continued from January Number.)

The miller came in to tea, and, though he smelt a little strongly of flour, was otherwise agreeable to the fastidious taste of Josiah. To look at him as he sat at his own table with thin white hair straggling to his shoulders, wrinkled face, lack-lustre eyes, and an air of absolute and hopeless dejection, one would have guessed his age as seventy-five. It was occasionally when his niece poked him that his aspect changed, and then momentarily came back to him the strength and cheerfulness which stands by sixty when a man has lived happily and is prosperous.

"The old gentleman seems in low spirits to-day," Josiah observed to Frank.

It was night, and they were sitting in the room which served for breakfast, dinner, tea and supper. At 10 o'clock the miller, his niece and the whole establishment were accustomed to retire to rest, and half an hour later were probably asleep. Frank was not able to fall in with these pleasing manners, and was accustomed to sit up later in order to smoke a pipe. Josiah would rather have gone to bed, but his inclination was not of much consequence at any time, and none at all when in company with Frank Fisher. It seemed good to Frank to sit up late and smoke. He preferred to do it with company, and, willy nilly, Josiah sat up with him, getting his clothes odiously impregnated with tobacco smoke.

"A little low to-day, isn't he?" Josiah repeated apologetically, for Frank had not replied to his first remark, being overcome by one of those fits of staring steadily into the fire the while he puffed.

"He is much the same as usual, or as he has been any time these last ten years," he answered presently.

"Oh!" said Josiah. "I thought perhaps flour had gone up or down, or the boiler had burst at the mill, or something unpleasant had happened."

"No, Josiah, we are somewhat advanced beyond that stage. At the period of our history with which you are best acquainted they may have had boilers in water mills, but in the present day they use the water cold. Nevertheless, it was at the mill that happened the events to which are traceable the old man's depression. I think I mentioned when we were at Battleborough a little circumstance which led to my making a sketch of some county magistrates and their court? It was here, or rather over at the mill yonder, that the murder took place. It was the old man's nephew who was foully put to death.

"Miss Hargraves's brother?"

"Yes, Mary's brother."

Frank said no more, but, with his chin sunk on his chest, sat slowly smoking and staring into the fire.

"I think I'll go to bed now," said Josiah after a pause, rising and yawning in an engaging manner, designed to hide a growing state of nervousness. In Battleborough he had been consumed by a gentle desire to know all about the mystery that had affected these three lives. But he did not care to hear the story close upon midnight, within sight of the scene of the tragedy.

"Sit down, old man," said Frank peremptorily; "it's early yet, and I don't mind telling you now that you are here that I brought you down here with a special object not fully revealed in my reference to the Roman chimney-pots. I may want you to do something. Don't look so uncomfortable. It may come to nothing, and at worst you will figure in it only as a looker-on—a credible witness, if witnesses be needed, which they may not be. Or perhaps I may be a stupid old fool."

The cold sweat broke forth on Josiah's brow as he contemplated the situation. Here he was, against his inclination at the outset, in a lonely hamlet, with a man of strong will, and perhaps undeveloped tendencies to lunacy, who had a murder on his mind, and wanted Josiah to have something to do with it.

"I told you I found this place accidentally," Frank said, taking no more notice of Josiah's perturbation than a snake bestows on the trembling of a rabbit on which it has fixed its glittering eye preparatory to munching its bones. "I came down here sketching some of those quaint houses, and staying over at the little inn met the miller, who came down on summer evenings to play bowls. He asked me to his house, where I met Mary, then a girl of seventeen, and the fairest, freshest creature I ever met. I am not going to make a long story of it. It is the old, old story, which you have doubtless already guessed. I fell in love with Mary, and dared to hope she would come to London as my wife.

"Her brother Jack was two years older than she; a handsome, high-spirited lad, who fretted under the rule of his uncle that bound him to the hateful enterprise of the mill. He did not quite know what he wanted to be. But he had a very strong conviction that he was not meant to be a miller. Hargraves—who at that time was a very different man from what you find him now, being as obstinate as a pig and as self-willed as an ass—ruthlessly resisted these longings to be free. There had been a Hargraves miller at Ellendale as far back as record went. The present mill was built by our friend up stairs, and worked by him with substantial profit and universal credit. His sister, going outside the parish of Ellendale, and banking after better things, had married a gentleman, who had of course died leaving her in a state of destitution. The miller would not have her back in Ellendale. But he was careful that she should not absolutely starve in London, and when she died he himself went up to Camden Town, saw her decently buried, and brought down Jack and Mary, then aged respectfully nine and seven. He meant to do his duty by them when he took them in hand, and he had done it. Both had had a first-class education and a comfortable home, which in these last months was daily growing in grace under the touches of Mary, now installed as housekeeper. Jack, the miller said, should have the mill when he was gone, due provision being made for Mary. What could be fairer or kinder than this? As for Jack's repugnance to account-books and his abhorrence of the sight of sacks of flour, that was merely boyish ignorance."

"The miller," added Frank, severely, all unconscious that there was someone else in the room whom the cap might fit, "was one of those people who, as they say, put their foot down, never doubting that, since they have taken the action, it must be put down in the right place. He put his foot down on the declaration that Jack should keep the accounts, collect the money, and have a settlement with his uncle every Saturday night. Jack yielded perforce, though it was evident he would take the first opportunity of breaking the hateful bonds.

"In the meantime he kept the accounts very badly, and the peace of Saturday evening was often broken by discussion between his uncle and himself, in which two hot tempers came into collision. I suppose Jack had been having a row with his uncle when he met me one Saturday afternoon strolling home with my sketch-book under my arm. He fiercely opened on me with inquiry as to what I wanted making love to his sister. The inquiry, as indicating discovery of what I thought was a secret locked in my own breast, staggered me to such an extent that I only half heard the hot-blooded youth rattling on with wild remarks, and I was presently stupefied by receiving a blow in the face well planted between my eyes. This was Jack's peroration, his emphasis to a declaration that as long as he lived he would have no London gentlemen prowling around his sister. Jack was a tall, well-made youth, though slight in build, and no more a match for me than—than—if I may say so without disrespect,—you are at the present moment. We were not far from the cottage at the end of the field by the mill-stream, which, having done its work, here runs on in the full majesty of its broad channel full four feet deep. The lad's remarks about my intentions towards his sister did not hurt me, being childish and of course absolutely without foundation. But I could not quite stand the blow; so while the young champion was raging round, I took him by the heels and the collar, and dropped him into the stream. I knew he could not drown in that depth, and the cool water might do him good. Turning round after walking on some distance, I saw Jack scrambling out of the stream. I expect he was wild with passion, and he stood there shaking his fist at me and shouting something that I could not hear. That was the last I saw of him till the following afternoon I helped to carry him, wounded to death, up to the little bed on which an hour or two later he breathed his last."

"Hadn't he been seen from the time you parted with him till this happened?"

"Oh, yes, he went home, and when Mary, alarmed at his appearance, asked him what was the matter, he said he had fallen into the mill stream. But he must have told his uncle about our encounter, for it was through him the news of it reached the sapient police. On the following morning after this little affair, Jack got up and, dressed in his Sunday best, as usual, went over to the mill to square up some accounts. His uncle came down and breakfasted by himself at half past 9. At quarter past 10 he left the room and went over

to the mill, returning to the house about a quarter of an hour later. I can remember those particulars, as they were of course set forward with great detail at the inquest. Mary, wondering where Jack could be so long, asked her uncle, had he seen him? He said "No," asked Mary for his black coat and waistcoat, put them on in place of those he was wearing, and went to church. When he came from church Mary, increasing in marvel, asked him again if he had seen Jack, and again he said "No."

They dined about 1 o'clock, and an hour later the old man, now himself getting a little anxious at the prolonged absence of his nephew, went out and called on a neighbor to help him to search for Jack. The two men went down to the mill pond, and after a brief search concluded that Jack was not there and separated, the miller returning to the house. Later in the afternoon the miller went to the mill to get a feed for the horse. Seeing blood on the mill floor and on the scoop, he concluded that the worst had happened, and once more calling in a neighbor, being himself too nervous to search, the men found poor old Jack at the bottom of the steps leading from the mill floor. He was lying partly on his face, his right arm doubled over his head. Near him was a stout stick covered at the top with blood. He was disfigured with wounds on the head, and, though still breathing, was evidently on the point of death. They carried him to the house. We carried him up stairs, where he presently died, without even a momentary return to sensibility.

"The police being summoned, commenced in due form a search for 'a clew.' On the middle floor of the mill, where it was evident the murderous attack had commenced, the account book which Jack had entered the mill to balance was found lying open. Up to the forty-third entry made in the new year, all were in Jack's handwriting. Two later entries had been made in the handwriting of the miller himself. On the page headed "February 20, 1870," were spots of blood in two places smeared over, apparently in an attempt to wipe them off. There were spots of blood on several of the pages, but they were smeared only on this particular page. Twelve or thirteen leaves were indented, as if they had been struck with some heavy pointed instrument. On the lower floor, nearer the place where Jack was found, the police picked up a mill-punch covered with blood. From the general appearance of the place all the witnesses examined at the inquest arrived at the conclusion that Jack had been on the middle floor engaged in making up his accounts when the attack had commenced, and that he had struggled with his assailant, who, overpowering him, had thrown him through the opening in the floor into the room below. There was some talk in the neighborhood about these entries made in continuation of Jack's work, evidently done at some time subsequent to the moment at which he had been engaged with the books when broken in upon by his murderer. But the miller was able to explain the matter. "Sometimes," he said in reply to the coroner, "the deceased neglected to make entries in his account book when he was in the habit of receiving money from me. He neglected to make two on Saturday, and I made them yesterday,"—that is to say, on the day following that of the murder of his nephew, when the blood on the leaves could scarcely be dry. But of course, painful as these circumstances are in a family, business must be attended to.

"It was after the first adjournment of the inquest that the police pounced upon me. Hargraves had, in a natural attempt to call to mind all circumstances in the recent history of his nephew, mentioned our quarrel of Saturday. To the mind of a country policeman the whole dark landscape was forthwith illumined. We had quarrelled; he had struck me and I—what had I done? Why, taken him up as easily as a child might be lifted, and had dropped him into the mill-stream. What could be clearer than that I had repeated this gymnastic performance in the mill, had taken him up and dropped him down the passage on to the lower floor? Accordingly, when I arrived post-haste at Ellendale, on reading the account of the murder in the newspapers, I found myself in the arms of old Bodkins, a good-natured, pudding-headed policeman, with whom I had smoked many a pipe in quiet country lanes. He almost blubbered as he put the handcuffs on me, and was, I own, unfeignedly sorry. But, as he said, duty must be done, and the magistrate—on the whole, a deuser personage than Bodkins himself—had signed a warrant for my arrest.

"I was taken off to Battleborough through

a gaping crowd, who, forgetful of the interchange of many courtesies, were unanimously of the opinion that I was guilty. In fact, it turned out—what had never before been suspected—that my intermittent residence in the village, and my lonely wanderings with a sketch-book in my hand, had resulted in a deeply-seated and unanimous feeling that I was after no good; and that I should be arrested on a charge of murder seemed to these good people quite a natural conclusion.

"I was brought up before the magistrates the next morning, when I made the sketch of which I told you. I was remanded for three days, which sufficed to bring to the knowledge of the police a circumstance which they might perhaps have learned earlier, if they had not shut their eyes, lowered their heads, and run at me bull-fashion. On the Saturday night, being myself a little upset with my quarrel with Jack, and desiring a few quiet moments to think the matter over, I had walked over to Battleborough, had slept at the Falstaff, had had my shaving-water brought up at 9 o'clock, had breakfasted at 10, had gone over to the old church for the 11 o'clock service, which I had diligently sat throughout—though, if my deliverance had depended on my ability to say what the sermon was about, I should infallibly have been hanged. All this was as plain as day, and there remained nothing but for the police to release me with many apologies from the gentlemen on the bench, and amid much rapturous blubbing on the part of Bodkins, who wanted to shake hands with me all across the market-place. But I had had enough of the police and Battleborough, and even of Ellendale, which I saw no more till the morning I met you.

"I cannot say that I was incensed against the old man for the trouble to which he had put me. It was natural enough that in his anxiety to clear up the whole matter, he should mention what Jack had told him about our fight, which, moreover, did not appear altogether without bearing upon what followed. What I was maddened at was the fact that this unfortunate setting of the police upon the wrong track lured them away from other pathways on which the scent of blood lay, and which might, perhaps, have led them to poor Jack's murderer. As it was, nothing was discovered then, or has been since. The murder has added another to those mysteries which crowd the pages of our criminal records, and Jack's young life is unavenged. I am not a vindictive man, I trust; but I own I should like to place my hand on the shoulder of the murderer, with the old stern cry of the prophet: "Thou art the man!"

Frank's pipe had gone out, and he sat with his chin sunk on his chest staring into the fire, after a manner with which Josiah had of late grown familiar. But he had not before seen this resolute look on his face, in which there was something of anguish, as if he were struggling between a hateful task and a call to duty.

"Look what he has done," he added after a pause, using the personal pronoun, that seemed to Josiah as if he had in his mind some particular person. "The blow, foully dealt, that killed the poor lad, also destroyed the happiness of two lives. I was certain from what Jack said to me that he had observed in Mary what confirmed my hopes, and that part of his anger with me was borne of the conviction that I was trifling with affections already gained. I could not marry Mary with this horrible mystery hanging over the house; and as I could not live near her and not speak, I went away. What may seem to be the wreck of my own career is of no great matter. That is a fracture not too late to mend. But, whatever may happen, the other dream has gone forever. I felt irresistibly drawn back here just now, for to-morrow it is ten years since this thing was done. I want to look about me a bit, meaning to take this matter up, and see it through, at whatever cost. That's what I am here for, Josiah, and now you know all about it, including the mystery of muddy boots and mysterious walks."

"Yes," said Josiah, "but it does not explain why I am here."

"I daresay you wish you were not. But the fact is that I felt I must talk of this matter to someone, and Heaven seemed to have sent you at this particular crisis. You can listen and not talk, and moreover, I may want a witness. Now good night; go to bed and don't dream."

IV.

The next morning was Sunday; a day such as that the memory of which Herbert has made memorable:

So fair, so bright,
The bridal of the earth and sky.

Apparently the threatened snow-storm had blown over and the sun shone through a blue and cloudless sky. Like everyone else in Ellendale, the miller's household went to church on Sunday morning. Frank and Mary walked on to church together, Josiah following after, keeping pace with the feebler steps of the miller. If Josiah had not known what sad anniversary had come about, he would not have failed to surmise that some uncommon influence was at work. The miller had taken to his shoulders an added stoop. The ever present sadness on his face was deepened.

Josiah's gentle nature was greatly drawn toward him, and brief as had been their acquaintance he sat and talked with him for hours, conveying to the miller much amazing information relative to traces of deserted towns and hamlets at low levels. The old man talked to Josiah with equal readiness. He conversed with him much more than with his older friend Frank whose conversational powers were in truth of a varied and spasmodic nature.

As has been seen, Frank indulged in long monologues in Josiah's company, at times when more properly he should have been in bed. At other times he would sit and smoke and look unutterable things straight into the fire. On this particular day he was at his gloomiest, and saw more in the fire than met the eye of Josiah or anyone else in the room. Only with Mary was he unvarying in his manner. He had probably set for himself the model of a brother in company with a favorite sister. But there were some lapses from the type not too slight for the simple mind of Josiah to detect. Whether Mary saw or felt them, who could tell?—since she herself betrayed no indication. Frank was an old friend, always welcome in happier times. He had gone away at a period of trouble, some portion of which was accidentally brought home to him. For ten years nothing had been heard of him. Not a line had reached her directly or indirectly. She had come to regard him as dead, when without note or preparation he one day walked into the cottage, placed his hat on his accustomed peg, and the room was once more filled with the resonant sound of a familiar voice that had once been part of her daily life.

Mary was greatly fluttered, as any maiden might be in similar circumstances, but Frank's eccentric nonchalance communicated itself to her. If he took matters so coolly why should she be in a flutter? Accordingly after the first few moments' agitation, natural in the face of this apparition from the supposed dead, Mary was slicing cold ham for Frank's luncheon with as perfect equanimity, and more than as much grace, as was displayed by Charlotte when Werther first saw her cutting bread and butter.

The miller was not able to take matters so quietly. Frank's coming was more than that of an old friend long lost to sight of eye or touch of hand. He brought with him the memory of terrible days that had seemed to be fast folded in the grave.

The dead boy was daily with them at meat though he filled no chair and claimed no part in the conversation. The influence of his presence was seen in the miller's ever-deepening grief, which seemed, as it increasingly possessed him, to absorb all the grosser parts of his nature, leaving him as simple as a child and as gentle as a woman. In Frank the chilling influence of the nameless guest was displayed in his fits of taciturnity and his increased consumption of tobacco.

Only Mary seemed unconscious of the proximity. She had loved her brother and passionately mourned his untimely death. But there was perhaps another sorrow bound up with it which, unconsciously mingled, had taken the elasticity out of her steps, much of the laughter out of her eyes, and had made her a woman before her time. Josiah noticed that whenever Frank spoke to the miller's niece his face beamed with a sudden flush of delight.

V.

Mary prattled all the way to church with Frank, and Frank talked to her with as light a heart as if he had never made that sketch on the bare wall of a room at Battleborough which at other times seemed burned into his memory.

"How wise these young people think themselves as compared with us!" Josiah reflected. "A little common sense and courage would put all right. She loves him and he loves her. But he goes prowling round in the early morning and sitting up late at night, creating

nightmares for himself and brooding over mysteries, till he will have his brain addled and his blood soured. She doesn't know what to make of it, but is proud and modest, and perhaps keeps Frank off when at times he might find himself enjoying a lucid interval. I will sit up with him one night more and talk to him plainly."

With which resolution Josiah fixed his spectacles so as to get the range of the pulpit, and having put on an appearance of profound attention, which gradually drew the rector unconsciously to address himself to him personally as being the most attentive member of the congregation, he closed his eyes and recaptured twenty minutes' sleep filched from him over-night by Frank's unwholesome habits.

It was a slumberous morning, closed in by a peaceful evening. With the fall of darkness came the snow, long threatening. Ellendale drew up its chair round the fire and enjoyed the absolute peace of the Sabbath evening. Nowhere was it more peaceable than at the mill cottage. When supper was over, Mary brought the great Bible in which the names of innumerable Hargraves were entered, and the old man read with clear voice the hundred and second Psalm. "My days are consumed like smoke, and my bones are burned as an hearth. My heart is smitten, and withered like grass; so that I forget to eat my bread.....My days are like a shadow that declineth; and I am withered like grass. But thou, O Lord, shalt endure forever; and Thy remembrance unto all generations."

He was evidently back once more with his troubles, and they seemed all the greater to him by reason of the surcease but just enjoyed.

"Frank," said Josiah, as the two sat before the fire for what Frank modestly called his last pipe, "don't you think you are a great fool?"

This was strong language from the lips of Josiah. But it was used with a purpose. He had made up his mind to put an end to the misunderstanding that he imagined existed between his old friend and the miller's niece, and, as is the manner with mild men when facing a mighty resolve, he was inclined to err on the side of strong language.

Frank looked up and regarded the speaker with lazy curiosity.

"What for? Because I cannot go to bed early after the manner of a learned and automatic thing like you? or because, when I smoke a pipe, I like to have one that will hold more than a pinch of tobacco? There is a little monotony in your criticism of my habits, which generally alternates between these two points. Which is it to-night?"

"Neither; I was thinking of Mary. I don't of course know much of such matters; but if ordinary eyesight serves me, I should say that she is as much in love with you as you are with her, and I suppose you know how much that is."

Josiah spoke in a tone of assumed confidence, though all the while he was horribly frightened, and nervously kept his eyes fixed on Frank's face, not quite sure what a man like him might do in circumstances like these. Finding that he listened with a certain wistful look on his face, Josiah proceeded more briskly.

"Now, if I were you, Frank, and knew my own mind, I should take an opportunity tomorrow of bringing this matter to a head. I suppose you are certain of the uncle's consent. In such case, the next thing—"

"Josiah," said Frank, quickly looking up, and speaking in a hard voice that contrasted with his former gentle tone, "oblige me by not again referring to this subject. What you talk of can never be. I have told you my secret, but in other quarters I have, I think, safely guarded it. That's my only excuse to myself for coming here again. I came on another errand than love. It may be accomplished or it may not. In either case, I cannot hope for any conclusion that would make it possible for me to speak to Mary the words that linger on my lips whenever—as seldom happens, if I can help it—I am alone with her."

Hereupon Josiah collapsed much after the miserable and woe-begone fashion of a hat that has been sat upon. He had nerved himself with great effort for the task he had undertaken. He had started well, and had been much pleased with the easy flow of his own speech, and with its apparent effect upon Frank. Now he was cast down and in a generally limp and unhappy condition. All this was nothing to him, and what had he done that he should be drawn into the toils of this crime and mystery, and breaking up of young hearts? He was something more than half in

love with the miller's niece himself, and if the tangled skein could have been unravelled by placing at her feet such portions of the manuscript of "Underground England," as were complete, he was at the moment just in that desperate frame of mind that would have led him to take the act.

He got out of the parlor and stole along the lobby feeling for the head of the banisters, which were fixed midway between the parlor and the kitchen. The kitchen door was more than half open, and a shaft of light projected itself into the hall. Josiah's blood froze, and if his hair did not stand upright, he had a curious sensation about its roots that favored the delusion.

When he mastered the situation there was nothing particularly dreadful about it. The miller was in the kitchen—a circumstance which, seeing that he was master of the house, was not particularly remarkable. He was sitting on a chair pulling on a pair of big boots; also a matter-of-fact procedure not to be challenged by a guest. Nevertheless, it was odd that a man of regular habits, who, according to custom, went to bed at 10 o'clock and might not be expected to rise till 6, should be discovered in the kitchen in the dead of the night, putting on a pair of boots by the light of a bull's-eye lantern.

The look of the old man's face did not tend to reassure the looker-on in the lobby. Josiah saw, with a fresh icy current running through his spine, that the old man's face was purple with suppressed passion, over which sometimes flitted a look of horror. He was talking to himself—at least, his lips moved, though no articulate sound escaped him. He seemed to be expostulating with someone, violently shaking his head, and sometimes pausing in the operation of pulling on his boots to shake his fist. When he had, with much stamping and thrusting, got on his boots, he put on a great overcoat, wound a muffler round his throat, pulled on a thick woolen cap, took up his blackthorn stick lying in a corner of the kitchen, and with the lantern in the other hand, made for the door leading out at the back in the direction of the mill.

VI.

"Frank! Frank!"

Josiah was shaking up the burly figure seated at the fire, with astonishing frenzy. But Frank had at last actually fallen asleep, and took a great deal of rousing.

"There is something the matter with the miller, Frank. I saw him go out just now at the back door, and I don't think he is in a condition to be trusted by himself."

Frank was wide awake now.

"Is it snowing?" he said.

"Yes, I think so. I saw the door open for a moment, and by the light of the lantern I just caught a glimpse of falling flakes."

"Get on your things as quick as you can and come along with me—quietly, though—and don't disturb the household or let Mary know anything of this."

They were dressed and down in less than five minutes, and, standing at the open door by which the miller had just passed out, looked out on the night. They could not see far, though there was all about the luminous glare that comes from untrodden snow. Frank strode straight on over the pathless snow and through the blinding storm. They had not got thirty paces from the house, before, like everything else, it disappeared from view. The wind was blowing the snow direct in their teeth. They saw the mill presently, having kept on a bee-line for it. The key was in the door on the outside, and it remained for them only to lift the latch and walk in. The door opened on to a room in which the sacks of corn were heaped. Through the centre of the floor chains passed, connected with a winch, for the purpose of raising and lowering sacks of flour. The lower room was in total darkness, but through the aperture in the floor above, through which access was gained by steps, they saw the faint glimmer of a light.

"Don't speak," Frank whispered, "follow me closely and quietly."

Creeping gently up the staircase with Josiah exceedingly close at his heels, they heard the miller talking in a loud and angry voice. He seemed to have someone with him, though the other made no audible reply to his bitter reproaches and passionate denunciation. When they reached the level of the floor, and could look in, they saw that the miller was alone. He had taken off the thick overcoat and pushed the woolen cap back over his forehead. He was standing by a plain deal desk, set against the wall, which in the day time was used by the clerk who had

taken the place once filled by Jack. In fact the desk was in exactly the same place where it was on the Sunday morning when Jack sat at it for the last time.

The miller had placed the lantern on the desk with the dark side toward the staircase, leaving all that part of the room in deep shadow. He stood with his left elbow on the desk, his right hand nervously grasping the thick blackthorn Josiah had seen him take up out of the kitchen. The light of the lantern shone full on his face, which was distorted by passion. The account-book lay open on the desk, and the miller was apparently expostulating with someone in reference to its condition. But as far as the shivering Josiah could make out, there was no one in the room, and he watched with growing horror the eyes of the miller, blazing with passion, apparently fixed upon someone whom he saw sitting on the stool.

"A good-for-nothing lazy lad!" the miller was shouting at the top of his voice when the two guests from the cottage came within hearing. "This is a pretty return you make me for all I have done! I had no call to take you out of the squalor in which your fine gentleman father left you. If it had been me who was in his shoes and him in mine, I warrant he would have left me and mine to starve. But I take you up, give you a good home grudge you no pocket-money, don't ask you to do too much for it, and look here! Here are three accounts that I can call to mind at the moment which you don't enter in the book, and which, if I had not looked over the list would never have been asked for. I am not going to work this mill for nothing or for good-for-nothings. You will have a week to think of it. Next time a thing like this happens, you leave the place, go your own way, and if ever I catch you writing to Mary, or trying to see her when you have once left the mill, I will bundle her out after you, and you may both go and starve in fine-gentleman fashion."

As the miller said these words his voice rose almost to a scream. There was lying by the open book a mill-punch, which whilst he spoke he had taken up in his left hand, and as he uttered this last threat he smote the iron punch with pointed end downward into the open account book, piercing it at every blow.

"Ha!" he screamed, "you'll strike your uncle! Take that," and with his left hand he struck at the air above the stool, where Josiah instinctively felt the head of the lad would be supposing he were sitting there in the body. Leaping backward as if he himself had been struck in the face, the miller made as if he were closing with an antagonist. With panting breath, but otherwise in grimmest silence, the old man fought with his ghostly adversary, stumbling and struggling about the room till he beat the invisible something against the wall, and then stood back regarding it. Suddenly he made a dash at the chains which passed from floor to floor through the middle of the room, and beat on them fiercely with his stick, from which Josiah gathered with horrid distinctness that the lad, having been beaten down in the corner of the room, had, in a moment of desperation, attempted to run across the room in the direction of the staircase, but had been caught at the chains, which he clung to till beaten off by his uncle.

"I can stand this no longer," said Frank, and without further attempt at concealment he entered the room, with Josiah cleaving to him as a shadow. The miller had neither eyes nor ears for anything save the ghostly sights and sounds which possessed his fancy. Frank and Josiah had scarcely entered the room when he made as if he were dragging a body from the chains into the middle of the room toward the staircase. Here he flung his ghostly burden down, and stood for a moment peering down into the darkness.

Frank came forward, and, taking him by the collar of the coat, pulled him round, and looking sternly into his face, said:

"Miller, thou art the man!"

It was well that the grasp by which he held him was firm, otherwise the old man would have toppled over, and fallen where he had thrown his nephew ten years ago. But Frank held him as in a vice. His face when turned round to the light was still distorted by the passion that possessed him. His eyes were bloodshot, his forehead was set in a deed frown, and his dry lips slowly opened over his firmly set teeth. When his eyes met Frank's and turned with quick inquiry to the figure which stood a little in the background, a remarkable transformation was effected. The strength passion had lent him had faded from his face. His arms fell limp at his side, his knees bent under

him, and he fell a nerveless heap at Frank's feet.

"Get up and come away from this," Frank said. But the miller made no sign either of speech or motion.

"I expect he has fainted; bring me the light."

Josiah brought the lantern which, turned on the face of the old man, left no doubt of what had happened. The stroke, long pending, had fallen, and the miller lay dumb and helpless on the spot whence he had rolled over the still living body of his nephew.

"We must get him home somehow," said Frank, no longer gruff in voice and stern in manner. "It will be a great shock to Mary, but it will, for the present at least, serve to explain everything, and we can think over what must follow."

They carried the lifeless figure of the miller home through the blinding snow, and for the second time within the history of the little household a poor wreck of humanity, speechless and motionless, was carried up the narrow staircase and laid on a bed, from which it was only once more to be lifted out.

VII.

All the village went to the funeral, for the miller was always popular, being esteemed and feared in the earlier days, when a naturally ungovernable temper occasionally got the better of him, and loved and respected in later years, when in the shadow of his great sorrow he had fought against human infirmity, and gloriously overcome it. Mary would not leave the house whilst the dead body lay in it, or even after, when everyone said she ought to go for change.

The miller had left her the whole of his property, and it seemed to her that she would be best respecting his wishes by remaining where she was, and as far as possible allowing things to go on as before. Frank and Josiah spent their last night in the cottage on the eve of the funeral. Frank reproduced his pipe, and fell into his old habit of sitting contemplative before the fire.

"You will be off in the morning, old man," he said, after one of his eloquent pauses, and I am afraid you will not regard your holiday down here as either lively or refreshing. There is one word I want to say to you, though. I daresay your good sense would have forestalled it. Let the secret go into the grave where these two will lie together. That was a point which I confess gave me a good deal of trouble. It was of course natural that the miller should be buried in his own grave, though the notion that he was thus to find quiet companionship with his nephew was at first very revolting to me. But I see more clearly now the measure of his guilt. I doubt even whether, if all the circumstances had been placed before a jury as clearly as they were brought under our eyes, they would have called the crime murder, and would not gladly have availed themselves of the opportunity of bringing in a verdict of manslaughter. I think it is clear that Jack, whom I have good reason to know shared his uncle's violent temper, struck him first and the blows that followed were dealt in a fury of passion, free at least from the guilt of premeditated murder. Since then he has lived ten years, which I believe has been one long unceasing pang of remorse. Day and night he has fought against the domination of that temper which led him into crime. I expect that on Sunday he had been brooding over the anniversary, and his brain, temporarily at least, giving way, the failure had been accompanied by a paroxysm of passion in which he once more went through the fearful scene. Jack's death is almost forgotten. The miller's hand in it is unsuspected. No innocent person has suffered by his escape, and since no good, but only infinite pain, would come of the discovery, let us bury our knowledge of it in the grave where we shall lay the old man in the morning."

"And what about Mary?"

"I am going away in the morning as soon as the funeral is over," said Frank abruptly, and Josiah recognized in the tone a bar to further conversation.

Frank went away as he said, but there is reason to believe that at some subsequent time he must have returned. At any rate it would not be reasonable to suppose, from all we know of her character, that the miller's niece would have followed him to London. What is certain is that Josiah is a constant visitor at a house of red-brick frontage and Elizabethan design, built not a mile and a half from Hampstead Heath. Here lives the miller's niece, now known as Mrs. Frank Fisher, the happy wife of the distinguished artist whose picture, "Sunset at the Mill,"

will be remembered as the great attraction at the Academy last year.

They must have been married some time too, for Josiah has twice had an opportunity of severally renouncing the devil and all his works on behalf of two small atoms of humanity set forth in lace frills. They were both boys and the first was of course christened Frank. With respect to the second, Mary, thinking kindly of many years' kindness in far-off times, would have had the lad named Alfred.

"Dear uncle would have been so fond of him if he had been alive to know him," she said, with softly glistening eyes.

But somehow or other Frank objected to this name, protesting that, for unaccountable reasons, he had never been able to bear it. He suggested Josiah, a proposal against which Mrs. Frank Fisher at first turned up her pretty nose. But she relented when Frank told her, even with unnecessary enlargement, how Josiah had pleaded her cause in times past. "He was a perfect nuisance with his 'What about Mary?' 'What will Mary think of this?' and 'Won't you go down on your knees and implore her to marry?'"

So they called the babe Josiah.—*Belgravia.*

Josh Billings' Philosophy.

If you will sit down and wait yung man, at least one half of the good things of life will at some time eddy around near you, while the more you chase them the more they will break into a run.

All of nature's works are a part of a perfect shun of a plan. She makes no mistakes, creates no vacancies, and guesses at nothing.

Ideas are what wins, but if a man hain't got but one, he is very apt to run that one into the ground, and take himself along with it.

Laffer proves nothing. Wise men laff, and ideats grin all the time.

Cunning iz a weak imitashun of wisdom, and iz liable at enny time to merge into fraud.

Happiness haz no abiding place, but often is very near at hand, like the old woman's spektakles. After hunting for them hi and lo, she found them at last safe on her noze.

Gravity iz becoming to a phool at all times, but only to a wise man on state ockashuns.

Very menny seek knowledge, not so much for the truth as for the spekulashun thare iz in it.

Heroizm iz simple, and yet it iz rare. Every one who does the best they ken is a hero.

Buty is a dangerous gift. The vanity it inspires, and the base flattery it attracts its possessors, are not to be envied.

Charity makes no mistakes that she can be charged with.

Good breeding iz the only thing that kan make a fool enduring.

Servitude iz so unnatural that an honest servant iz the rarest of all things.

There iz great art in knowing how to give without creating an obligation.

As selfish and ill-bred as the mass of mankind are, I prefer to live with them rather than go into solitude and try to live with myself.

Gratitude is a word that you will find in the dictionary, but you will not find much of it anywhere else.

If a man haz got the right kind of religion he can pick up a creed ennywhere that will fit it.

A true friend iz one whom you kan chide for his faults, without giving offense, and who, without giving offense, kan chide you.

Nature haz never made ennything perfekt, and she luvs variety so well that she never has made enny two things just alike.

Indolence iz a quiet malady, but it haz eat up more foundashuns and tipt over more superstruktures than wild ambishun ever has.

Abstinence should be the excepshun and temperance the rule.

Glasgow Flour and Grain Trade.

Dunlop Bros., of Glasgow, importers of and dealers in flour and grain send us their trade circular bearing date Dec. 31, 1881, from which we make the following extract which American millers will read with interest:

It will be found on comparing Prices, that, despite the very indifferent harvest again reaped in England, and the undoubted shortness of the American crop of 1881, the ordinary runs of wheat are only about 2s 3d. per 240 lbs., and flour 3s. to 4s. per 280 lbs. higher than they were this time last year; the upper grades of Hungarian flour and Minnesota Patents being indeed a trifle lower. Bread, it may be mentioned, sells to-day at 7d. to 8½d. per 4 lbs., according to quality, as against 6d. to 8d. last year. American Hard Spring Wheat, it will be seen, keeps dearer

than White or Red Winter, doubtless on account of its comparative scarcity and the favor shown to it by those City Millers who have adopted the Roller System. Indian Corn is 1s. and 3d. per 280 lbs. dearer; Pease unchanged; Scotch Beans and Barley are 1s. and 2s. 6d. respectively lower than the previous year. The other articles of the Trade show little variation.

Regarding the year's imports—while wheat is fully 40,000 qrs. less, flour is 207,000 sacks of 280 lbs, Indian Corn 27,000 qrs., and Barley 25,000 qrs. more than in 1880. Oats, Oatmeal, Beans, and Pease show a considerable falling off. As to the sources of this year's wheat supply, America and Canada together contribute fully 94 per cent., the balance being made up by Russian, Australian, and native sorts. Indian Wheat, although very largely imported by the leading English markets, has not attracted our buyers here, on account of its indifferent strength and flavor. Flour this year shows an import equal to no less than 1,393,295 sacks of 280 lbs., or an average weekly supply of 26,800 sacks. America and Canada, as before, supplied about 76 per cent. of this, while Hungary Austria, Russia, Germany, California, &c., furnished the balance. A closer study of these returns would show that this market continues to attract supplies of the very highest quality of flour manufactured at the chief centres of production at home and abroad.

As to Exports, it will be found that they largely exceed those of the past year in Wheat, Flour, and Indian Corn; and that, while making due allowance for "through traffic," they indicate that the North of Ireland and the South and West Coasts of Scotland continue to draw from the Glasgow Market liberal supplies of the leading articles of the trade.

With regard to present Stocks, with the exception of Flour, which is unusually heavy, all the other articles are moderate. The relation which they bear to last year's stock is as follows:—Wheat is about 17,000 qrs., Flour nearly 101,000 sacks per 280 lbs., Indian Corn about 45,000 qrs., and Pease 7,000 qrs. more; while Beans are 2,000 qrs., Oats 9,000 qrs., and Oatmeal 16,000 loads less than they were then.

It remains to be said that receipts have fallen off within the past week or two; that contrary to experience the demand has revived during the holiday season; and that we enter upon the new year with prices having a decidedly upward tendency.

Reported Fusion of the Buda Pesth Mills.

One of the Vienna journals professes to be informed that the Bontoux group of operators has the plan of forming a union of all the Buda Pesth mills into one great Hungarian milling establishment. As regards this transaction it is said that the negotiations are already far advanced, and those mills which are in the possession of the Hungarian Credit Bank would, as it were, form the groundwork of the undertaking. The Hungarian Land Bank is said to have made so favorable an offer for these mills in the name of the Bontoux group that probably no long delay will take place in the transaction. We, however, give this communication under all reserve, as the fusion of the Buda Pesth mills appears to us very improbable. Even after the purchase of the mills of the Hungarian Credit Bank by the Land Bank, such a complete union seems to be still far afield.—*Oesterreich Ungarische Mueller Zeitung.*

Items of Interest.

PATENTS IN TURKEY.—General patent laws have been lately passed and promulgated in Turkey and Liberia. The Turkish patent law is substantially a copy of the French and German systems. Any person may take a patent on deposit of drawings and specifications. Longest term of patent, fifteen years; annual tax, \$18. The invention must be worked within two years from the date of patent. The penalties for infringement and the proceedings are the same as in all European countries. In Liberia the patentee must be the inventor, or must have lawfully acquired the invention from the inventor. Drawings and specifications must be furnished. The government fee is \$50. The invention must be worked within three years after the grant of the patent.

PAPER BELTING.—At the exhibition now being held in Japan, an interesting feature is the successful use, in the machinery hall, of paper belting. The Japanese have long been celebrated for their manufacture of some exceedingly tough descriptions of paper, and it is stated that the paper belting has been tested and found much stronger than ordinary leather. Now that machinery is rapidly making its way into Japan, the manufacture of this paper belting is of special interest to the country, as from want of proper tanning, good leather is not made by the Japanese.

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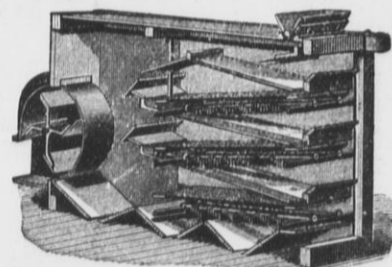
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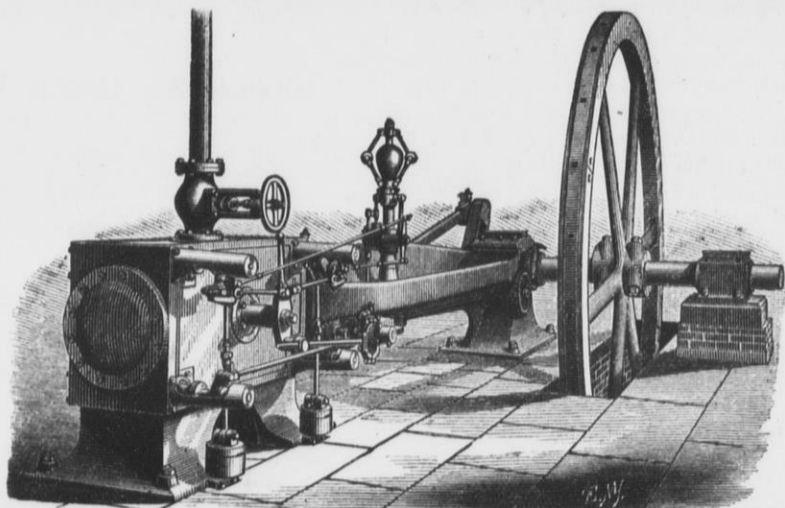
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Engines and Boilers,

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Calls your attention to the following REASONS WHY, if about to make a Journey to the GREAT WEST, you should travel over it:

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DENVER, COLORADO SPRINGS AND PUEBLO,

At reduced rates, good returning, until October 31st. Also to San Francisco, for parties of ten or more, good for ninety days, at great reduction from regular fares.

REMEMBER, this is the most direct route for all points WEST and SOUTHWEST. For further information, time-tables, maps or folders, call upon or address

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ROLLS! ROLLS! ROLLS!

For the Entire Reduction of Wheat to Flour

GRADUAL REDUCTION HAS COME TO STAY.

C. F. MILLER, of Mansfield, Ohio, representing John T. Noye & Sons, is prepared to furnish Roller Mills complete of any desired capacity.

The Stevens System of Gradual Reduction a Success Everywhere

Plans furnished when desired. Correspondence Solicited.

C. F. MILLER, Mansfield, Ohio.

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We continue to act as Solicitors for Patents, Caveats, Trade Marks, Copyrights, etc., for the United States, Canada, Cuba, England, France, Germany, etc. We have had thirty-five years' experience.

Patents obtained through us are noticed in the SCIENTIFIC AMERICAN. This large and splendid illustrated weekly paper, \$3.20 a year, shows the Progress of Science, is very interesting, and has an enormous circulation. Address MUNN & CO., Patent Solicitors, Publishers of SCIENTIFIC AMERICAN, 37 Park Row, New York. Hand book about Patents sent free.

Over 1,500 of these Turbines IN USE.



It has tight shutting and easily operated Gate; gives more power for the water used, and will last longer than any other Turbine. Large shop with improved tools for making this wheel and machinery. Illustrated Pamphlet and Catalogue with prices sent free by

BURNHAM BROS.

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ELECTRIC PURIFIER COMPANY,

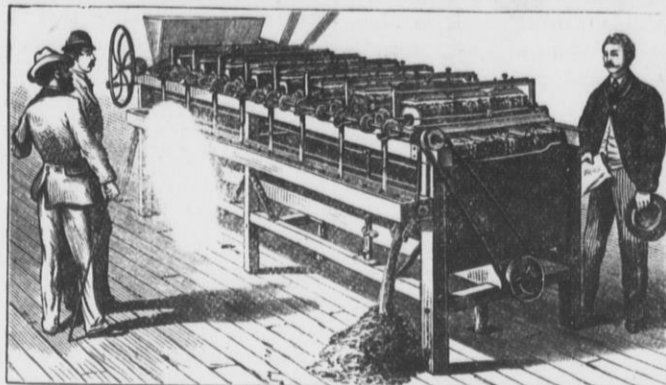
New Haven, Conn.

Factory, New Haven,

New York Office, 17 Moore Street.

This Company was Organized at New Haven on the first of March, 1881, with a Capital of \$300,000.

Electric Middlings Purifiers.



HAVING PURCHASED THE SMITH-OSBORNE PATENTS GRANTED BY THE

United States, Great Britain, France, Belgium, Austria and Canada.

The first Machine manufactured was put up soon after the United States patent was granted, in February, 1880, in the ATLANTIC MILLS, BROOKLYN, and has been in almost constant practical use since, demonstrating beyond a question that it possesses the following advantages:

- It Purifies Middlings Absolutely without Waste.
- It Purifies Middlings with Greatly Reduced Power.
- It Purifies Middlings with Greatly Reduced Space.
- It Purifies Middlings with Greatly Increased Rapidity.
- It Purifies Middlings from Spring and Winter Wheat Equally Well.
- It Purifies Middlings with the Best Results.
- It Dispenses with the Use of Air Blasts.
- It Dispenses with the Use of all Dust Houses.
- It Dispenses with the Use of all Dust Collectors.
- It Dispenses with the Dangers of Explosion and Fire.
- IT PURIFIES DUST HOUSE MATERIAL OF ALL KINDS.
- IT PURIFIES THE FINEST MIDDINGS OF ALL KINDS.
- It is Remarkably Adapted to Custom MILLS.
- It is Excellently Adapted to Manufacture Farina.

WHERE THE ELECTRIC PURIFIERS MAY BE SEEN IN OPERATION:

Atlantic Mills, Brooklyn, N. Y.; Archibald Schurmeier & Smith, St. Paul, Minn.; F. L. Johnston & Co., St. Louis, Mo.; Washburn, Crosby & Co., Minneapolis, Minn.; Norton & Co., Chicago, Ill.; Sanderson & Co., Milwaukee, Wis.; M. C. Dow & Co., Cleveland, Ohio; James K. Hurin, Cincinnati, Ohio; Mosely & Motley, Rochester, N. Y.; Chas. Tiedman, O'Fallon, Ill.; Lyman & Co., Norfolk, Va.; Texas Star Flour Mills, Galveston, Texas; Zenith Milling Co., Kansas City, Mo.; C. Hoffman & Son, Enterprise, Kansas; Richter & Co., Williamstown, W. Va.; Kinney & Hobart, Burron, Kansas; Parkville Milling Co., Parkville, Mo.; Norton & Co., Lockport, Ill.; Ballard, Isom & Co., Albany, Oregon; Niederhammer & Walton, Buena Vista, Ind.; Kimberly & Clark Co., Appleton, Wis.; Cyrus Hoffer, Lewisburg, Pa.; Roberts & Briggs, Seneca Falls, N. Y.; Phillips & Thomas, Kennedy, N. Y.; Hillsdale City Mills, Hillsdale, Mich.; Susong, Logan & Co., Bridgeport, Tenn.

SOMETHING NEW.

A Combination Electric Purifier—A Complete System of Three Purifiers in One.

Samples of work will be sent upon application, by mail, and all inquiries answered from the New York Office. Parties contemplating building new mills, or reconstructing old ones, should see the superior working of the ELECTRIC SYSTEM before making contracts for Purifiers elsewhere.

JOHN RICE,

General Manager.

No. 17 Moore St., NEW YORK.

GUNN, CROSS & CO., Minneapolis, Minn.,

Manufacturers and Agents for the Northwest.

GEO. G. SMITH, San Francisco, Cal.,

Manufacturer and Agent for the Pacific Slope.

JAMES E. LOOMIS, St. Louis, Mo.,

General Western Agent.

[Mention this paper when you write to us.]

RICHMOND MANUFACTURING CO.,

LOCKPORT, N. Y.,

Manufacturers of

RICHMOND'S CELEBRATED

Smut Machines,

Brush Machines,

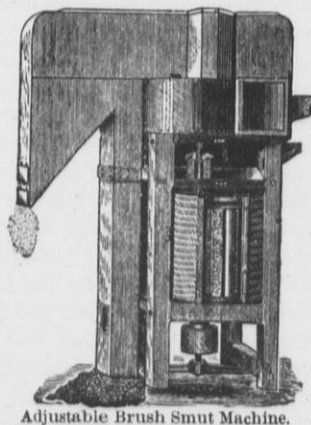
Grain Separators,

and Bran Dusters.

Nearly Two Hundred of these Machines are now in operation in the city of Minneapolis, Minn., alone, and more than sixty in the city of Milwaukee, Wis. They are also extensively used in many other sections, both on Winter and Spring Wheat.

SEND FOR DESCRIPTIVE CATALOGUE.

[Mention this paper when you write.]



Adjustable Brush Smut Machine.

HARRIS-CORLISS ENGINE.

—BUILT BY—

WM. A. HARRIS, Providence, R. I.

Built under their original patents until their expiration. Improvements since added: "STOP MOTION ON REGULATOR," prevents engine from running away; "SELF-PACKING VALVE STEMS" (two patents), dispenses with four stuffing boxes; "RECESSED VALVE SEATS" prevent the wearing of shoulders on seats, and remedying a troublesome defect in other Corliss Engines, "BABBITT & HARRIS' PISTON PACKING" (two patents). "DRIP COLLECTING DEVICES" (one patent). Also in "General Construction" and "Superior Workmanship."

The BEST and MOST WORKMANLIKE form of the Corliss Engine now in the market, substantially built, of the best materials, and in both Condensing and Non-Condensing forms.

The Condensing Engine will save from 25 to 35 per cent. of fuel, or add a like amount to the power and consume no more fuel. Small parts are made in quantities and inter-changeable, and kept in stock, for the convenience of repairs and to be placed on new work ordered at short notice.

NO OTHER engine builder has authority to state that he can furnish this engine. The ONLY WORKS where this engine can be obtained are at PROVIDENCE, R. I., no outside parties being licensed.

WM. A. HARRIS, Proprietor.

[Mention this paper when you write us.]

The Fire Hazard of Flour Mills.

A PRIZE ESSAY BY ERNEST C. JOHNSON.

Read before the Northwestern Underwriters' Association
Chicago, Sept. 14.

(Continued from page 23, December number.)

Spontaneous combustion has not yet been charged with its share of flour mill fires; and has not been sufficiently guarded against. An able writer recently stated that 87 per cent. of the flour mill fires in this field, during four years and seven months, occurred at night; and called for scientific scrutiny of such as broke out beyond two hours after closing mill. Investigations of both American and foreign mill fire reports, prove that per cent. to be nearly an average, though probably 90 per cent. would not be excessive, with a majority occurring from 6 to 24 hours after closing the mill. This excessive night burning can be quite largely accounted for in two insufficiently considered and exceedingly ignitious sources.

1. As stated above, from smoldering fire under the pulley in an elevator head. 2. From spontaneous combustion in mill dust, smut, or product, from one of the several causes incidental. 3. Among the known causes of such ignitions is dampness and mill grease in smut, dust, bran, middlings, shipping stuff, and mill sweepings. 4. The liability of grease from mill gearing, unnoticed dust balls formed by oil drops, or dampness, in product of all kind to heat and ignite voluntarily, render mill sweepings and mill dustings exceedingly perilous. 5. These should always be removed from the mill, and never put in feed bins. 6. A four-inch metal tube, run from basement to top of mill, with a covered flat funnel entry to it on each floor, would be a labor-saving device, through which to send sweepings to a metal dust truck in basement, so connected that dust will not escape while using. By this means, sweepings can be disposed off without the usual attending nuisance. 7. Fire had been scented for several days, in a mill at St. Charles; persistent search had been made for heated journals, high and low, but failed to show cause; a mill inspector readily found the fire, size of a foot ball, in the center of a bran heap; the cause, a slight leak in the roof above, admitting occasional, unnoticed, drops of water during rain. 8. A similar consternation and suspense was caused in an Alton mill. When discovered, it was a ball of fire in the middlings bin, caused by a few drops of oil from a shaft above. The smell of fire was apparent in a mill near London, at 5 p. m. Persistent search was made, but it was not found until 8 o'clock p. m. It was small, in the dust house in the mill, but blazed when the door was opened. It could not have come from other than spontaneous combustion. 9. Doubtless all mill products, subjected to similar conditions, will produce the same results. 10. The degree of danger from this source is measured only by contingencies and combinations which may produce these conditions. 11. Prof. Peck states, in his report, that "All sorts of flour dust absorb moisture very rapidly." 12. Experience shows this to be equally true of all flour mill products. 13. A brush machine, at Princeton, Ill., had clogged and was idle; on opening it two hours later, bunches of smut, fist size, on the wire screen, were found to be evenly saturated, nearly wet, with dampness. The venerable miller said he had never seen a similar instance before. It was doubtless produced by cooler air being drawn through the heated machine, and condensed in the dust. This would indicate that to be entirely safe, after running, the dust should not only be taken away from, but out of such machines. 14. The chop left in elevator cups will sometimes absorb a great degree of moisture, probably from air drawing through them in equalizing temperature. The large number of mill fires during the cooler part of the year, when greater difference of temperature promotes condensation, may be partially accounted for from these sources. 15. During the winter season, a miller at Westville, Ind., found a fire in the saw-dust packing around the water heater. He had cased up and packed the heater about with saw-dust, to keep out frost. It was detached from furnace heat, and the water was warmed only by the exhaust steam passing through it. It could not have been ignited from other than spontaneous heat in dampened saw-dust. 16. Prof. Peck states, as a result of his dust explosion tests, that "after several explosions in the above boxes, in rapid succession, the dust became very hot. In this condition particles formed into loose bundles, about the size of a pea, which not only smoldered, but actually blazed enough to set the sides of the box on fire." He does not say whether the

"very hot" condition was spontaneous ignition, or simply sustained combustion; it seems probably that it was from the former, since the continuation of the combustion, from artificial origin, would hardly be noteworthy. 17. Broken window-panes, and other defects of structure, are frequent promoters of these conditions known to have caused spontaneous ignition. 18. Finally, the conditions that produce and promote dampness in mill products, and combinations that arouse latent heat, are numerous; and the established fact that, with other conditions favoring, such as shutting up the day heat in the mill, and reactions of temperature, these products will heat and ignite voluntarily, renders spontaneous combustion a most prolific source of peril in flour mills. This fact, more than any other cause, accounts for the excessive number of long deferred and mysterious mill fires.

The American Miller, which furnishes much valuable information for insurers as well as millers, in commenting on *The Chronicle* loss tables, says: "Fully twenty-five per cent. of the flour mill fires occurring in the United States, in the past five years, are directly traceable to friction of machinery. In nearly fifty per cent. of the fires, the cause is unknown. Some few of these latter may be charged to the account of spontaneous ignition of oily waste, fermenting bran, and such articles; some others, to incendiarism, and others still, to dust fires; but in our estimation, a very large per cent. of these fires, whose causes are not ascertainable, can also be referred to friction."

There is no fire contingency, of commensurate existence, that is so difficult to establish a belief in generally, as that of the prevalence of spontaneous combustion. Incendiarism that are often seen in action are early admitted and provided against; but such as are induced by molecular changes, reactions, and elective affinity, to which the night season is especially conducive, are less believed, and more nearly approximate unknown hazard, than others, because only the results are discovered.

To be warned by the experience and calamities of others, and thereby avert danger, is better than experience itself in such matters. However, in the absence of faith in such contingencies, thanks to inventive genius, there are provided efficient automatic detectors, and ignipotent devices; if millers will adopt these, of approved form and number, insurers can safely afford to excuse their unbelief.

External exposures add fully twenty per cent. more to the fire rate of this class, on account of the quantity and combustibility of dust discharged from mills, than to most any other hazard. These should be carefully noted, on unprotected sides, and rates computed accordingly.

Modern flour mills require a vast amount of ventilation, and the air should be as pure as possible. This fact renders their location centrally in large cities, and in the vicinity of smoke producing factories, very unfavorable. The head miller of a 500 bbl. city mill states that the waste occasioned his mill from this source is at least 30 lbs. per hour, or about four barrels a day, besides affecting the quality of the output more or less.

With this array of contingencies, incident to flour milling, it would seem unnecessary to look to any other source to explain the vast number of mill fires. However, this does not include all of their inherent hazards; though, if perfect, it would recite the predominant causes. There are the incendiaries, mimical and speculative, which help to schedule a higher rate of premium for all mills, since a proper rate is necessarily calculated on the proportion that all losses bear to the aggregate value.

It would seem due to the legitimate milling interest that insurers ascertain the conditions most liable to produce inimical and speculative hazard, and either avoid such entirely, or charge specifically for them, where they exist, rather than tax the whole enterprise with what is not common to it. This is earnestly sought by insurers, and were it definitely ascertainable, both millers and insurers would be equally benefited by it.

The jealous competitor, the revengeful wronged, the vicious ex-lessee, or the discharged employe, often becomes the incendiary inimical. A good watchman protection of the exterior from easy approach and against ready combustion, and a proper amount of insurance, are safeguards against this incendiary.

The disappointed purchaser, the unsuccessful miller, the fated speculator, or the

financially bankrupt owner of a heavily incumbered mill property, might become the incendiary speculative. However, it is not the heavy, but the increasingly heavy incumbrance, that hurts; which, if nothing more, will prevent proper repairs and increase carelessness. Heaven bless the man of energy and pluck, who, having mastered this intricate science, and established local credit, has the nerve and enterprise to realize on his industriously obtained skill, by staking his ability against an interest-accruing loan. Having computed results, such an incumbrance on mill property is not a hazard. Outside speculation, deficient milling experience, a neglected business, or a neglected and depreciating property, attended with incumbrance, are prolific incentives to incendiarism, directly or indirectly.

Grading in Milling.

One of the salient points in new ideas of milling is the prominence which is given to the grading and separate handling of products. Millers are growing more and more to believe that division and separation of products is essential to obtaining the highest results. It is this separate classifying and handling of products that is the distinctive feature of Hungarian milling aside from the gradual reduction of the wheat. Of course there are shades of difference in the classes of middlings so small that they can safely be ignored; but this cannot disprove the general principle that the proper grading of products is one of the essential features of good milling; it is only the carrying the principle too far that it becomes a useless complication instead of a benefit.

By whatever system of gradual reduction the wheat is reduced to middlings, it is safe to say that a grading reel should be used to separate the grains from the small grains, and that the first reduction or cracking of the wheat should be made on these two grades separately. It makes little difference what instrumentality is used, so far as the propriety of the grading is concerned. No machine will crack or break small and large grains alike. If set to break the large grains, the smaller ones will escape either whole or insufficiently broken; while conversely, if the machine is adjusted to break the small grains it cannot help flouring the large grains more than is desirable.

So, too, with the middlings. The importance of dividing the middlings into grades and purifying them separately, cannot but be apparent on reflection. Purifier makers have perceived the desirability of this to some extent and made their machines conform more or less to this idea. But where it is possible the middlings should be graded and purified on separate machines. This is the most satisfactory method to all concerned, as any machine will do better work on a uniform grade of middlings than when the material is of different classes. Just how many grades of middlings it is desirable to make is a question which every miller can best settle for himself. Three or four grades are probably as many as it is desirable to make and handle; for here the field widens and the possibilities of expansion become manifest. So, too, how to handle these middlings after they are purified, is a question which is now engaging the attention of our millers, and here opinion differs. Many millers advocate the gradual reduction of middlings the same as the gradual reduction of wheat, making, however, only three reductions, thus: reducing or breaking down the coarse middlings, making flour, and one or two grades of middlings, say medium and fine, then reducing the medium middlings to flour and very fine middlings, and the latter from all sources, by itself. The possible variations of separation, purification and reduction of the middlings are almost infinite, and every miller will in the end determine just how far this division and separate handling of products can be carried with advantage and convenience to himself. —American Miller.

Grain and Flour Trade Notes.

An indication of the continued falling off in Hungary's export trade in flour is furnished by the recent official account of the exports from Trieste. In November only 6,245 sacks were sent to Great Britain, against 26,190 sacks in November last year; whilst for the Brazils 2,420 brls were exported, against 11,130 brls in November last year.

The following three items are from an esteemed English contemporary, *The Millers' Gazette and Corn Trade Journal*, which has since its change of name (transposition,

rather) shown itself full of enterprise and good taste.

ODESSA is desirous of organizing itself *a la mode Americaine*. A commercial society is, in fact being started there which has for its object the receiving of agricultural products from the interior of South Russia, and the re-selling of the same to the best advantage for the producer. It is in fact a sort of co-operative farmers' society. The directors of the society are to be composed of several large capitalists and representatives nominated by the farmers themselves. The construction of the warehouses and elevators, and all the necessary apparatus, will be according to the latest and most improved American system, in the copying of which Odesa will certainly make one important step in the path of progress.

THE CULTIVATION OF ENGLISH WHEAT IN GERMANY.—The Association of German millers has, in the journal of the Association at Nassau, inserted an article against the culture of English rough wheat. It is alleged that through its extensive cultivation arises a general agricultural loss, as this grain contains much less human nourishment than the local wheat. The flour from the English rough wheat, if used alone, is not fit for baking, but only for starch manufacturing. Millers, who know the wheat, will not buy it even at very low prices, and the Hamburg Produce Exchange decided to exclude it from the 1st of June, 1881, from delivery. Finally the association warns farmers against the cultivation of English wheat, in order to keep up the well-deserved reputation of the home-grown wheat, and to preserve agriculture and the milling industry from an inevitable loss.

NATIONAL ASSOCIATION OF BRITISH AND IRISH MILLERS.—We understand that arrangements are now completed for the meeting of the representative committee appointed by the local branches of the Association, with Mr. Thomas Muir and Dr. King on behalf of the Germ Milling Company, Limited, at the offices of the Association in London, on Thursday week, the 12th inst., and we hope that their report will be ready to present to the council which meets on Monday, the 16th. We are also informed by Mr. Chatterton, the secretary that in all probability the next General Meeting of the Association will be held at the Baker's Hall, Harp Lane, London, on Monday, the 13th February, when Mr. George Pawsey Witt, of the firm of Corcoran, Witt & Co., will read a paper on their Modified Roller Mill System in combination with their new patent degerming roller. Mr. Chatterton will read the report furnished by the Board of Trade to the Home Secretary on the recent flour mill explosion at Macclesfield, and Mr. Potts, of Sunderland, will read a paper on the Rating of Flour Mills.

NEWS.**Everybody Reads This.**

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

DIED.—Mason Parker, miller, at Wadeville, N. C.

BURNED.—A. E. West's flour mill at Hazleton, Ind.

BURNED.—Scott's flour mill, at Elbar, N. Y. Insured.

A 300 barrel roller flour mill is to be built at Perham, Minn.

Bottkel Bros. are preparing to build a mill at Brussels, Wis.

CHICAGO now has a grain storage capacity of 20,000,000 bushels.

Cook & Sackett is the name of the new milling firm at Watkins, N. Y.

JOHN SCHALL's roller mill at Allentown, Pa., is expected to start up Feb. 1st.

There are fifty-five cotton mills in Georgia, and others in process of erection.

THE mills of Clement & Stevens, at Neenah Wis., now use rollers exclusively

H. D. Perry, miller, of the firm of Johnson, Perry & Co., Milford, Neb., is dead.

THE grist mill at Cambridge, Me., has been putting in some straight work lately.

THE new steam flouring mill at Calhoun, Ga., will soon start up on custom work.

It is said that twenty-seven of the exhibitors at Atlanta are going to establish factories there.

THE Columbus Roller Flour Mill Co. will build a 200 barrel mill this year, at Columbus, Iowa.

THE Quincy, Ill., flour mills manufactured during the year 1881 about 400,000 barrels of flour.

Eastern millers are commencing to pay more attention than ever to improving their mills.

NEENAH is the second milling city in Wisconsin, Milwaukee only surpassing her in that respect.

THE West Liberty, Ky. flouring mills burned January 12th. Loss, \$10,000; no insurance.

Gilman Conner, one of the earliest millwrights in Minneapolis, died recently of pneumonia.

It is said that preparations are being made to rebuild the mill recently destroyed by fire at Minneapolis.

The new Wabash grain elevator in Chicago is just completed. Cost, \$400,000; capacity, 1,700,000 bushels.

Stewart & Wood's mill, at Bellaire, O., is being remodeled, and will have a capacity of 75 barrels per day.

MR. CAMMERY, of Cedar Creek, Lehigh county, Pa., expects to put up a grist mill at that place next spring.

The firm of Simpson & Gault, Cincinnati, O., will hereafter be known as the Simpson-Gault Manufacturing Co.

John Hoover now owns and operates the mill at Provo, Utah, formerly belonging to George Beebe, deceased.

MESSRS. S. C. HURT & Co., of Lynchburgh, Va., have purchased a new turbine for their "Piedmont Mills" at that city.

THOS. MIGHTON has put a new purifier into his mill at Chardon, O. Wolf & Hamaker, of Allentown, Pa., sold it to him.

THE Garden City Mill Furnishing Co., of Chicago, Ill., report business lively, and they are running full force on full time.

C. & F. NACHTRIEB, Galion, Ohio, are now remodeling their mill and have put in a full line of the Odell double roller mills.

BURNED. — Ferguson, Watkins, & Cornell's flouring mills, at Toledo, Ohio, burned January 6th. Loss, \$10,000; fully insured.

THE works of the Turbine Water Wheel Co., at Orange, Mass., were destroyed by fire, January 24. Loss, \$55,000; insurance, \$26,000.

THE Garden City Mill Furnishing Co., of Chicago, sold during the month of January 98 of the Garden City wheat brush machines.

THE Crescent roller mill at Eau Claire, Wis., owned and operated by the D. Shaw Lumber Co., has a capacity of 200 barrels per day.

The steam flour mills at New Haven, Ind., owned by Hartzell Bros., were destroyed by fire January 7th. Loss \$25,000, and no insurance.

Louis Snider's sons are remodeling their paper mill at Hamilton, O. They will replace their old engine with an Atlas Corliss of 100-horse power.

THE Garden City Mill Furnishing Co., of Chicago, Ill., recently put in eight of their purifiers in Pennypacker & Co.'s Mill, in Philadelphia.

Many Minnesota and Wisconsin mills are having rather dull times on account of the unsatisfactory condition of the wheat, as well as its scarcity.

DURING the year 1881, the Fleming Mills, of Minneapolis, manufactured 3,629,687 barrels of flour, of which 1,288,399 were exported direct to Europe.

THE Garden City Mill Furnishing Co., of Chicago, recently placed ten of their largest size middlings purifiers in Norton & Co.'s mill, in Chicago.

Ex-Gov. Washburn will build a \$125,000 saw-mill at Brainerd, Minn., next spring. It will have a boom large enough to hold 50,000,000 feet of logs.

Quale, Ferguson & Co.'s flour mill at Toledo, O., was damaged by fire January 7th to the extent of \$10,000. Fully insured in eastern and foreign companies.

The new Indianapolis steel rail mill will put in seven new boilers, 48 feet in diameter and 28 feet long, to be furnished by the Atlas engine works, of Indianapolis.

Cherry, O'Connor & Co., the well known contractors, of Nashville, Tenn., have placed an order with the Atlas engine works, of Indianapolis, for a 20x48 Corliss engine.

American theatre-goers have of late laughed themselves sore at the absurdities of "Samuel von Posen," and now comes the news that the great miller von Posen has failed for the snug sum of \$250,000.

A new mill is being built at Burat Prairie, by Holmes & Young, formerly of Enfield, same state. They are having the machinery

made for them by Nordyke & Marmon Co., of Indianapolis, Ind.

Nordyke & Marmon Co., of Indianapolis, Ind., have received a contract to manufacture the entire machinery for a two-run custom mill at Evansville, Ark., for Messrs. McCormick & Littlejohn.

THE first shipment of wheat for the new flouring mills at Attica, N. Y., was received Jan. 23. The mills have a capacity of 300 barrels per day and are driven by a 140 horse power engine.

McCullough & Hollister are about to build a three-run mill driven by an engine, at Hepler, Kan., and Nordyke & Marmon Co., of Indianapolis, Ind., are manufacturing the machinery for them.

In North Carolina there are fifty-three cotton mills in operation, and six others are in progress and nearly completed. There are also four or five woolen mills in operation in "the old North State."

The Scoville Manufacturing Co., Waterbury, Conn., are putting in a new 26-inch Harris-Corliss engine, and making large additions to their shop area, to accommodate their rapidly growing business.

Boile, White & Co., of Chicago, are extending their already large saw-mill business in Tennessee, and have ordered a complete 50 horse power engine and boiler outfit of the Atlas engine works, of Indianapolis.

J. M. Veach & Co., of Adairsville, Ga., are building a new mill, and will put in a 14x42 Atlas Corliss engine and a pair of boilers to furnish power. The entire outfit will be furnished by the Atlas engine works, of Indianapolis.

THE Garden City Mill Furnishing Co., of Chicago, shipped, on orders, one of their Wheat Brush machines to Australia, and another to Constantinople, the last order being through the advertisement in the UNITED STATES MILLER.

The Brooklyn and San-Miguel Mining and Reduction Co. have ordered a complete steam outfit from the Atlas engine works, of Indianapolis, consisting of a 14x20 Atlas engine, with a pair of 40x18-ft. boilers, for their mines at Columbia, Col.

Elias Faylor & Co. have commenced the erection of a 150-barrel roller mill, operating on the gradual reduction system, at Rich Hill, Mo. Nordyke & Marmon Co., of Indianapolis, Ind., are planning and manufacturing the entire outfit for the same.

C. B. PALMER & Co., Dayton, Ohio, who recently purchased the Dayton View Mills, are making extensive repairs and changing into a roller mill, and putting in a line of the Odell double roller mills. They will be ready to start up in a few days.

Nordyke & Marmon Co., the mill furnishing firm at Indianapolis, shipped and delivered to the various roads in that city almost 1,000 loaded cars, during the year 1881. This does not include local shipments which were delivered to freight depots by wagons.

A barbed wire manufactory is to be erected shortly in Winnipeg, Canada, by a Chicago firm. An American sewing machine firm is also erecting a factory in Scotland. Some fifty English manufacturers have branch mills in America. Things are getting mixed.

The remodeling of the old mill at Pendleton, Ind., have been commenced by the new purchasers, Messrs. Potts & Parker. The improvements are very extensive, making almost an entire new mill. All the new machinery comes from the Nordyke & Marmon works, at Indianapolis, Ind.

In St. Louis there are now building what will be known as "East St. Louis B.," capacity, 900,000 bushels; "Union Depot," capacity, 550,000 bushels; the "Union," increasing to capacity for 1,500,000 bushels; "Advance B.," capacity, 1,000,000 bushels; "Missouri Pacific," capacity, 1,500,000 bushels. When these are completed the capacity in the city will be 11,600,000 bushels.

R. L. Downton has the contract for building an 800 bbl. roller mill at Alton, Ill., for E. O. Stannard & Co., the mill to be ready for running within ninety days of signing the contract, and to be as good as the best modern milling engineers can design and build. The Downton Manufacturing Co. will put in the Cranston-Downton corrugated roll, with Gray's belt drive, paying royalty for the latter, thus giving a very complete machine, fully protected from litigation.

A number of prominent Minneapolitans, backed by ample capital, have formed a new elevator company, the object of which is to own and operate elevators in Minnesota and

Dakota, and the Davidson elevators on the Breckenridge division of the St. Paul, Minneapolis & Manitoba road have already been purchased by the company as a nucleus. The organization will also buy or build other elevators at prominent points, both on this side of and beyond Wahpeton, on that line, and at other points where favorable openings occur. The company is composed of citizens of Minneapolis. It has ample capital, and they propose to run their elevators in a legitimate and business like manner, dealing justly by all. The organization is not yet perfected, but will be immediately, when the names of the incorporators and officers will be made known.—*Minneapolis Tribune.*

The Consumption of American Breadstuffs and Provisions in Europe.

REPORT BY CONSUL BYERS, OF ZURICH.

Before the year 1860, the United States did not export, on an average, more than 4,000,000 cwts. of wheat yearly. Between that date and 1865 the average amount was nearly 15,000,000 cwts., and during the years 1871 to 1875 it ran up to 24,000,000. They commenced an increase of grain export pronounced by good authority as being absolutely without parallel in the history of commerce.

Our wheat exports reached, in 1876, 29,500,000 cwts.; in 1877, 21,500,000 cwts.; in 1878, 38,500,000 cwts.; in 1879, 65,500,000 cwts.; in 1880, 83,000,000 cwts. During these years, 1876 to 1880, our flour exports had increased from less than 7,000,000 cwts. to 10,500,000 cwts., and the corn we sold went from 24,500,000 to 49,000,000 cwts. Very bad harvests at home and very fair harvests abroad checked the tremendous exports in 1881, but the healthy steadiness with which they have increased, with few exceptions, for the last fifteen years, is a guarantee that the check is temporary only, and that, with favored harvests and increased acreage, our grain exports will become almost fabulous. Better grain lands do not exist in the world, and our people, aided by the millions of industrious farmers coming from Europe, are each year adding vast regions to the hand of the reaper. Our cheap lands and machine cultivation have revolutionized farming over the entire world, and this revolution is a permanent one, waiting only on cheaper methods of transportation to make it still more radical. When our barge systems are completed, and our water-courses made to serve us, and we own lines of great freight-steamers to every foreign sea-port, famine and hunger will be things only of fable and history. Our grain exports do not go so exclusively to England as in former years; there the increase since the year 1860, in wheat alone, has been 58,000,000 bushels. Almost no wheat was bought from us by Belgium in that year, but in the year 1879, 9,000,000 bushels were taken. France commenced in that year (1860) with but 28,000 bushels of American wheat. Nineteen years later she bought of us about 42,000,000 bushels, and the increase in flour and corn sent to that country in those years is yet more marked. With all this, there remain good reasons for supposing that we are only at the beginning of grain-exporting to continental States. Cheap transportation can easily make it possible for us to supply other continental states with the millions of grain they are now buying from abroad, for the increases of their purchases from us have not by any means reached the amount we can yet make them. If wheat bears the cost of transportation even from Australia, Egypt, and Chili, to Europe, and statistics show that it does, there certainly can be no further question as to our furnishing the article at as low a price in any continental harbor.

London now controls the wheat market of Europe; but, on the other hand, her own market is controlled by the wheat-fields of the United States. Of Great Britain's imported wheat last year, 5 per cent. came from Russia, 6 per cent. from India, 8 per cent. from Australia, 7 per cent. from British America, 3 per cent. from Egypt, 3 per cent. from Chili, 3 per cent. from Germany, and 65 per cent. from the United States. There is no good reason why other wheat-buying states should not be supplied from the United States in the same proportion as Great Britain, and there are visible signs that this will soon be effected. Russia sold 9,000,000 centners of wheat to Great Britain only three years ago; now she sells but little over 2,500,000. Germany, which furnished Britain with 5,000,000 centners in 1878, furnished her but 1,750,000 in 1880.

There are not fewer than ten European countries which must buy a part of the grain

they consume, and nearly as many are compelled to buy a part of their meat. France imported in 1878 not less than 20,000,000 centners of grain, not a fourth of it coming from the United States, though we increased the amount to about 44,000,000 in 1879.

Little Switzerland imports about 7,000,000 centners of grain yearly, but to the present time almost wholly from Eastern European states, while 117,000,000 francs worth of wheat and corn are bought yearly by Italy, a small proportion only coming from the United States. So, too, is it with Sweden, Portugal, the Netherlands, and Greece, all large buyers of grain and of meat, but not yet buying extensively of the United States. Supposing that Europe continues to produce the same quantities of bread and meat as now, there is still left the numerous markets referred to, to be supplied, and that with amounts which, in their totals, would double the exports we now have. There is no likelihood, however, of production continuing so largely in Europe when it is becoming unprofitable. Cheap labor is counterbalanced by dear land, and the question of American supply has become almost wholly a question of freights.

If with but 32,000,000 acres of land in wheat we can now support 50,000,000 of our own people, and send about 100,000,000 of spare bushels abroad, what will we have for export when all territories of American wheat-land shall stand in golden grain?

Our corn-fields have produced surplus crops for Europe that are scarcely less astounding than the shipments of wheat. From 3,000,000 bushels sent abroad in 1860, the exports had risen to more than 85,000,000 bushels in 1879; and this is supplemented by something like 11,000,000 bushels of rye, barley, and oats furnished to Europe in that year.

The grand complement of these grain exports are the meat, butter and cheese we sell abroad. These necessaries of life we export mostly direct to England, but the consumption on the continent is much greater than is usually supposed. We sent directly to English ports in 1879, exclusive of our shiploads of live cattle, &c., not less than 516,000,000 pounds of ham and bacon, 25,000,000 pounds of butter, and 136,000,000 pounds of cheese. Another hundred million pounds of these same articles were sent to other states, mostly in Europe.

It is not so much the enormous amounts of these articles exported that is worthy of attention as it is the steadiness of the increase recently from year to year, showing that this stupendous export of breadstuffs and meats is not based on fictitious circumstances that may speedily change. The price of the native products of the land do not change materially in Europe. The land itself cannot become much cheaper or produce more, nor can farm laborers be expected for less wages than they at present receive. In America land may become dearer, it is true, but in proportion that it becomes dearer will immigration increase its products, while new methods of farming, of slaughtering, packing, preserving, and transporting, will double and treble the capacity of our country for supplying the world cheaply with life's necessities.

The Total Product for 1881.

The secretary of the St. Louis Merchants' Exchange furnishes the following official report of the flour manufactured by the St. Louis mills during the year 1881:

Atlantic (burned August 12), Atlantic Milling Co. owner, 194,425 barrels product.
 Park, J. W. Kaufman (run for six and a half months) capacity 800 barrels, 97,951 product.
 Anchor, Anchor Mill Co., 800 barrels, 65,000 product.
 Eagle, E. O. Stannard & Co., 700 barrels, 159,196 product.
 Laclede, Kehlor Bros., 700 barrels, 128,000 product.
 Venice, Kehlor Bros., 400 barrels, 43,000 product.
 Empire, Empire Mill Co., 600 barrels, 91,442 product.
 Victoria, Victoria Mill Co., 500 barrels, 33,375 product.
 Phoenix, Atlantic Mill Co., 46,750 product.
 Franklin, Geo. P. Plant & Co., 425 barrels, 86,845 product.
 Pearl, Geo. P. Plant & Co., 325 barrels, 67,030 product.
 Cherry Street, T. L. Johnston & Co., 350 barrels, 51,800 capacity.
 Union Steam, Union Steam Mill Co., 450 barrels, 123,150 product.
 Camp Spring, Camp Spring Mill Co., 500 barrels, 104,259 product.
 Saxony, Saxony Mill Co., 350 barrels, 82,600 product.
 United States, E. Goddard & Sons Co., 600 barrels, 56,140 product.
 Jefferson, Sessinghaus Bros., 400 barrels, 90,000 product.
 Iron Mountain, F. Tiedeman & Co., 500 barrels, 45,675 product.
 East St. Louis, Hezel Milling Co., 400 barrels, 78,000 product.
 Globe, W. S. Taylor & Co., 150 barrels, 20,600 product.
 St. George, H. Kalbfleisch & Co., 200 barrels, 34,385 product.
 Carondelet, Lallemand Bros., 18,000 product.
 Tuscan, J. L. Price & Co.
 Total barrels manufactured, 1,717,629.
 Flour manufactured in 1880, 2,077,625 barrels.
 Flour manufactured in 1879, 2,142,949 barrels.

The Wheat Crop and Bread Supply of Switzerland.

REPORT BY CONSUL MASON, OF BASEL.

There are in Switzerland no complete official statistics of the annual crops of wheat and other cereals, but trustworthy agricultural authorities have made careful estimates and comparisons from which some approximate and interesting results may be deduced.

During the period from 1868 to 1880, the average annual home crop of wheat was about 4,100,000 centals. During the same period the average yearly import of wheat, flour, rye, and other bread materials was 5,500,000 centals.

The entire annual consumption during that period was therefore about 9,600,000 centals exclusive of the small amount of rye and barley raised at home and used in the manufacture of bread. The population of Switzerland is 2,750,000, a large majority of whom consume comparatively little meat and but few vegetables; so that it is hardly surprising to find the yearly bread consumption of the entire people estimated as high as 306 pounds per capita. This estimate would seem to be somewhat in excess of the fact, since the total 9,600,000 centals of breadstuffs annually consumed includes the large amount eaten by the throng of tourists and visitors, who from June until October inhabit the numerous summer resorts of this country.

The essential fact, however, from the American point of view, is that while Switzerland consumes 9,600,000 centals of breadstuffs, it raises from its own soil only two-fifths of that amount, leaving the remainder to be imported, mainly from the United States, Russia, and Austro-Hungary.

During the past three years European harvests have been generally unfavorable, and during part of this time the exigencies of war and home demand have to some extent checked the supply from Russia; so that the proportion of the entire breadstuff import which has been drawn from the United States has steadily increased.

At the same time the area of wheat culture in Switzerland has rapidly decreased. The uncertainty of the grain yield, and the necessity of securing the utmost annual return from the limited productive area of this country, have constrained a constantly increasing percentage of Swiss farmers to abandon wheat-growing for the more certain and profitable pursuits of dairying and stock-raising. Lands that were uniformly devoted to wheat and rye culture, until railroad facilitated the importation of cheaper American breadstuffs, are now devoted wholly to grazing, fodder crops, potatoes, and the vine.

Meanwhile the use of rye and barley as bread material has rapidly diminished. Laboring people who had eaten black coarse bread on account of its greater cheapness, now find white wheat flour more economical than rye, although it can hardly be said that the white bread is preferred on any other ground than that of economy to the dark loaves to which they had previously been accustomed.

CONCLUSIONS.—1. The wheat crop of Switzerland for 1881 is of excellent quality, and, in proportion to the area harvested, shows some increase over the yield of 1880. But as the wheat area is, for the reasons above stated, rapidly diminishing, the yield of the present season will not exceed, if it equals, the average annual supply of 4,100,000 centals.

2. There will be, therefore, an import demand for about 5,800,000 centals, of which the United States will have an opportunity to supply their usual large proportion, although the more favorable harvests in other European countries this year will enable some of them to offer somewhat more serious competition.

3. It would seem apparent that a systematic and vigorous effort on the part of American wheat and flour exporters to introduce into Switzerland the coarser, darker, and cheaper grade of breadstuffs might develop satisfactory results. The Swiss people, in general, do not prefer white and high grades of flour, but they do insist that their bread shall be wholesome, nutritious, and cheap.

George Motley.

On the 24th of December, 1881, while sitting quietly in his chair, Mr. George Motley, of Rochester, N. Y., suddenly died from an attack of heart disease. He was in his forty seventh year. Mr. Motley was an Englishman by birth. He was a member of the milling firm of Moseley & Motley, and was the inventor of a mechanical device for degerming wheat, now owned by Chisholm Brothers, of Chicago.

The Flour Milling Interest.

The flour milling interest of the country is in a deplorably depressed condition, resulting from two leading causes, the relatively higher cost, through a short crop and speculation, of Wheat than flour, and the over-production of high grades of the latter, which are mainly used for home consumption, and the under-production of the low, or export grades. As a consequence of the excessive supply of the higher grades of Flour, for which it is almost impossible to get back a new dollar for an old one, the flour being on an average fifteen per cent. cheaper than the wheat from which it is made,—a large number of the mills in the principal flouring districts have been obliged to shut down, or suspend work for a season. The primary cause of this glut is the adoption in recent years by the leading millers of the country of the new patent process for converting wheat into flour, whereby a largely increased percentage of the product consists of the finer grades, which cannot all be consumed at home, their high cost being a practical bar to free exportation. While the market has been for a long time over-supplied with the high grades, there has been almost continuously for many months a scarcity of the low or export grades, especially of superfine and No. 2 extra, which are principally sold for exportation. Attention has been so frequently directed to this anomaly, in our review of the market, that the wonder is that the millers have not applied the only remedy possible,—that is, such a change in tactics as to afford a larger percentage of low grades and a lessened percentage of high grades. To this complexion must the milling business come at last, if it hopes to prosper.

In this connection, it is interesting to note the tendency to concentration of the milling interests in fewer districts where superior facilities, such as unlimited water power and accessibility to the great wheat fields, are afforded. This tendency is promoted by the extension of the railroad system and the cheapening of the rates of transportation, which are fully fifty per cent. lower than they were a few years ago. This will explain why Minneapolis, notwithstanding its remoteness from the seaboard, has become the chief centre of the Flouring interest of the country. That young and thrifty city is favored by the finest water power probably in the world, and is moreover the seat of the great Spring Wheat fields of the Northwest. Minneapolis flour mills consume not less than 25,000,000 bushels of Wheat annually. The Minneapolis millers have just organized what is to be known as the Manitoba Elevator Company, the object of which is to insure rapid delivery of Wheat at the mills in their city. This movement is said to have been rendered necessary by the state of the wheat market, but it will not be long before the wheat growing region North and West of Minneapolis will be so vast in area that there will be no difficulty in supplying the mills of that city as promptly as possible with the best wheat grown. This action on the part of the Minneapolis millers is illustrative of the shrewdness and business energy of the men who have built up that prosperous and growing city in the Northwest,—a shrewdness and energy that will no doubt in due time find a remedy for the excessive production of grades of flour for which they cannot at present find a profitable outlet.—*N. Y. Commercial and Shipping List.*

Grain and Flour Trade Notes.

The average annual wheat crop of Italy is estimated by United States Consul Smith to be about 141,000,000 bushels, and of corn 85,600,000 bushels. A considerable quantity of Neapolitan wheat is exported, and cheaper foreign wheats imported for home consumption.

The total shipments of wheat from California during December were 2,816,437 centals, valued at \$4,670,210.

During the year ending November 30, 1881, there were shipped from the ports of Melbourne, Adelaide and Sydney, to Europe, 3,712,000 bushels of wheat, against 8,488,000 during the previous year, and 81,900 tons of flour, against 73,200 tons the previous year.

An immense mill and bakery is projected in Vienna, and the projectors think they can furnish a good quality of bread at from four to five cents per pound, and still make a reasonable profit.

It has been found that a large portion of the grain stored in New York and Brooklyn warehouses has become badly heated, and the falling off from the grading has been very marked, and is the cause of serious loss. A meeting of the grain trade was held Tuesday, Jan. 24th, at which meeting a committee of

five was appointed by the grain trade to cooperate with the grain committee. It was proposed to have the damaged grain aired, and if necessary transferred to other warehouses. A re-grading of the grain will no doubt be necessary.

In Kansas farmers have been plowing all through the month of December, and it has been the mildest winter ever known. In Missouri there has been no snow, and the ground in southern Illinois is still bare. In Ohio and Indiana the situation is the same.

Messrs. Walker, Sumner & Co., of Detroit, Mich., write to *The Times* as follows: We have compiled the following figures in a very careful manner, and consider them as near correct as is possible, considering the magnitude of the undertaking. While the movement of wheat throughout Michigan since the 1st of August last has been largely discussed, many people seem to have lost sight of the vast milling interests of the state. These people will be astonished when they find that the demand from that forgotten source has exhausted over 5,000,000 bushels of the crop of 1881, or more than twenty per cent. of the estimated yield. There are 734 mills in the state of Michigan, and they have been divided into five classes, as follows: The first, constituting those that have ground 50,000 bushels or over; second class, 20,000 to 50,000 bushels; third class, 10,000 to 20,000 bushels; fourth class, 5,000 to 10,000 bushels, and fifth class, those grinding less than 5,000 bushels. From the recapitulation of these, it was found that

Class 1 comprised 15 mills, which ground.....	Bushels	1,368,970
Class 2 comprised 26 mills, which ground.....	1,097,385	
Class 3 comprised 64 mills, which ground.....	960,420	
Class 4 comprised 146 mills, which ground.....	994,160	
Class 5 comprised 483 mills, which ground.....	910,540	
Total.....	5,331,475	

The returns which go to make up this total of 5,331,475 bushels do not in most instances include the wheat ground for farmers' use, or what is called grist work. Add to the above figures 2,800,000 bushels, the amount in round figures received at Detroit since August 1, also 1,500,000 bushels, the estimated amount shipped around Detroit direct to New York and other eastern markets; also 500,000 bushels, the estimated amount shipped from interior points direct to millers in the east, southeast and south, and there is a grand total of 10,100,000 bushels. Thus it will be observed that a very large percentage of the crop has been marketed. Note again the remarks of these numerous millers as to the probable amount in farmers' hands:

Nine report no more wheat in farmers' hands, with the crop very light—not a sufficient amount for home requirements; 127 report at least 50 per cent. marketed; 98 report at least 66 per cent. marketed; 72 report at least 75 per cent. marketed; 428 make no remarks as to the amount back.

An Ingenious Invention.

It is reported that the Reading railroad will introduce a station indicator on passenger trains, the Boynton patent. At each end of the car is an oblong box containing the names of the stations on a ribbon. Over the top of the box is printed "next stop," and the name of the station at which the next stop is to be made shows through an opening in the door of the box. The shifting of the names is controlled by the engineer on the locomotive. There is a small rubber bellows in each box which is contracted when the engineer makes a vacuum; this works a lever that raises a platform on which the band containing the names of the stations rests. An ingenious catch prevents the band from slipping backward, so when the platform falls again by the bellows filling with air the band must fall to the front, thus shifting the name of the station passed to the next one above it. The engineer has a small indicator in the locomotive cab, bearing the names of the stations and he thus knows whether the apparatus is set right. The indicator can also be worked by the Westinghouse automatic brake cylinder or by a bell cord.

FOR SALE.

A good two run, water power Grist Mill, 36x50, stone foundation. Good dwelling house and barn with 23 acres of land, situated in fine grain growing country, 1 1/2 miles from railroad station and 9 miles from Manitowoc, Wis. For further particulars address, ANTON E. REIF, Branch, Manitowoc Co., Wis.

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We build mills on any system known. We guarantee a saving of 25 per cent. on the cost of construction and room occupied by

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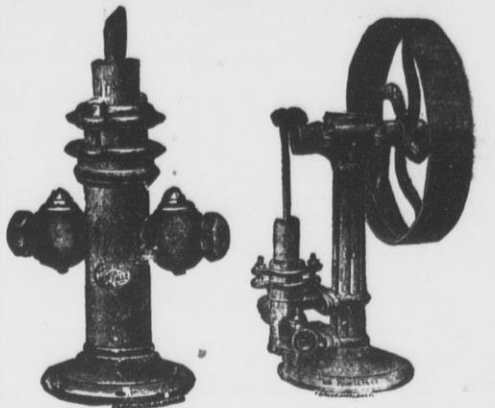
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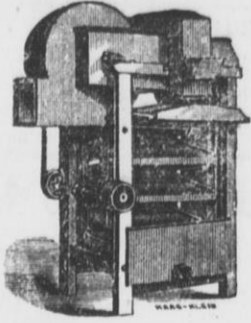
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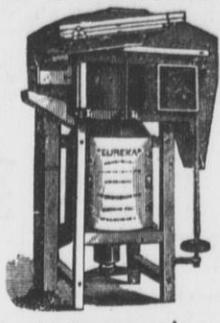
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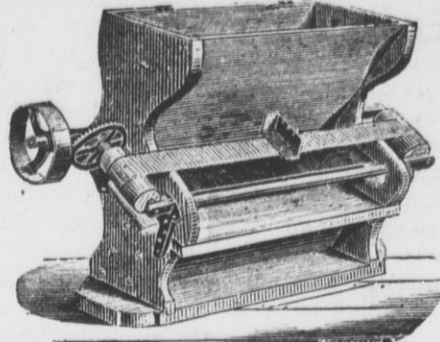
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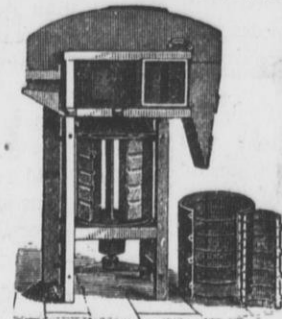
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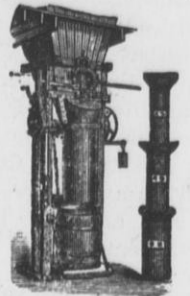
Eureka Magnetic Automatic Separator.

Removes all metallic particles from a flowing stream of grain, requiring no attention from the miller. 5 sizes.



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Recognized as the leading one of this class of machines. Universally recommended for finishing the process of cleaning.



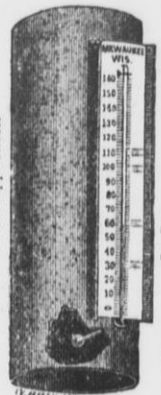
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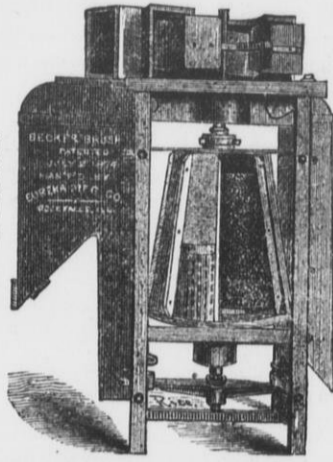
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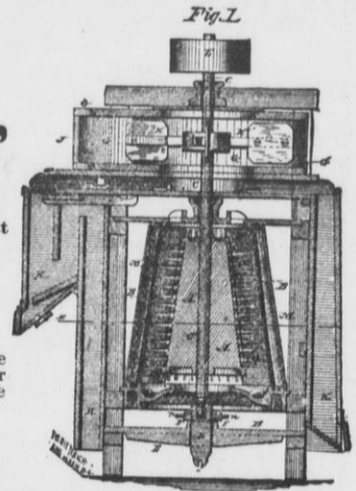
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Galt's Combined Brush and Scourer.



POOLE & HUNT'S Leffel Turbine Water Wheel

Made of best materials and in best style of workmanship.

Machine Molded Mill Gearing

From 1 to 20 feet diameter, of any desired face or pitch molded by our own SPECIAL MACHINERY. Shafting, Pulleys, and Hangers, of the latest and most improved designs.

Mixers and General Outfit for Fertilizer Works.

Shipping Facilities the Best in all Directions

POOL & HUNT, Baltimore, Md.

N. B.—Special attention given to Heavy Gearing for Pulp and Paper Mills.

CAWKER'S AMERICAN FLOUR MILL DIRECTORY FOR 1882:

Is Now Ready for Delivery, February 1st, 1882.

It has been compiled with the utmost care, and contains 22,844 Addresses

Of Flour Mill Owners in the UNITED STATES and CANADA.

It give the Capacity and Motive Power of Mills wherever obtained.

MILL FURNISHERS, FLOUR BROKERS,

And Every one Desiring to Reach the Trade,

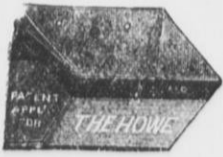
WILL FIND THIS WORK SIMPLY INVALUABLE.

PRICE, TEN DOLLARS PER COPY.

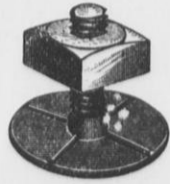
Address **THE UNITED STATES MILLER, Milwaukee, Wis.**

Will be sent to any part of the world by Mail, REGISTERED, on Receipt of Price.

ESTABLISHED 1877.



THE HOWE



Mill Elevator Cups.

NEAT, STRONG, DURABLE and CHEAP.

FIN.			IRON.		
BELT.	END.	PRICE.	BELT.	END.	PRICE.
2 1/2	2 1/2	3 Cents.	4 1/2	4 1/2	7 Cents
3	3 1/2	3 1/2 "	5	4 1/2	7 1/2 "
3 1/2	4	4 "	5 1/2	4 1/2	8 "
4	4 1/2	4 1/2 "	6	4 1/2	8 1/2 "
4 1/2	4	6 1/2 "	6 1/2	4 1/2	9 "

GEORGE W. WHITE & CO., 257 Twenty-Ninth St., CHICAGO, ILL.

[Mention this paper when you write us.]



BOTTLED BEER.

VOECHTING, SHAPE & CO.,

SOLE BOTTLEERS OF

JOSEPH SCHLITZ BREWING COMPANY'S

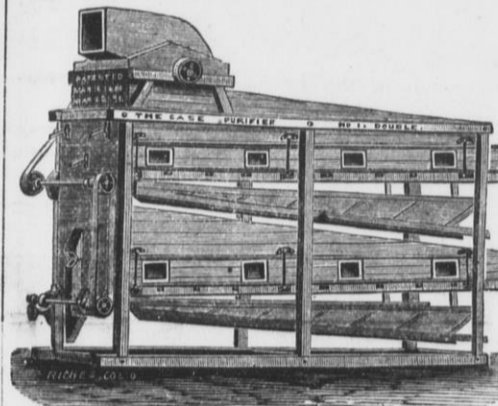
CELEBRATED MILWAUKEE LAGER BEER,

Cor. Second and Galena Streets,

MILWAUKEE, WISCONSIN.

BOTTLEERS' SUPPLIES CONSTANTLY ON HAND.

[Parties corresponding will please state where they saw this advertisement.]



THE Case Purifier

COSTS LESS AND HAS

MORE CAPACITY

—THAN—

ANY in the MARKET.

IT IS THE

KING OF PURIFIERS.

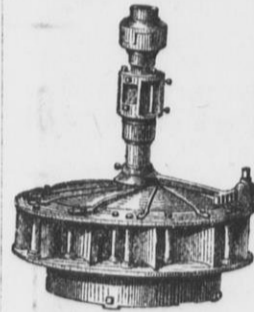
ADDRESS,

CASE MFG CO., Columbus, O.

WM. E. CATLIN & CO.,

68 LAKE STREET, CHICAGO, Chicago Agents.

[Mention this paper when you write us.]



James Leffel's Improved WATER WHEEL.

NEW PRICE LIST FOR 1881.

The "OLD RELIABLE" with Improvements, making it the Most Perfect Turbine now in Use, comprising the Largest and the Smallest Wheels, under both the Highest and Lowest Heads used in this country. Our new Pocket Wheel Book for 1881 and 1882 sent free to those using water power. Address

JAMES LEFFEL & Co., Springfield, Ohio.

and 109 Liberty Street N. Y. City.

[Mention this paper when you write us.]

PURIFIERS.

Redfield's Combined Elevator and Purifier.

The Cheapest and the Best. Machine will Elevate its Own Material any Height and Distance, thereby Saving the Expense of Building Elevators. Also

REDFIELD'S PORTABLE BOLTING CHEST for SCALPING or DUSTING PURPOSES.

Send for Catalogue and Price List before purchasing. It will pay you.

Address

J. H. REDFIELD, Salem, Ind.

[Mention The United States Miller when you write.]

HENRY SMITH, JR. GEO. G. SMITH. F. A. SMITH.

SMITH BROS., Practical Millwrights.

PLANS, SPECIFICATIONS & ESTIMATES

MADE FOR ALL KINDS OF

MILLWORK, MACHINERY, ETC.

Flour, Sawmill, Tanners' and Brewers' Machinery, and General Mill Furnishers,

454 CANAL STREET,

MILWAUKEE, WISCONSIN.

[Mention this paper when you write us.]

CHOICE BEVELED EDGE

FLOUR BRANDS

For two dollars and upwards. Also RUBBER STAMPS, BURNING BRANDS, SEALS, STEEL NAME STAMPS, LETTERS AND FIGURES, Etc. Orders promptly attended to. **CHAS. H. CLARKE,** 82 Wisconsin St., Milwaukee.

FOR SALE.

A good water power and mill with two run of stone at Stone Bank, Waukesha County, Wis. Mill is doing a good business, which with a moderate amount of improvements, could be largely increased. One half or the whole will be sold to the right party. For full particulars, address, **U. S. MILLER, Milwaukee, Wis.**

IMPORTANT NOTICE TO MILLERS

The RICHMOND MILL FURNISHING WORKS, are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery, and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to **NORDYKE & MARMON CO.,** INDIANAPOLIS, IND.

WEGMANN'S PATENT

PORCELAIN ROLLS

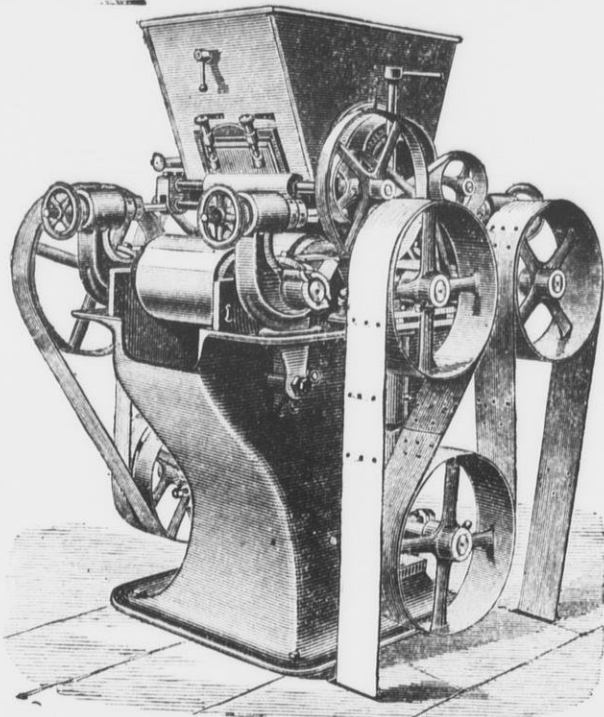
THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!



THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!

"AWARDED SPECIAL PREMIUMS."

OVER 6,000 OF THESE ROLLS IN USE

IN THIS COUNTRY AND EUROPE.

The Superiority of Porcelain over Chilled Iron for Reducing Middlings for Tailings is as under :

CHILLED IRON ROLLS, whether polished at first or scratched with fine grooves, soon become, through wear, smooth and glassy, and will only squeeze instead of grinding.

PORCELAIN presents a continual inherent sharpness, which no art can give to any other material in equal fineness and regularity, which enables it to act upon the smallest particles of flour and to separate them.

CHILLED IRON discolors the flour, by reason of the carbon that exudes from it, and also by its liability to rust.

PORCELAIN does NOT discolor the flour and is entirely indifferent to any and all chemical influences.

CHILLED IRON ROLLS are smooth and "cake" the meal; more especially is this the case on soft material.

PORCELAIN ROLLS possess a certain porosity, and no matter how finely ground, or how long they have been used, still re-

tain this granular and porous texture, and will reduce the middlings without "caking."

CHILLED IRON can be cut with steel.

PORCELAIN can ONLY be cut by the best black diamonds.

CHILLED IRON ROLLS require great power to reduce middlings to the proper fineness on account of their smooth surface.

PORCELAIN ROLLS will do the same amount of work, on account of the slight pressure required, and the gritty nature

of the Porcelain, with one-half the power. The flour produced by Porcelain Rolls is sharper, whiter, stronger and more even than that produced by Iron Rolls.

No remarks need be made as to the superiority of Porcelain Rollers over Millstones, as it is a recognized fact by all. Porcelain Rollers are the only Rollers that will entirely super-

cede Millstones and Metal Rollers.

THESE MACHINES RECEIVED the FIRST PREMIUM!

At the late Millers' International Exhibition, Cincinnati.

Gold Medals at Nuremburg, 1876; Paris International Exhibition, 1878;

Little International Concours, 1879; First Gold Medal of the State, Berlin International Exhibition of the German Millers' Association, July, 1879; and Gold Medal Le Mans, 1880.

Full Instructions regarding the system of using Rolls in place of Stones given to parties purchasing. Address

EDW. P. ALLIS & CO., Sole Mfr's.

MILWAUKEE, WISCONSIN.

Mention this Paper when you write us.

COCKLE SEPARATOR MANUFACTURING CO., MILWAUKEE,

GENERAL MILL FURNISHERS

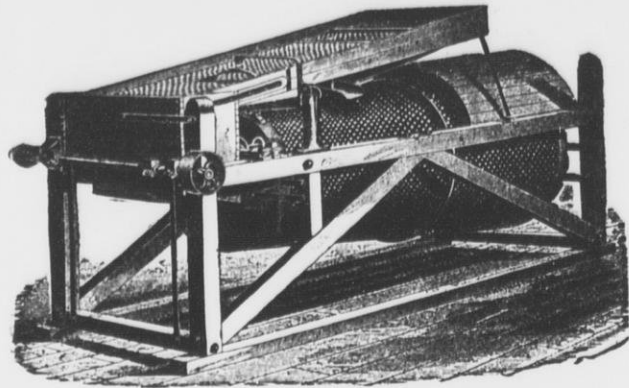
AND MANUFACTURERS OF

IMPROVED COCKLE SEPARATORS

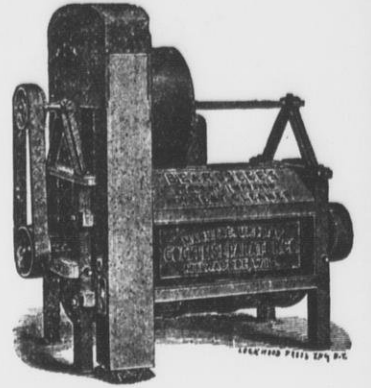
(Kurth's Patent.) Also built in combination with

Richardson's Dustless Wheat Separators!

Also Sole Manufacturer of BEARDSLEE'S PAT. GRAIN CLEANER



PLAIN COCKLE MACHINE.



BEARDSLEE'S WHEAT CLEANER.

Perforated Zinc at Bottom Figures.

Send for Illustrated Catalogue.

We GUARANTEE GREAT CAPACITY combined with GOOD QUALITY OF WORK. Any common Sieve will separate the cockle from wheat but to separate it WITHOUT WASTE is the GREATEST FEATURE of our Machine. A WASTEFUL machine is a DAILY LOSS OF MONEY in a mill. There is NO MACHINE IN THE MARKET which can stand comparison with ours.

Carbondale, Ill., Dec. 2, 1881.
Cockle Separator Mfg. Co., Milwaukee.
Gentlemen:—Replying to your late favor, would say that we can cheerfully recommend your Cockle Separator as doing all that you claim for it. We have tested ours thoroughly by this time and know whereof we speak. We would not think of doing without it, having tried it once, and can conscientiously vouch for its good work.
Yours respectfully,
BROWN & WINFREY,
Perrysville, Ind., Nov. 24, 1881.
Cockle Separator Mfg. Co., Milwaukee.
Sirs:—The combined machine I bought of you has been running about three weeks. It certainly does all you claim for it, and is the most perfect Separator that I have any knowledge of.
Very respectfully,
B. O. CARPENTER.

Hixton, Jackson Co., Wis., Dec. 30, '81
Cockle Separator Mfg. Co., Milwaukee.
Gents:—In answer to your inquiry of the 28th inst., I would say that the combined machine I bought of you last summer, works to my entire satisfaction. Respectfully yours,
W. T. PRICE,
per D. G. THOMAS.
P. S.—I have been milling now for twenty-seven years, but never have I seen anything that will equal yours in cleaning wheat.
As an Oat Separator it is No. 1, and for Cockle it cannot be beat. I can take screenings and separate the cockle from it without wasting any of the small wheat. In my opinion every mill in the United States ought to have one, and if I were to build a mill I would have no other.
Yours, etc. D. G. THOMAS.

Minneapolis, Minn. Aug. 22, 1881.
Cockle Separator Mfg. Co.:
We have been using two of Beardslee's wheat cleaners, a scourer and finisher, for nearly two years, and are passing one hundred and fifty bushels per hour through them, one third more than rated capacity, and are not using any other cleaners, and consider our wheat as well cleaned as any in Minneapolis.
Yours truly,
CAHILL, FLETCHER & CO.
La Crosse, Wis., July 30, 1881.
Cockle Separator Mfg. Co., Milwaukee.
Gentlemen:—The Beardslee Grain Cleaner sent me about the middle of June has been in operation since that

time with very satisfactory results. I cannot see that it breaks the wheat or requires an unusual amount of power to run it.
Yours truly,
WILLIAM LISTMAN.
Milwaukee, Wis., Aug. 23, 1881.
Cockle Separator Mfg. Co.
Gentlemen:—The Beardslee's Grain Cleaners which we have purchased from you for our New Era and Milwaukee Mills give us the best of satisfaction. Experienced millers having seen the work done by the machine agree with us, that it cannot be beat. You are at liberty to use our names as a reference, and any party calling on us we will be pleased to show the machine in operation.
Yours truly,
NEW ERA MILLING CO.

Pott's Patent Automatic Feeder! The best device for regulating the FEED ON ROLLER MILLS, PURIFIERS, and other machines requiring a regular feed, spread out the full width. Very cheap and simple. Sent on trial upon application. Write for circulars with illustrations. Perforated Zinc of all sizes at low rates. Send for Illustrated Catalogue.

STEEL CASTINGS

Works, CHESTER, PA.
[Mention this paper when you write us.]

FROM 1-4 to 10,000 LBS. WEIGHT.
True to pattern, sound and solid, of unequalled strength, toughness and durability.
An invaluable substitute for forgings or cast iron requiring threefold strength.
Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for Locomotives, etc.
15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over all other steel castings.
CRANK SHAFTS, CROSS-HEADS and GEARING, specialties.
Circulars and price list free. Address
CHESTER STEEL CASTINGS CO.,
407 LIBERTY ST., PHILADELPHIA, U. S. A.

Genuine Dutch Anker, DU FOUR & CO'S, —AND— Excelsior Bolting Cloths,

AT IMPORTERS LOWEST PRICES.
Sold by the piece, or cut and made up in any quantity desired. Plans of bolting complete for stone or roller mills. Address,
C. F. MILLER,
Mansfield, Ohio.

Northwestern Mill Bucket Manufactory

310, 312, and 314 FLORIDA STREET.

NORTHWESTERN MILL BUCKET MILWAUKEE

KING COCKLE MILL AND SEED SEPARATOR!

75 to 100 BU. PER HOUR. No. 1.
150 to 200 BU. PER HOUR. No. 2.
225 to 300 BU. PER HOUR. No. 3.
300 to 400 BU. PER HOUR. No. 4.

Pat. November 9, 1880. Gives 25 Grades of work by Change of Screen. No change of Screen. Requires no power. When used in Connection with Kurth Cockle Mill your cleaning capacity is more than Doubled. When used alone you have more Merit for the money than in any device yet invented. Write for circulars to La Du & King, Manufacturers, Rochester, Minnesota.

SIMPLE, DURABLE, ECONOMICAL. Cheaper than any other of EQUAL CAPACITY. Licensed under all patents owned by Consolidated Middlings Purifier Co. Eight sizes single and three sizes double machines.

The Lockwood Medal, "Awarded to the Geo. T. Smith Purifier, as the machine making greatest progress and utility in its application to the grain and milling interests, invented within the last ten years."
Millers' International Exhibition, Cincinnati, Ohio, 1880.



THE GEO. T. SMITH MIDLINGS PURIFIER

Was awarded THE HIGHEST PRIZE ever offered for the competition of milling machinery — THE LOCKWOOD MEDAL — at the great Exposition. Competition and comparison with every other known Purifier only established it more firmly in the esteem and approval of millers and mill-owners.
It was UNANIMOUSLY awarded the FIRST PREMIUM in its class by a jury of five of the ablest, most successful and experienced mill-owners in the United States, men who represented the milling of every variety of wheat; and the use of all the latest and most approved methods of new process and gradual reduction milling.
Our sales during the Exposition aggregated OVER ONE HUNDRED MACHINES, for every part of the country and for work on all kinds of stock.
We invite particular attention to our SPECIAL machines, combining in one all the features of both air and sieve Purifiers, perfectly adapted to handle and purify the breaks of roller mills.
Write for descriptive circular and price list to the
GEO. T. SMITH MIDLINGS PURIFIER CO., Jackson, Mich., U. S. A.
[Mention this paper when you write us.]

Is furnishing Mills and Elevators in all parts of the country with their superior BUCKETS. They are UNEQUALED for their SHAPE, STRENGTH and CHEAPNESS.
Leather, Rubber, Canvas Belting and Bolts at lowest market rates. We have no traveling agents. Sample Buckets sent on application. Large orders will receive liberal discounts. Send for sample order.
Address all inquiries and orders to
L. J. MUELLER, 197 Reed St., Milwaukee, Wis.
[Mention this paper when you write us.]

TRIUMPH POWER CORN SHELLER.

Shells and Cleans 2,000 Bushels Ears per Day.
The Cheapest, Best, and most Simple Power Corn Sheller in use. Send for Circular and Price List.
Manufacturers of Steam Engines, Mill Builders and Mill Furnishers.
HULBERT & PAIGE, Painesville, Ohio.
[Mention this paper when you write us.]

The Perfect Feed Box.

It insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address,
CASE MANUFACTURING CO.,
COLUMBUS, OHIO.
W. E. CATLIN & CO., 68 LAKE ST., CHICAGO, ILL., AGENTS.
[Please mention this paper when you write us.]

Nickle FLOUR TESTERS mailed for 25c.

The United States MILLER

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APR 13 1882
U.S. PATENT OFF.

Published by E. HARRISON CAWKER. { Vol. 12, No. 5. }

MILWAUKEE, MARCH, 1882.

{Terms: \$1.00 a Year in Advance. Single Copies, 10 Cents.}

BUDGETT, JAMES & BRANTH,
Flour Merchants,
BRISTOL, ENGLAND.

[Mention this paper when you write us.]

Chamberlain, Pole & Co.,

Brokers & Factors
IN FLOUR,
BRISTOL, ENGLAND.

[Mention this paper when you write us.]

Patrick Murphy & Son,
FLOUR AND GRAIN
BROKERS & FACTORS,

CORK, IRELAND.

American correspondence solicited.

[Mention this paper when you write us.]

H. G. JANSSEN & CO.,
Commission Merchants,

Amsterdam, Netherlands, Europe.

AMERICAN FLOUR A SPECIALTY.

Mention this paper when you write us.

GANZ & CO.,
Budapest, Austria-Hungary.

We are the first introducers of the Chilled Iron Rollers for milling purposes, and hold Letters patent for the United States of America. For full particulars address as above.

[Mention this paper when you write us.]



HENRY HERZER,
Manufacturer
and
Dresser
—OF—

MILL PICKS!
NO. 156 ON THE CANAL,
MILWAUKEE, WIS.

I have had twenty-two years experience in the manufacture and dressing of Mill Picks, and can do make as fine Mill Picks as can be made by anybody anywhere. I use only the best imported Steel for the purpose. My work is known by millers throughout the country, and is pronounced to be first class by the very best judges. We have hundreds of the most gratifying testimonials from nearly all the States. We solicit your orders and guarantee satisfaction. Address as above. [Please mention this paper when you write.]

Important Notice

For Millers about to purchase Roller Mills. We take this method of informing our friends that we have made arrangements for the exclusive manufacture of the

STEVENS ROLLER MILLS,

UNDER THE PATENTS ISSUED TO JNO. STEVENS.

The work done by the Mills is far superior to that of any other machine known in this country or Europe. License to use the machine and process will be issued by the patentee for each mill furnished by us. Old rolls, or those with inferior dress, recut with the Stevens dress at reasonable prices.

JOHN T. NOYE MANUFACTURING CO., Buffalo, N. Y.

[Mention this paper when you write us.]

Important Notice to Millers

I have this day granted to the **GEO. T. SMITH MIDDLING PURIFIER COMPANY,** of Jackson, Michigan, a SOLE and EXCLUSIVE license, under the patents of Morritz Martin, to manufacture and sell the Centrifugal Flour Dressing Reels, heretofore made by me, in THE WHOLE of the United States and Territories, reserving to myself only the right to complete and sell such machines as are already in process of construction.

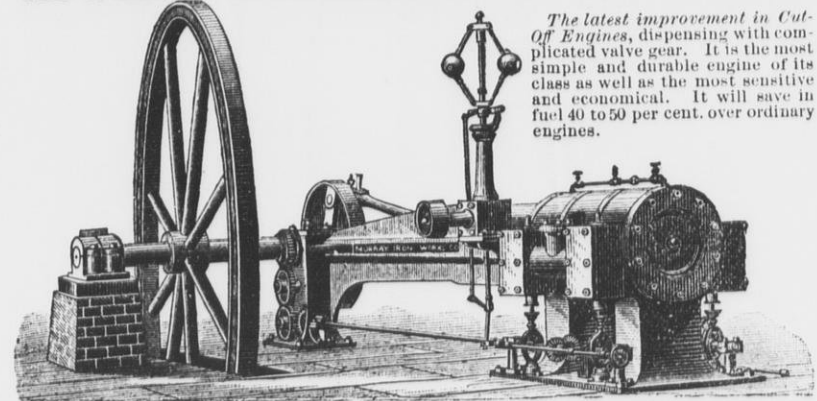
Millers contemplating the purchase of Centrifugal Bolting Reels, will do well to inform themselves as to the claims allowed Mr. Martin in his patents, which are the earliest granted on this class of machines, and cover all the important features of Centrifugal Flour Dressing Reels.

MORRITZ MARTIN,

By Bruno Kniffler, his Attorney.

Jackson, Michigan, Feb. 2, 1882.

"HOWARD" AUTOMATIC CUT-OFF ENGINE.



The latest improvement in Cut-Off Engines, dispensing with complicated valve gear. It is the most simple and durable engine of its class as well as the most sensitive and economical. It will save in fuel 40 to 50 per cent. over ordinary engines.

Built only by the **MURRAY IRON WORKS CO.,** BURLINGTON, IOWA.
BUILDERS OF ALL KINDS OF ENGINES AND MACHINERY.

Millers, Attention!

You can successfully purify the chop from either Stone or Rolls with the

Wheat Meal Purifier.

Satisfaction Guaranteed or No Sale.
THIRTY DAYS' TRIAL.

Send for circular and full particulars to

Wheat Meal Purifier Co.,

Academy of Music, MINNEAPOLIS, MINN.

[Mention this paper when you write us.]

MEAL & PREMIUM AWARDED TO
TURBINE WATER WHEELS
Most Perfect Turbine in Use.

ALCOTT'S IMPROVED TURBINE WATER WHEEL.
MANUFACTURED BY T. C. ALCOTT & SON, MOUNT HOLLY, N. J.

MANUFACTURERS OF
Circular Saw Mills, Shafting, Pulleys, Hangers & General Mill Machinery, Stating Particulars of Stream, &c.

Address: **T. C. ALCOTT & SON,** Mount Holly, N. J.

[Mention this paper when you write us.]

We have the BEST GATE in EXISTENCE and by it the Most Direct and Efficient Application of the Water to the Wheel.

The Wheel is STRONG, DURABLE AND EFFECTIVE. Transposed in Power at "part gate." Warranted to give full satisfaction.

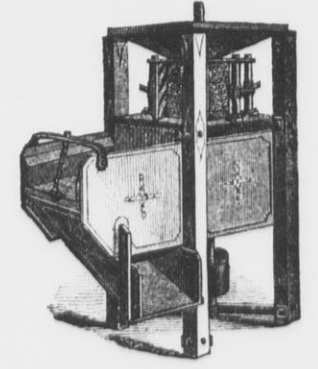
Mill Furnishing,
Foundrymen & Machinists.
Established 1851.
MANUFACTURE
MILL STONES.
Flouring Mill Contractors.
Send for Pamphlet.
Nurdyke & Harmon Co
Indianapolis, Ind.

[Mention this paper when you write us.]

JOHN C. HICCINS,
Manufacturer and Dresser of
Mill Picks,
No. 169 W. Kinzie Street,
CHICAGO, - ILLINOIS.

Picks will be sent on 30 or 60 days' trial to any responsible miller in the United States or Canada, and if not superior in every respect to any other pick made in this or any other country, there will be no charge, and I will pay all express charges to and from Chicago. All my picks are made of a special steel, which is manufactured expressly for me at Sheffield, England. My customers can thus be assured of a good article, and share with me the profits of direct importation. References furnished from every State and Territory in the United States and Canada. Send for Circular and Price List.
[Mention this paper when you write us.]

MARSHALL'S NEW CORN SHELLER.



The only Self-Adjusting Sheller in use that will
SHELL MIXED CORN
FAST AND WELL,

And that will clean it THOROUGHLY. Easy of access to all parts liable to clog. Thoroughly made. Sold as cheap as the cheapest.

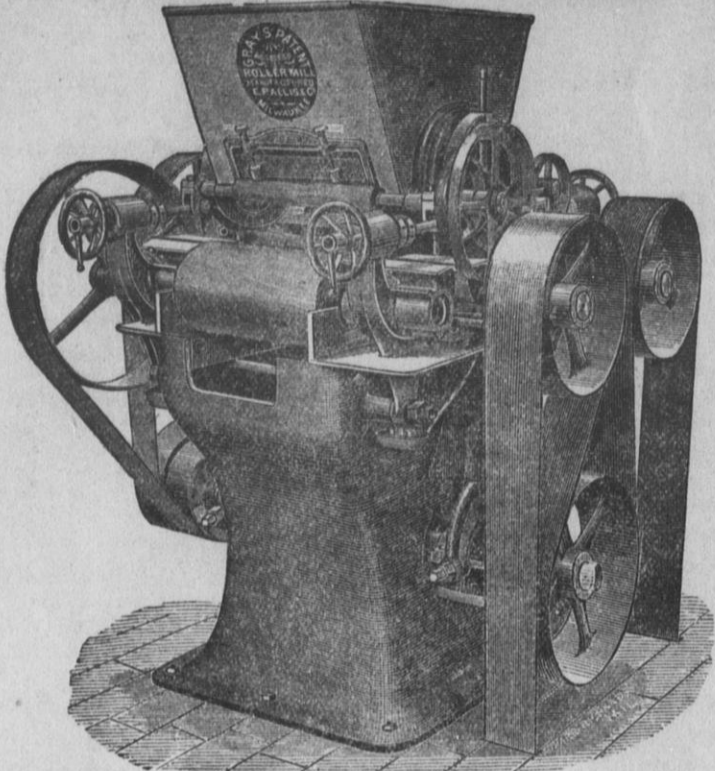
Send for circulars to
G. MARSHALL & SON, Mfrs.
Kilbourn City, Wis.

[Mention this paper when you write to us.]



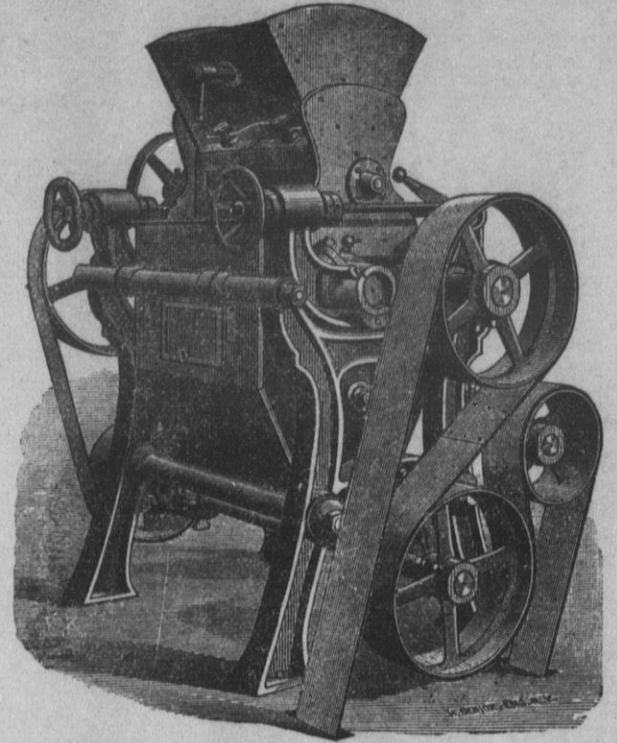
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GRAY'S PATENT NOISELESS ROLLER!



DOUBLE MACHINE.

MILLERS



SINGLE MACHINE.

WITH

CORRUGATED CHILLED IRON ROLLS.

CORRUGATIONS CUT OF ALL DESCRIPTIONS.

OVER 5,000 IN USE.

First Premium Awarded at Millers' International Exhibition.

These Machines require little power, are perfectly noiseless, being driven entirely by belt; are simple in construction; strong and durable; perfect in every adjustment; adapted to both soft and hard wheats.

We refer to the following prominent millers who are each using from 50 to 150 of these machines:

Winona Mill Co., Winona, Minn.
 C. A. Pillsbury & Co. Minneapolis, Minn.
 C. C. Washburn. " "
 Washburn, Crosby & Co., " "
 W. D. Washburn & Co., " "
 Sidle, Fletcher, Holmes & Co., " "
 E. V. White & Co., " "
 John Glenn, Glasgow, Scotland.
 Jones & Co., New York City.
 Geo. V. Hecker, New York City.
 Becker & Underwood, Dixon, Ill.
 Schurmeier & Smith, St. Paul, Minn.
 E. T. Archibald & Co., Dundas, Minn.

Jesse Ames' Sons, Northfield, Minn.
 J. B. A. Kern, Milwaukee, Wis.
 Edw. Sanderson, " "
 Daisy Roller Mill, " "
 C. E. Manegold & Sons, Milwaukee, Wis.
 Commins & Allen, Akron, Ohio,
 L. H. Gibson & Co., Indianapolis, Ind.
 L. H. Lanier & Co., Nashville, Tenn.
 LaGrange Mill Co., Red Wing, Minn.
 Waggoner & Gates, Independence, Mo.
 Horace Davis & Co., San Francisco, Cal.

And Hundreds of others.

To all parties purchasing our Rolls we give full information regarding the system of Roller Milling.

ADDRESS:

EDW. P. ALLIS & CO.,

Mention this Paper when you write us.

MILWAUKEE, WIS.

The United States

MILLER

Published by
E. HARRISON CAWKER. { Vol. 12, No. 5 }

MILWAUKEE, MARCH, 1882.

{ Terms: \$1.00 a Year in Advance.
Single Copies, 10 Cents.

{Written for THE UNITED STATES MILLER.}

Birkholz on Milling.

BY R. BIRKHOLZ, M. E.

THE CLEANING OF WHEAT.

It is impossible to make a clean and healthy flour from dirty wheat. The wheat, as it is brought to the mill, contains the following foreign substances, in variable percentage, which will color the flour: Loose dust, dust adhering to the berry, loose smut dust, smut adhering to the berry, beards or fuzz grown on points of the berry, cockle and other seeds, corn and oat kernels, shrunken, small or unripe kernels, sand and stones, pieces of wire (from wire binders), sticks and straws. The foreign substances found in raw wheat injurious to the health of the consumer are cockle and some other weed seeds, smut, and fungi grown on the wheat kernel, even though it be microscopically small.

All of these substances must be eliminated. When grinding wheat with stones, the cockle will produce black specks in the flour, and the prudent miller will anxiously seek to take out the cockle before grinding the wheat. When wheat is reduced on corrugated rolls, however, only the conscientious miller will eliminate his cockle, for the cockle bran is not lacerated or pulverized by the action of corrugated rolls, and it will not give black specks in the resulting product. The unconscientious—and I must confess that there are some—do not remove the cockle when grinding with corrugated rolls. They say, "The cockle flour improves the color of the wheat flour." What do such millers care for the poisonous action of the cockle flour mixed with the wheat flour, as long as it improves the color and enables them to run their mills without a cockle machine? It is self-evident that sand, stones and pieces of wire will injure the corrugations of the rollers or the dress of the stones. The pieces of wire found in wheat are from the wire-binding reapers, and it is indeed a blessing to millers that lately efficient binders have come largely into use, that use twine instead of wire. Straws and sticks will fasten themselves into the feeding apparatus of the rollers, and tend to impair the evenness of grinding.

The machines necessary for the elimination of the before-mentioned foreign substances, thoroughly, are a separator, cockle machine, smutter, magnetic separator, brush, and aspirator.

The separator will remove the loose dusts, seeds, oats, corn, sticks and straws, stones, small shrunken kernels of wheat, some wire and some cockle. The cockle machine will remove the balance of the cockle and the very small, shrunken and unripe wheat kernels and broken wheat. The smutter will polish the kernels, rub off the adhesive dust, pulverize the smut, and scour off the fuzz or tips of the kernels. There are three classes of smutters built. One class scours the wheat by dashing it against smooth surfaces and against itself, kernel against kernel; another class scours the wheat by rubbing it against corrugated surfaces, and the third class scours wheat by means of sand stones.

The machines of the first class are, in my opinion, the best, for they break but few kernels, polish well, and their capacity is large. Machines of the second class act too hard on the wheat—the bran is broken by the corrugations, kernels are split open, the flour magazine of the kernel is damaged and the flour rubbed out. The machines of the third class are also too severe in their treatment of the wheat. They tend to weaken the bran, produce too much smut flour, and their capacity is small compared with machines of the other two classes, while the power required to drive them is greater.

All three classes of these smutters tend to rivet the dust into the creases of the berry. This dust must be removed, and the simpler

the construction of the mill the greater is the necessity of removing such dust flour. To explain: All of the best and dearest mills bolt the flour out of their first break of the wheat. This flour is indeed the poorest made in any mill. The kernels are opened in first break rolls, and the dust drops out of the crease. In small mills, when but four reductions instead of six are employed (to suit the pocket-book of the small miller), the first break must be set closer, and it does not pay to eliminate the first flour, as other good bakers' flour is made, along with the poor dirty flour. Now in such a mill it becomes an absolute necessity to employ a brush machine to brush out the dirt riveted into the crease of the berry by the smutter. For small mills, the combined smutter and brush is indeed very profitable. These machines first smut the wheat and then brush it. For larger mills it will of course be necessary to employ a *bona fide* brush machine, to finish the cleaning of the wheat. From this machine the wheat is spouted or elevated and spouted to the bin over the stones or first break rolls. It is good for large mills to take away the dust which is made by the rubbing of the kernels against each other and the spout during its passage to the bin. This can be done by making a cataract in the spout near the bin end and sucking air through the stream of wheat, or by employing some aspirators, which are constructed for that purpose, provided with five or more cataracts and suction.

Wheat liable to contain pieces of wire must be passed over powerful magnets on its way from the smutter to the brush. Wires ought to be removed before the brushing is effected, in order to save the brushes from wearing away too rapidly.

Some spring wheat contains incredible quantities of cockle, and in order to avoid the overloading of cockle machines, it is advisable to put in between the separator and cockle machine a wire-rolling screen, clothed so as to let the cockle and small wheat drop through. The tailings of such a screen are large wheat, free from cockle. This may be passed right along to the smutter. The dust made by all cleaning machines should be sent to a dust-room; and I will here state that owing to the fuzziness and lightness of this smut dust, this dust-room ought to be, if possible, better than those usually employed for purifiers. The cloth ought to be self-cleaning and fine meshed, owing to the injuriousness of just that fine dust, which will pass even through the finest cloth. I think flannel is best to cloth such a room with, and there ought to be plenty of it. The smut dust can be mixed with the bran or shorts.

It is always a good plan to keep the wheat-cleaning machinery by itself—insulated and partitioned off from the mill proper,—for the reason that they produce a certain dust which is, as before mentioned, very injurious to operatives, as it is irritating to the lungs. Cleaning machines displace a great quantity of air, and will draw off a great deal of heat from the mill proper in cold seasons, if no dust-room is employed, and will render the mill very drafty. Cleaning machines are fast running machines, and are liable to cause fires. If the cleaning machinery is partitioned off from the mill proper by brick walls, insurance companies will give far lower rates than they otherwise would.

Mills having a high basement may best keep their grain cleaning machinery therein, as the machines are usually heavy and heavily driven, and in this place they are easy to attend without running up and down stairs. In mills with a capacity of more than 150 barrels of flour per twenty-four hours it is best to place cleaning machines one below the other, thus saving power in re-elevating large quantities of wheat.

In a winter-wheat mill having a basement and four stories above, place the separator in

the attic, smutter on floor below, and brush on floor above grinding floor. A winter-wheat mill does not need a cockle machine so much as a spring-wheat mill, as winter wheat is singularly free from cockle as compared to spring wheat.

A four-story spring-wheat mill grinding wheat containing a moderate quantity of cockle ought to have the separator in the attic, cockle machine below, smutter below that, and the brush in the basement—keeping all cleaning machinery away from the grinding floor.

A three-story spring-wheat mill ought to have the separator in the attic, cockle machine in story above grinding floor, and the two heaviest machines, smutter and brush, in the basement. A spring-wheat mill grinding very cockly wheat containing pieces of wire, ought to have the separator in the attic, rolling-wire screen hanging under floor below, cockle machine standing on floor below, smutter on floor above grinding floor, and brush in basement, and so on.

It is the practice of the best mills of the country to arrange the driving of all cleaning machines, their elevators and conveyors, so that the whole combination can be stopped and started easily and while other machinery is running. Cleaning machines of large capacity are chosen, and are only run twelve to fourteen hours per day, during daylight. At night this dangerous machinery is allowed to remain idle. A suitable bin over the wheat stones or first break rolls should be provided.

Large mills get quite an amount of separated oats, corn, small shrunken wheat, cockle and broken but good wheat. Their practice is to take the cockle and poor shrunken wheat and grind it on a corrugated roll, and send the meal, without bolting, directly to the bran bin. The oats, corn and broken good wheat they grind in another finely corrugated roll; the meal is then sent to the scalping reel of the sixth break. This practice has been found to be very lucrative.

To sum up: The cleaning of the wheat is just as important a factor in the production of good and healthy flour, as the purification of the middlings. **BE CAREFUL WITH EACH.**

Milling Points.

ABOUT BUCKWHEAT.—A French authority (G. Le Chartier) says that frequently buckwheat straw is richer in phosphoric acid than the grain itself which is never the case with other cereals. A crop of buckwheat takes more fertilizing matter from the ground than other grain does if the straw is removed from the ground. Buckwheat straw rotted and used as manure is a valuable fertilizer for any grain crop. Buckwheat should be well hulled before it is passed to stones or rolls. Rollers with sharp corrugations have been used successfully for making buckwheat flour recently. Cranson's buckwheat huller is a good machine for the purpose. Old stock stone of a very porous nature should be used. The furrows should be smooth and have a fine feather edge. From 8 to 14 cracks per inch should be put in. About 60 pounds of flour should be produced from 100 pounds of buckwheat. It should be run through a No. 14 bolting reel after the first grinding and that which does not bolt through should be returned to the stones and reground and bolted again. A great deal of buckwheat is raised in the New England and Middle States and in the province of New Brunswick. It is however raised we believe in all of the Northern and Western States to a greater or less extent.

CORN, (Maize) GRINDING. There is probably no better method of reducing (grinding) corn than with a pair of ordinary millstones. The dress usually adopted in the West where a 4 feet stone is used has 12 leading furrows with 4 inch draft; 12 second furrows laid off from a circle 12 inches in diameter and 12

short furrows laid off from a circle 24 inches in diameter. The furrows are deep at the back feathering out to the front and leaving a light catch at the edge of the land. The lands are cut at an angle of 45 degrees with the draft and about 1-16 of an inch apart.

REMOVING MILLSTONE GLAZE.—The Fry process for taking off the glaze of millstones, which was so much talked of a few years ago, was as follows: First the burrs must be put in perfect face, well dressed, out of wind, and in the best possible condition for grinding. They are then run a couple of hours until they become warm, taken up, and washed with aqua ammonia in the following manner: Take four ounces of aqua ammonia (spirits of hartshorn) and thoroughly saturate the stones with a good sponge, and let them stand over night. By doing this once a week, or oftener if necessary, the glaze will be kept off. His second method was to take two ounces each of borax, washing soda and muriate of ammonia, and dissolve them in a quart of warm water; then add cider vinegar. Now cover the stone with sand, and apply the solution with a sponge. Leave it on ten minutes, and then dry the stones thoroughly. This is said to harden the burrs so that nothing, not even garlic, can glaze them, and they will retain their natural temper and grit for weeks, and will not glaze.

TO KEEP MACHINERY FROM RUSTING.—Take ½ ounce of camphor, dissolve in 1 pound of melted lard, take off the scum and mix in as much fine black-lead as will give it an iron color. Clean the machinery and smear with this mixture. After twenty-four hours rub clean with a soft linen cloth. It will keep clean for months under ordinary circumstances.

TO OIL A MILL SPINDLE.—Somebody says: The best way to oil a mill spindle is to guide the oil through a small gas-pipe half an inch in diameter, from the outside of the curb down below the hurst frame to the bottom of the stone, and thence with an elbow to the bush, upward to a level with the top of the bush. This will thoroughly oil the spindle, and is not a very expensive arrangement.

SHARPENING MILL PICKS.—Emery wheels have been quite extensively used for sharpening millpicks. The best size of wheel for this purpose is said to be 8 inches in diameter by 1½ inches thick. A machine for the purpose of sharpening mill picks with wheel complete is in the market and can be purchased for about thirty dollars.

SHEAR'S a student of modern milling concludes that wheat should not be handled tenderly in cleaning. "In twelve years experience" he says: "I have never seen wheat overcleaned. No smutter using steel or chilled iron surfaces has ever scoured wheat too much, if unbroken. The brush is a great help but it is not intended to take the place of the smutter."

WATERLOO, IOWA, has a new organization proposing to improve a water-power at the south part of the city. There is already one power improved there, and four large mills and factories in operation. The new power is to be formed by the building of a dam about 4,400 feet below the one now built, and from it a race two miles in length will be constructed through a neck of land, and emptying into the Cedar river again. This race will be 100 feet wide, and a fall of 7 feet will be obtained. The articles of incorporation allow a capital stock of \$300,000, and it is proposed to go to work as soon as possible in the spring. The Cedar river at this point is about 600 feet wide, and is very rapid, so that it will furnish, when properly developed, almost unlimited power.

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We send out monthly a large number of sample copies of the UNITED STATES MILLER to millers who are not subscribers. We wish them to consider the receipt of a sample copy as a cordial invitation to them to become regular subscribers. Send us One Dollar in money or stamps, and we will send THE UNITED STATES MILLER to you for one year.

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THE UNITED STATES MILLER appears this month in an entire new dress of body type. We trust its improved appearance will gratify our many readers.

MILWAUKEE MILLERS like their brethren all over the West, complain of dull times a little but are looking forward to lively times after harvest.

EVERY flour broker or mill furnisher or any other person desiring to reach the flouring mill owners of America should purchase a copy of Cawker's American Flour Mill Directory for 1882. It contains 22,844 names and addresses. Price, Ten dollars per copy. Sent postpaid to any address on receipt of price. Address, United States Miller, Milwaukee, Wis.

THE United States Consuls in various parts of the world who receive this paper, will please oblige the publishers and manufacturers advertising therein, by placing it in their offices where it can be seen by those parties seeking such information as it may contain. We shall be highly gratified to receive communications for publication from Consuls or Consular Agents everywhere, and we believe that such letters will be read with interest, and will be highly appreciated.

THE C. A. Gambrill Manufacturing Company has nearly completed its new flour mill at the lower end of Smith's dock, Baltimore, Md. It is to be known as Patapsco Flouring Mill "B." The company runs two other mills, one of which, Patapsco Flouring Mill "A," is at Elliott City and the other at Orange Grove Station, Baltimore and Ohio Railroad. The new mill, which is built of brick, is 123 by 65 feet, and 78 feet high. It will have a capacity of 500 barrels per day, and will rank in completeness with any mill in the country. It has all of the most improved appliances, having been constructed on the roller system. The mill has twenty-three double sets of the Dawson Brothers' chilled-iron rolls, sixteen of

Smith's purifiers, six aspirators, ten dust-catchers, and two boilers of 160 horse-power each. There is a fine wharf property belonging to the new mill. The dock tower is capable of taking out 3,000 bushels per hour. The storage house, adjoining the mill proper, will hold upward of 120,000 bushels of wheat, all of which will be handled by machinery. It has twenty bins, each of which will hold 5,700 bushels of wheat, and there are besides two upper floors for wheat.

The Denchfield Patent Case.

We are reliably informed that the Executive committee of the Millers National Association have fully determined to legally contest the claims of the owners of the Denchfield Patent. The council for the Association upon examination of the case conclude that they have a good defense. On the other hand the Denchfield party claim that they have so far always been successful and that they know of no reason why they will not continue to be so.

Personal.

During the month of February THE UNITED STATES MILLER was favored with calls from the following persons connected with the trade:

Frederick Ogden, Esq., late of the firm of Esser, Ogden & Co., Buffalo, N. Y.

William F. Putnam, Esq., head miller for Hickox & Co., Cleveland, O.

M. H. Buck, Esq., Delafield, Wis.

Samuel Darrah, Esq., Stone Bank, Wis.

G. M. Marshall, of Kilbourn City, Wis.

Wm. Norman, Newburgh, Wis.

William McLain, of the Richmond Manufacturing Co., Lockport, N. Y.

W. C. Edgar, business manager of The Northwestern Miller.

Geo. B. Heckel, Chicago, representative of The Lockwood Press.

Mr. Glessner, of Thornburgh & Glessner, Chicago, Ill.

French Opinion favorable to Mill stones.

Charles Touaillon, the French milling engineer recently concluded a communication to the Paris *Echo Agricole* as follows: "We repeat that what for a long time has been done by rollers in Hungary, and more recently in some other countries, proves nothing in their favor; this is a system which takes us back to when *moture a la grosse* was in its infancy. The real end to be sought should be to obtain a single and straight grade at one operation; rollers give as many qualities as the number of grindings, which reaches ten or twelve. Rollers flatten and cake the middlings of soft wheat instead of dividing it. One should strive to make as fine a powder as possible in order to avoid making irregular or, what is in England called 'strong' flour, which yields a heavy and indigestible bread, and which could not be eaten were it not cut into infinitesimal pieces and covered with a considerable quantity of butter. Whatever may be said and done, it is only in making a fine flour, with a regularity in the bolting of it, that one can attain perfection in the art of milling. The demand for good bread will certainly advance with civilization, and those who do not follow in the steps of progress will be soon outstripped, and will be forced to return to good stones, and the outlay they may have incurred will be lost."

Re-Issued Patents.

A U. S. SUPREME COURT DECISION.

January 9th 1882 Honorable Justice Bradley delivered the opinion of the Supreme Court of the United States in a case appealed from the U. S. Circuit Court in Connecticut. We have not space to publish the complete text of the decision but it fully settles three points regarding re-issued patents as follows:

First, That where the only mistake suggested is that the claim of the original patents is not so broad as it might have been, the mistake, if it was a mistake, was apparent upon the first inspection of the patent, and if any correction was desired it should have been applied for immediately, and the right to have it corrected was abandoned and lost by unreasonable delay.

Second, That if a patentee who has no corrections to suggest in his specification, except to make his claim broader and more comprehensive, uses due diligence in returning to the Patent Office and shows how such mistake occurred, his application may be entertained; but it must be remembered that the claim of a specific device or combination and

an emission to claim other devices and combinations apparent upon the face of the patent are in law a dedication to the public of that which is not claimed, and the legal effect of the patent cannot be revoked unless the patentee surrenders it and proves that the specification was so framed by real inadvertence, accident, or mistake, without any fraudulent or deceptive intention, and this should be done with all due diligence and speed.

Third, That it was not the special purpose of the legislation upon reissues to authorize the surrender of patents for the purpose of reissuing them with broader and more comprehensive claims, although under the general terms of the law such a reissue may be made when it clearly appears that an actual mistake has inadvertently been made, not from a mere error of judgment, but a real *bona fide* mistake, such as a court of chancery in cases within its ordinary jurisdiction would correct.

Our Chief Grain and Flour Ports.

There are only three ports in the United Kingdom which imports more than a million quarters each of wheat annually. Liverpool heads the list with an average of four millions, London follows with three millions, and Hull with about one million one hundred thousand quarters. The only other ports which exceed half a million quarters are Bristol, with an average of 750,000, Dublin 800,000, and Glasgow and Cork each about 500,000 quarters. In flour imports, Glasgow comes first, with a total for last year of 1,400,000 sacks (280 lbs.), or twice as much flour as wheat. Liverpool stands second with an average for the past three years of 1,000,000 sacks, while London receives about 850,000, and Leith, the next largest amount of 300,000 sacks. Hull, although the third largest importer of wheat, only imports 60,000 sacks of flour. Cork appears to be a specially favoured port, for, with an import of 500,000 quarters of wheat, it has not, on the average, received 1,000 sacks of flour annually. Taking the average of the past three years, we find that England and Wales imported annually 9,000,000 quarters of wheat, and 2,500,000 sacks of flour, the flour bearing the proportion of 15 per cent. to the wheat. Scotland imported 1,000,000 quarters of wheat, and 1,600,000 sacks of flour, the quantities of each being about equal. Ireland imported 1,600,000 quarters of wheat, and only 150,000 sacks of flour, the proportion of flour imports being only about 6 per cent. of the wheat imports. The Irish imports of flour are very low, but a portion of the Liverpool and Glasgow imports is re-exported to Belfast and Dublin.—*The Miller* (London).

Proofstaffs.

The proofstaff may be said to be the foundation almost of good milling with buhrs. The proof can always be rectified by putting two already proved staffs to it. The slate staff is the best, and it can be easily made. It may be made five feet long so as to be suitable for any size of stone, and it is not half so expensive as the iron staff, while it is entirely more correct, and is never known to vary. It ought to be at least two inches in thickness. It will never be affected by temperature, and in a large country like ours it is necessary to have a staff of this kind. The best iron staff cannot be wholly depended on, but must always be proved before using, then rectify your staff to the proof, put a little oil on it very evenly distributed all over and reduce all the highest places on the staff until it shows an equal bearing on every part. In proving the stone place a piece of tissue paper under each end of the staff and one under the middle and keep the staff about three inches from the eye. The stone should be tried in this manner all around, and if correct it will hold all the papers so that they cannot be pulled from under the staff. In proving a new stone, place a screw with the head rounded to form a pivot for the staff to turn upon, in the eye of the stone; make a place in the staff about a quarter of an inch deep, lower the screw until the staff, if the stone is true, will swing round evenly.

The stones should always staff from the skirt with a good face and if the buhrs are very incorrect when the staff is laid on dry to try them, it would be well to rub them over with a piece of buhr. A good buhr block is far better than the corundum polishers. When the stones are staffed first only the very large spots should be knocked off with the pick, and two or three coats of paint should be aken off in this way, and then the dressing of the buhr will be easy and swift. Never

allow the staff to cross the eye under any circumstances. If this is done it may take a week to dress a stone that could be dressed in a day. I used to face blocks fifteen years ago, and generally faced eight a day, at fifty cents each, which was more money than the builders could make, and it was done because I knew how to staff them.—*Millstone*.

California Wheat Overland.

From the Rochester Democrat-Chronicle.

The farmers of California produce a large amount of wheat not needed for home consumption. The surplus has been shipped to Europe by a long and, at some points, dangerous water route. Most of it has sought San Francisco for shipment, and has given employment and profit to many persons. But within the present month the course of California's outgoing wheat has been changed to a considerable extent, and the prospect is that the new outlet will assume very large proportions. The opening of the Southern railroad route to the Eastern States gave the wheat dealers a sharp thought, and the new idea is in process of rapid development.

San Francisco about the middle of the present month was startled by a telegram from Bakersfield, a point which taps great wheat valleys of the State, that from twenty to fifty cars loaded with wheat pass that point daily, bound east. Further information notified the San Francisco Board of Trade that on the 16th of the month there were upward of 400 loaded cars between Bakersfield and Lathrop ready for shipment to St. Louis. The *Morning Call*, of San Francisco, in noticing the outlet, says: "This is probably the first California wheat that ever left the State, except through the Golden Gate. This sudden change in wheat shipments is almost startling. What will be its effect on San Francisco? We think the loss of a portion of the grain business will not injure San Francisco, for the banking of the interior wheat shippers will continue to be done in San Francisco. The capital to move grain will be furnished from here; the Eastern and foreign exchange bills drawn against wheat will be negotiated here, and all the loss this city will sustain will be the handling, which is not very much. It was said of old, that all roads lead to Rome, and all interior facilities and new routes for transportation must eventually lead to San Francisco."

It is evident that if the new way of outlet should in all respects prove to be the cheapest and best, it will be quite a damper to certain San Francisco interests. Yet the San Francisco journals have a faint word of rejoicing for the California farmers, as "everything that helps California farmers," they say, "helps San Francisco." One journal says: "Whenever the great valleys of the Sacramento and the San Joaquin are prosperous San Francisco is prosperous. Reduced freight rates mean more money for the wheat-raiser, more improvements, and more supplies will have to be purchased in this city to meet new demands.

Just what effect this new movement is to have upon prices of wheat east of the Rocky mountains, and how it will affect certain shipping routes, remains to be determined.

New Publications.

HARPER'S MAGAZINE for February, 1882. Published by Harper & Brothers, N. Y. Subscription price \$4.00 per year.

Harper's Magazine for March is full of handsome illustrations and notable articles.

THE CENTURY MAGAZINE The Century Co., New York, Publishers. Subscription price, \$4.00 per year.

CONSULAR REPORTS, from Department of State, Washington, D. C.

COMMERCIAL AND STATISTICAL REPORTS from the Treasury Department, Washington, D. C.

THE U. S. MONTHLY MAGAZINE, published by the U. S. Monthly Publishing Co., Lakeside Building, Chicago. Subscription price, \$1.00 per year.

THE AMERICAN MAIL AND EXPORT JOURNAL, published by Howard Lockwood, 74 Duane Street, N. Y. Subscription price, \$3.00 per year.

FENWICK & SWENERTON'S flour mill, at Exeter, Ontario, was destroyed by fire on February 8, with 3,000 bushels of wheat and 300 bags of flour. The loss is \$21,000. The building is insured for \$2000 each in the Western and British American, and \$6,000 in the Phoenix of London. The stock is insured for \$2,200 in the Queen, and \$1,200 in the Royal. Smith Bros. millwright shop on the Canal was damaged by fire, on the evening of February 17th to the extent of about \$500. Insured Messrs. Smith Bros. are now established in their new quarters on the East Side.

The Dearness of Cheap Machinery.

There are plenty of people who are always looking after good articles, but they do not want to pay a good price for these articles when they find them. They seem to be oblivious of the truth that good things cost money, and that the best class of labor and material is required in turning out superior productions.

A man starts out to purchase a piece of machinery; he wants it to do perfect and exact work; he wishes it to have the latest and best improvements, and to be capable of turning out work with rapidity. Such machines, of course, can be procured, but not for a mere song.

To produce them requires well-appointed works, an experienced management and skillful workmen. But these can only be obtained by the expenditure of large sums of money. It is, therefore, idle to expect that the work they produce should be as low in price as though the workmen were of the cheaper sort, and the works less expensive in their construction. But the would-be cheap buyers insist upon the maker of the better machinery placing it in competition with that produced in the poorer works by the poorer labor. One unfortunate disadvantage which the maker of the best machinery labors under, is his inability at times to show to the casual observer wherein his productions are better than another's. A great deal of work may be expended in the proper fashioning of intricate and delicate parts, or in fine adjustment, that may not be apparent to the eye, but is displayed only in the accuracy and perfection of the operation of the machine.

Every machinist knows how rapidly the expense runs up when employing the high-priced workmen in such fine operations, and he also knows that he can not get a perfect machine without such expenditures. But the cheap buyer comes along and says: "Why do you ask so much for your machine? I was offered one of the same kind for very much less than you demand?" Of course the dealer may contend that his is superior to, and that it will be more lasting and serviceable than the cheaper machine, but this does not satisfy Mr. Cheap Buyer. Because the castings, the fashioning and the painting of the poor machine look equally as well as the good one, he thinks there is no difference between them. Sometimes he is confirmed in his belief by the advice of his foreman, who, himself, may not be a judge of good machinery.

Doubtless some manufacturers are content to work for a smaller margin of profits than others, and sometimes, a good judge of machinery can make a saving by comparing prices, but we believe actual experience will demonstrate that in nine cases out of ten, the man who is always looking for cheap-priced machinery pays a relatively dearer price than one who seeks for the best article that he is able to buy. Good tools and machinery, as we have said, command a good price, but they are permanent investments which always yield a good interest. Good tools and good workmen yield the best attainable results in the factory, and it is the poorest policy to hire cheap labor to run cheap machinery, if good work is expected as the result.

Many and many a manufacturer has congratulated himself on his shrewdness in saving a few hundred dollars in purchasing machinery, who has, in fact, lost thrice the sum saved in the difference in the effectiveness of the machinery which he did buy, and that which he could have procured by paying the higher price.

Any good mechanic will verify the assertion that machinery which is constantly getting out of order, and that never does accurate work, in those cases where accurate work is needed, is dear at any price; and yet, there are plenty of shops and factories fitted out with just this kind of machinery, which was purchased because it was cheap.

A manufacturer of this city, desirous of procuring a machine that would make a difficult cam, went to a manufacturer and asked him what he would charge for getting up such a machine as he wanted. The price, which seemed to him a very high one, was named, and after some reluctance and an attempt at bantering, the machine was ordered. A few months after it was taken home and in operation, the maker called on the purchaser to see how he liked it.

In response to an inquiry, the purchaser said: "When I ordered the machine, I thought I was paying you a high price, as it was double what I had been offered a similar machine for, but after getting the machine

home, and seeing the work it performs, I am free to tell you I am perfectly satisfied, and would pay double the price rather than be without it. I have no machine that begins to compare with it in my shop." This instance, which has hundreds of parallels in this city, is sufficient to practically illustrate the point we are urging, that good machinery is always good, while cheap machinery may not always be cheap.

There can be no objection to a man setting out to buy poor machinery at a poor price, if he knows what he is buying, but it is extremely foolish for him to buy a cheap and poor article with the belief that he is obtaining a good one.—*Industrial World.*

Scale and Foaming in Boilers.

Most all water contains vegetable, earthy and solid matter in solution; those which occasion the greatest trouble are probably sulphate and carbonate of lime, oxide of iron, magnesia, alumina, and silica, and are found in greater or less proportion in waters of different localities. They are capable of being precipitated by heating water to a high temperature, as in the case of the steam boiler, when the precipitated salts settle, covering the tubes, sides and bottom of the boiler with a thin coating for each quantity of water heated, which, if not properly treated, will soon form a hardened scale very difficult to remove. The best preventive of scale is probably a good filter-heater, in which the feed-water can be raised to a temperature sufficiently high to deposit the matter held in solution, in the filter of the heater, before entering the boiler. A practice which facilitates the making or hardening of scale in boilers, is that of blowing out the water under high pressure. The only time to open the blow-cock when under steam is in the morning before starting the engine; a small percentage of sediment may then be blown out, but it should only be continued for a few moments at farthest.

When the boiler is to be emptied it should, if circumstances will allow, stand until the brick-work, water, etc., become quite cool; then the blow-cock can be opened, and while the water is running out, or immediately after it is out, take off the man-hole plate, and with a hose wash the sheets and tubes well while the sediment is still soft. With this treatment very little scale will adhere to the iron, but all that does should be dislodged as soon as possible, and on every occasion, by scaling bars, chisels, and hammers. Any sediment which the washing fails to remove should be scraped out before refilling the boiler. In cases where blowing out is compulsory, it should be done with as low a pressure as practicable. Water should be run out whenever it shows signs of being dirty; about once in two weeks is sufficient, as there is no use of emptying the boiler of water which has made its deposit and is comparatively good, to replace it with that which contains matter in solution to form new scale.

The great objection to scale is, that being a non-conductor of caloric, it prevents a large proportion of the heat of the furnace from entering the water, the heat escaping up the chimney, causing a waste of fuel and decreasing the evaporative power of the boiler.

With a heavy deposit of scale there is great danger of the iron which is in contact with the fire becoming burned, as the scale interposes a barrier to the radiation of the heat, also separates the water from the iron.

Foaming—Is a mixture of steam and water, and is the result of violent ebullition or agitation. It is caused, first, from poor circulation, owing to too great a number of tubes and flues, having insufficient spaces between them for the rise of the steam bubbles from the surfaces on which they are generated, and their rapid replacement by the surrounding water. A second cause is a contracted steam space; and thirdly, muddy or mucilaginous substances in the water.

Sometimes foaming is the result of carrying the water too high, in which case it should be blown down to its proper level.

When caused from the poor circulation, or from defect in the design of the boiler, to remedy it the engine would probably have to be throttled or cut off closer, the fire dampened with coal, and the pump or injector started before the trouble would cease.

Foaming caused by poor circulation is the result of the undue relation of temperature between the steam bubbles and the water, the excessive high temperature of the bubbles causing them to rise violently, carrying the water with them. When caused by mucilaginous substances the only remedy is changing the water.

The objections to foaming are the difficulties of ascertaining the water level and the danger, when violent ebullition occurs, of knocking out the cylinder heads, or otherwise damaging the engine. Water is made manifest in the cylinder by a peculiar knocking at the end of the stroke, and by a decreased speed of the engine.—*H. L. Stellwagen, in Mechanical Engineer.*

A Novel Steam-Ship.

In a new steam-boat now building upon the Hudson, an attempt is being made to produce a boat that shall be self-righting, that shall be very fast, and that cannot sink unless entirely torn to pieces. The boat is comparatively small, as it is intended only for an experimental or model boat. If successful, it is intended to build ocean steam-ships upon the same principle. It appears that the inventor's aim is to make a self-righting boat by carrying the sides over the deck in the form of a dome. The side frames are made continuous and meet over the center of the hull, or, in other words, the frames begin at one side of the keel, rise directly at an angle of about forty-five degrees to the water-line, and then curve inward over the deck and back on the same lines to the keel. A section of the hull taken in the center is thus of a wedge shape, with a sharp edge below and rounded top above. This wedge form is preserved through the entire length of the hull. There are no hollow lines in the boat, and the sharp, overhanging bow is intended to part the water near the surface and to form a long, tapering wedge. The widest part of the hull is exactly at the middle, both ends being precisely alike. This is quite different from the flat bottom and straight sides, with comparatively bluff or rounded bows, of the ordinary ocean steam-ship. The boat is intended to be much deeper aft than forward, and the deck will be much higher above water at the bows than at the stern. There will be no houses or raised constructions of any kind on the deck, except the dome-shaped pilot-house, the ventilators, and the smoke-stacks. There will be an open railing around the center of the deck, so that it can be used as a promenade in pleasant weather or whenever the seas do not break over the boat. The object of this unbroken dome-shaped deck is to enable the boat to throw off all waves that break over the bows or sides in rough weather.

It is thought that, instead of shipping tons of water and retaining it on deck till it can be drained off, the boat will shed or throw off the water from the long, sharp bows and open deck, and will at once relieve herself of the weight of the water. Waves striking the rounded deck will have no hold on the boat, and their force will thus be spent harmlessly. The sharp wedge-shape and rounded top of the hull, and the fact that even when fully loaded the center of gravity will be below the water-line, makes the model self-righting. From experiments with a small model, this claim of the inventor seems to be clearly proved. In laying out the boat, only the spar deck will be used for passengers, the main deck and all below being intended for cargo, coal, and engines. The state-rooms will be arranged along the outside, each room having a port in the side of the boat, while the ceiling will be formed of the curved deck above. The saloons will be the whole width of the ship, and on the spar deck. For lighting the saloons there will be sky-lights in the center, and as these in rough weather may be covered by the seas that sweep over the deck, they will be very strong, and will be air-tight. To secure ventilation there will be steam-fans, kept in motion at all times, and maintaining a good circulation of air through every part of the boat. For this purpose the fresh air will be taken through wind-sails on the deck, and the exhaust air from the rooms will be turned into the blast used in forcing the boiler fires.

No boats are to be carried on deck; the life rafts and boats will be kept in an apartment under the domed deck at the stern, and when they are to be launched, doors will be opened in the deck and the boats launched in the usual way from davits through these doors. The pilot-house will be at the bows, and will be entirely inclosed. It will not rise much above the deck, and will be entered from below.

There will be no masts or sails, as it is intended to depend wholly on the engines for propulsion. In constructing the hull, to secure great strength, three heavy trusses, or "hog frames," are to be placed on the keel, each one rising to the spar deck and securely fastened to the side frames of the boat. The ceiling will be double, and placed diagonally

on the frames. In the larger steam-ships, the absence of sailing power will be compensated for by two extra engines and two supplementary screws, that can be employed in case the larger screw is lost or the main engines break down.—*"The World's Work," in THE CENTURY for March.*

The Block System.

Frank L. Pope, the well-known patent expert, says: The most perfect description of the block signal is that known as the automatic system. The two rails of a stretch of track the length of the desired block are part of an electric circuit. So long as there is no metallic connection between the two rails a magnet at the signal post holds up the signal, meaning that the block is clear. But the moment a train rolls on the track connection is established between the two tracks by means of the wheels and axles of the cars, and the danger signal is displayed. When the train rolls off the block the connection is broken and the danger signal disappears. This system is in use on the Fitchburg railroad between Boston and Waltham; on the Eastern railroad between Boston and Salem; on the Old Colony road, and on the Pennsylvania road between Altoona and Cresson. On the Fitchburg road it has worked perfectly for the last three years, costing but little and doing the service to the complete satisfaction of the company. On some roads the ringing of an electric bell replaces the more perfect telegraph system used on the Pennsylvania road between New York and Philadelphia.

The great advantage of the block signals over every other kind of signals is that the engineer knows where and when to look for the signals, whereas through inattention he may not perceive a man standing at the side of the track swinging a lantern, especially if the steam of the engine is blowing in the engineer's face. But an engineer that is accustomed to look out and see that the block signal is all right will never miss it. Trains can now be brought to a stop so quickly by means of the Westinghouse brakes that the danger of collision can be almost certainly averted by the prompt display of danger signals. It has been repeatedly proved that when the rails are dry a train running at the rate of twenty-five miles an hour can be stopped in 210 feet—about the distance of a short city block. Going at the rate of thirty miles an hour a train cannot be brought to a stop within 300 feet. When the rails are damp 40 per cent. must be added to the distance that a train will run before stopping.

Centrifugal Reels.

An announcement on another page will, doubtless, attract attention, for it gives notice of a new departure made by the widely known Geo. T. Smith Middlings Purifier Company, of Jackson, Mich. The company has been granted, as will be seen by reference to the notice signed by Morritz Martin, of Bitterfeld, Germany, per his attorney, a sole and exclusive license to manufacture and sell the centrifugal flour dressing reels, heretofore made by Mr. Martin, in the whole of the United States and Territories, the patentee, Martin, reserving to himself only the right to complete and sell such machines as are already in process of construction.

The Martin patents are the earliest granted in this country on centrifugal machines, and parties interested will do well to examine into the claims allowed on them before placing orders. The licensees for this country claim that the Martin centrifugal flour dressing reel has more than four times the capacity of the ordinary reel, and will make clear flour and a clean finish on stock that can not be treated in the common reel without loss, no matter how much silk it is passed over. It is specially adapted to handling soft, reground material, full of light impurities, whether from rolls or stones. It is indispensable to a close finish in any system of gradual reduction milling, and will improve the quality of the low grade flour at the same time it makes the offals cleaner. It makes a clean separation on caked and flaky meal from smooth rolls, which no other style of reel can do. It can be used to advantage as a complete system of bolting, to the exclusion of the ordinary reel.

We commend to the careful reader a perusal of the advertisement and an application to the Geo. T. Smith Middlings Purifier Company, Jackson, Mich., for descriptive circulars and price lists.

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E. HARRISON CAWKER, EDITOR.

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Bills for advertising will be sent monthly, unless otherwise agreed upon.
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[Entered at the Post Office at Milwaukee, Wis., as second class matter.]

MILWAUKEE, FEBRUARY, 1882.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

FLOUR MILL DIRECTORY.

Cawker's American Flour Mill Directory for 1882, is now complete and ready for delivery this 31st day of January, 1882.

It shows that there are in the United States 21,356 flour mills and in the Dominion of Canada 1488. The mills in the United States are distributed as follows:

Alabama, 388; Arizona, 17; Arkansas, 234; California, 209; Colorado, 52; Connecticut, 309; Dakota, 44; Delaware, 96; District of Columbia, 7; Florida, 81; Georgia, 514; Idaho, 18; Illinois, 1258; Indiana, 1163; Indian Territory, 3; Iowa, 872; Kansas, 437; Kentucky, 642; Louisiana, 41; Maine, 220; Maryland, 349; Massachusetts, 363; Michigan 831; Minnesota, 472; Mississippi, 297; Missouri, 942; Montana, 20; Nebraska, 205; Nevada, 10; New Hampshire, 202; New Jersey, 445; New Mexico, 28; New York, 1942; North Carolina, 556; Ohio, 1462; Oregon, 129; Pennsylvania, 2786; Rhode Island, 47; South Carolina, 205; Tennessee, 620; Texas 548; Utah, 129; Vermont, 231; Virginia, 689 Washington Territory, 45; West Virginia, 404; Wisconsin, 780; Wyoming, 3; Total, 21,356.

The directory is printed from new Burgeois type on heavy tinted paper and is substantially bound. It makes a book of 200 large pages. The post offices are alphabetically arranged in each state, territory or province. The name of the mill, the kind of power used and the capacity of barrels of flour per day of 24 hours are given wherever obtained which is in thousands of instances. This work is indispensable to all business men desiring to reach the American Milling Trade.

Price Ten Dollars per copy on receipt of which it will be sent post paid to any address. Remit by registered letter, post-office money-order or draft on Chicago or New York made payable to the order of E. Harrison Cawker, publisher of THE UNITED STATES MILLER, Milwaukee Wis.

The publication office of *Leffel's Mechanical News* has been moved from Springfield, O., to No. 110 Liberty street, New York.

MANY FARMERS in Maine have become rather discouraged of late years in trying to raise crops of small grain. One of the principle difficulties is the scarcity of farm help.

"DEAL HOUSE" is the name of a new hotel at Bucyrus, O. It is named after M. Deal, the well known mill-furnisher of that city. We acknowledge receipt of invitation cards to the opening ball, Feb. 13th.

WHEN editors fight duels, they mean business. A dispatch from Guadalajara, Mex., says that Senors Morelo and Sevorito, rival editors, fought a duel there yesterday with pistols. Both fired and fell dead simultaneously.

THE Simpson & Gault Manufacturing Co., of Cincinnati, O., succeeds the firms known as Simpson & Gault and the Straub Mill Co. The new company has been incorporated under the laws of Ohio. The organization was effected January 14th, 1882.

ALBERT HOPPINS, editor and publisher of the *Northwestern Miller*, has sold out his interest in that paper to C. M. Palmer. We know not yet, what new path of glory our friend Hoppin will tread, but wish him the best of good luck in whatever enterprise he may embark.

POSTMASTER GENERAL HOWE revoked so much of the postal regulations as requires flour to be inclosed in sealed envelopes before being put into metal boxes for transmission in mails, and flour is declared not to be included among articles which, if not properly secured, might damage other contents of mails.

THE recent fire in New York which burned out so many publications, also destroyed the offices of the *Scientific American* and *Scientific American Supplement*, but as their printing was done in another building, where also their plates were stored, they are not at all crippled, but go right along as usual. Their business office is now at No. 261 Broadway, corner of Warren street, New York.

THE MINNESOTA STATE GRANGE, at their recent meeting in St. Paul, adopted resolutions severely denouncing Minneapolis Millers' Association by which most of Minneapolis wheat is purchased for the exclusion of other purchasers from the market and keeping down prices. The Grange also adopted an appeal to the railroad companies to cooperate with farmers to secure a freer and open market and fair competition for grain.

STILL ANOTHER ADDITION in the line of valuable inventions comes to public notice in the form of a new and improved gradual reduction machine for the manufacture of flour by the new process. Mr. Chas. Kropp, of Milwaukee, the inventor, has shown his drawings and specifications to a number of city millers for their inspection, and all agreed, that it is a first class machine and will rank high in the future.

MILLER BROS. & MITCHELL have a large establishment at No. 110, 112, 114, 116 King street, Montreal, Canada, where they do all kinds of machinery and millwright work. They are the sole Licensees for the Dominion for Gray's Noiseless Patent Roller Mills and Gradual Reduction machines and are having marked success in introducing them. The millers in all portions of the Dominion of Canada are fortunate in possessing this enterprising establishment which can furnish them at short notice with anything in the milling line.

THE following circulars from the Treasury Department, of interest to millers near the Canadian line, have been issued. On the exportation of flour wholly manufactured from imported wheat, drawback will be allowed at the rate of 89 cents per barrel, less the legal retention of 10 per centum. The rate heretofore prescribed, of 75 cents per barrel, is hereby superseded. The collectors of customs will see that proper arrangements are adopted by the mills within their respective districts, where flour may be prepared for exportation with benefit of drawback, to prevent any admixture of domestic grain to the improved wheat at any stage of conversion into flour.

Cincinnati "Ozone".

A Cincinnati company styled the "Prentiss Preserving Company", have recently been advertising very extensively what they claim is "simply and purely Ozone". They send packages to all parts of the country to parties ordering it, at the price of \$1.00 or \$2.00 per package. To quote from their advertisement "Ozone—a new process for preserving all perishable articles, animal and vegetable, from fermentation and putrefaction, retaining their odor and flavor." The chemist Robert E. Warden has examined this wonderful compound, and in his report to the Ohio Mechanics' Institute says: "It thus appears that the 'Ozone' as sold, consists essentially of about 19 parts of flowers of sulphur mixed with one part of lampblack, and scented with ground cinnamon, or something closely resembling it."

Two dollars per pound is rather high for this mixture, and the company will doubtless make huge profits for a while. It is said that they send out hundreds of packages daily in answer to orders.

(Written for the United States Miller.)

Gleanings from the German Milling Papers.

ACCORDING to the "Techniker" belts can be kept well on pulleys, if they are coated on the inside with a mixture of colophony (rosin) and linseed oil. The mixture should be so proportioned as to dry quickly. The belts will not slip off from the pulleys even if rather loose, and they will do more work when loose, if coated with this preparation, than if they are not coated and tight.

MUSTY bread, covered with fungi should never be fed to cattle. It is poisonous and like musty oil-cake produces colic and swelling of the belly, constipation and inflammation of the bowels, which, if severe, may cause the death of the animal. If it is necessary to feed musty bread to animals, boil it first thoroughly. This will destroy the fungi.

THE use of rye flour in America is comparatively insignificant. The native American eats wheat bread almost exclusively. Rye bread is only consumed by the immigrant. Considering the enormous immigration of late years, one is led to the belief, that rye will be soon in greater quantities and that the demand for rye flour will increase and that more mills will be devoted to grinding rye.

As the price of rye itself is very high and as this cereal will grow well and develop fully in the United States it is certain that the market for rye flour is bound to fulfill the most sanguine expectation. Further, there is no doubt but that if the process of grinding rye is ameliorated and improved as much in America as the grinding process of wheat has been—rye flour will become a first class paying article of export for American millers. Even now some of the poorer grades of American wheat is mixed with our rye and ground together into rye flour as the rye harvest has been rather poor in some parts of Germany and we Europeans, especially Germans are bound to have rye bread on our tables.

The celebrated Borsig mill in Berlin grinds the rye in 6 reductions on sharp corrugated rolls and purifies rye middlings, grinding the coarser kinds on smooth iron rolls and the finer kinds and dust middlings on stones. They have placed upon our markets an elegant, clear, white rye flour, which is sold at high prices even in our neighboring states. This Patent rye flour from this mill is celebrated for its color. It is as white as the so called American "second patent" wheat flour.—(American millers—think about this.)

OATMEAL. It is strange that our country, (Germany) has so long got along without more extensively employing the flour from oats or oat meal. In England, Spain, France and America the value of this easily digested food, especially endowed with strengthening and nourishing qualities has been long known and these nations spare no pains to secure oatmeal as pure and as well ground as possible. Oatmeal cooked with water, milk or beef tea is often the only nutriment that will keep the life in babes, whose mothers are not blessed with Nature's milk of a sufficient quantity or quality. The oat flour surpasses by far in nutritious qualities all other starchy preparations which are sold under a score of names, for oatmeal builds up ones bones and sinews, whilst starch only produces spongy fat. The reason is on account of the great amount of gluten it contains. As this flour tastes well, babes take it easily if cooked in the proper manner and a certain aromatic flavor which emanates from it does away with the possibility of disliking it when eaten too often. We call the attention of all parents of weak children to the strengthening properties of oatmeal gruels. Fine oatmeal is seldom seen in our German markets even though the demand for it is perceptible. We trust that these lines will encourage some millers to make such and supply us with it. We feel confident that it would soon become an article of consumption of considerable importance.—*German Milling paper.*

If the course oatmeal, brought upon the American markets, were crushed on iron rolls, the flour bolted out through No. 11 cloth, middlings repurified and then ground on porcelain rolls—the result would be an elegant strong, white and pure oat flour, which indeed would sell very well. We know of a miller who tried to grind oatmeal on a sharp corrugated roll, blown away the hulls, bolted off the middlings and flour, reground the coarser tailings on another fine corrugated roll and ground the middlings on iron rolls. This was done experimentally on hand rolls

and by hand sieves. The result was very good indeed.—*Editor.*

THE musty smell of heated and slightly spoiled wheat can be removed by smutting the same with pulverized charcoal, which is afterwards removed by the wheat brush machine. This operation must be performed when the wheat is dry and the atmosphere not too damp. After wheat is so treated it can be ground into nice white flour without any musty smell, provided the decomposition of the wheat has not proceeded too far.

THE largest driving belt of leather was recently made at Berlin. It was 72 inches wide, double, and weighed 3500. 200 oxhides were required from which to make it. This belt was ordered for use in a German starch factory, to transmit 500 horse power.

A. MUENTZ, a German milling expert, in his recently published book says: "Cereals exposed to the air emanate a greater quantity of carbonic acid than those kept in nearly air-tight vessels. It was ascertained by analysis that oats lost 7½ per cent. more of the weight than the equal quantity thereof stored in a deep bin with closed top. Corn, having been exposed to the air during sixteen months, had lost 10 per cent. more in weight than corn stored in a deep elevator bin. The loss is attributed partially to spontaneous combustion, oxygen having free access to the cereals, and to mechanical reduction in rubbing off dust from the kernels during the frequent reiteration of shoveling over the the masses in order to prevent heating. By this it is proven that wheat ought to be stored in deep bins, rather than spread over the mill floor to the depth of two or three feet.

French Method of Copying Drawings.

A patent which has been obtained in France by M. Tilbet for taking copies of drawings, etc., in any color and on any kind of paper, is described as follows: The paper is dipped first in a bath containing 1½ ozs. white soap, 1½ ozs. alum, 2 ozs. English glue, ½ oz. precipitated albumen, 1-10 oz. glacial acetic acid, ½ oz. alcohol 60, 25 ozs. water. It is then dipped in a second bath, containing 2½ ozs. burnt umber, ground in alcohol; 1 oz. lampblack, ½ oz. English glue, 25 ozs. water. The paper is now sensitive to the action of light, and must be kept in the dark. If the paper is to be prepared for negative copies, it is dipped in another bath similar to the second, in which umber is substituted by black. For colored positive pictures, black is substituted by red, blue, or any other color required. The drawing which is to be copied is placed in a copying frame, with the negative paper above. In clear weather it will be sufficient if exposed for two minutes. After the exposure, the negative is dipped in water. The drawing then appears white, and is left to dry. The positive copy is taken by placing the negative on the glass, and the positive paper over it. After two minutes' exposure, this is dipped in water, and the black dissolves.

Industrial Education.

The experiment is to be made of introducing industrial education into Girard College. The Russian system, adopted in the Boston Technological Institute after its exhibition in this city in 1876, has been selected. It aims at teaching the principal processes in various trades, and not at producing salable commodities of any kind. It was Stephen Girard's purpose that the children should be apprenticed, on their leaving the college, to some trade. The break-down of the apprenticeship system has abrogated this part of his plan. For many years it has been found impossible to obtain such places for them; and, where they have been apprenticed, in compliance with his will, the arrangement in many cases has been more nominal than real. The new plan carries out the spirit of his bequest, although the method is different. The children will at least learn the use of their hands, as the first step to the production of useful work. Meanwhile, our grammar schools go on teaching the whole body of the city's children the industry of the clerk. Days, months, years, are spent on lessons in mercantile arithmetic and writing; and then, at the end of all, we wonder why so many want places at a desk, and so few at the work-bench!—*The American.*

THE boiler in the Jewell Flour Mills at Brooklyn, N. Y., exploded February 16th killing Gilbert Stephens the engineer and seriously wounding two others.

Improvements in the Manufacture of Flour and the Removal of Husk and Germ.

(From the Millers' Gazette and Corn Trade Journal, London.)

Although the importance of the entire rejection of all particles of husk and of the germ is becoming more and more recognized amongst millers, there are many who not only believe that the bran and the germ are of great nutritive value, but that the latter improves the quality and the color of the flour. Other millers again, who believe that the germs ought to be rejected, say that they do reject it by grinding the wheat on stones, and by subsequently treating the middlings on smooth rollers. They contend that the germ is of such tough material that it cannot possibly be reduced to the same size as the more brittle flour producing semolina, during its passage through the stones.

The germ or germ-particles cannot therefore pass the meshes of the silk reel, and are delivered with the middlings at the tail end. If these middlings will then pass over the smooth rolls the germs or germ particles will be flattened and thus be finally rejected.

Although there is some justification in this assertion, and although there can hardly be any doubt that the germ particles will remain larger than the semolina particles, even the most ardent supporters of stone milling will not deny that the tearing and rubbing action of the rough surfaces of the stones must inevitably detach a certain amount of germ powder from the outer layers of the germ, so that although part of the germ still remains larger than the flour particles, some part of it has been ground fine enough to pass through the silk meshes and is therefore not rejected.

Such millers often mention the fact, that at the time when they used to grind some old and very dry beans together with the wheat in order to attract the moisture produced during low grinding, the beans were always returned at the tail end of the silk, because they were not reduced to the same size as the flour particles on account of their great toughness. But those millers never ascertained if all the beans were so returned; we should say not as part of them were ground fine enough to mix with the flour, and although there is no doubt that the flour produced by such means appeared to be superior to that ground in the ordinary way, the procedure is objectionable.

No doubt a great part of the moisture was absorbed, but, on the other hand, a certain amount of albuminous ferment, chiefly legumine, was introduced into the flour.

Such presence of moisture and of albuminous ferments has a most important influence on the baking quality, and on the color of the flour, which we will explain further on.

Although the construction of the wheat berry, and the situation of its different components have been often explained in the milling journals, it will be necessary for our purpose to shortly repeat them here:

The wheat berry consists of a body of starch cells, surrounded by the gluten cell layer, or embryous membrane and five different layers of vegetable fibre. These latter do not contain any nutritive substance in a digestible form. The gluten cell layer consists of comparatively large cells filled with a number of small cells. According to one view these cells contain gluten, a nitrogenous, and therefore a flesh-forming albuminoid, and the thick skin of these cells is impervious to the gastric juices of man and carnivorous animals, but not to the longer action in the stomach of herbivorous animals. According to another view, the gluten cell layer does not contain gluten or, indeed, any albuminous matter; its chemical composition is not yet finally ascertained, and that although it might contain nitrogenous substances, these are indigestible both for man and beast. Mr. H. Mege Maurier, on the other hand, has proved that this layer contains phosphate of chalk, fatty phosphoric bodies, soluble cerealine, and insoluble cellular tissue. The chief properties are its imperviousness to water charged with any mineral salt, its so-called contact action, through its presence and its action as a ferment. If the embryous membrane is present in a dilution of starch, such as the dough for bread-making, and if it is subjected to a certain point of temperature, it will cause a conversion of the starch into dextrine and glucose, thus injuring the baking quality of the flour. Even if all cerealine is extracted from the embryous membrane, the simple presence of its tissue will cause a conversion of starch into dextrine. This phenomena is a well proven chemical fact, and it is not only caused by the presence of cerealine, or the tissue of the embryous membrane, but also by sulphuric acid, hydrochloric acid, by the

contact action of malt, by simple moisture at a high temperature, and by nitric acid. All albuminous substances have also this property of converting the starch into dextrine but generally only after the commencement of decomposition.

The body of starch cells consists of a large number of cells filled with starch grains and gluten. The outer starch cells contain more gluten and have a thicker skin than the central cells, which shows very little gluten and have a very thin skin. As is well known, starch forms fatty substance during its digestion in our food and, therefore, tends to promote heat in our animal body.

The germ, or embryo, consists of a great number of very small cells, which, through their density and their oily contents, cause its great toughness. These cells surround the root of the coming wheat plant, and they give the first food to the root after germination.

According to Stoeckhardt, the wheat germ shows the following chemical components:

Starch.....	55.2
Albuminoids.....	25.3
Fatty substance.....	9.4
Gum and sugar.....	8.7
Cellulose.....	6.1
Ash.....	3.8
Water.....	11.5
Total.....	100.0

Prof. Kick gives the following analysis of the entire wheat berry:

Components.	Limits.	Medium Value.
Starch.....	55 to 67	62
Dextrine.....	5 " 10	7
Gluten.....	1.0 " 2.0	1.3
Cellulose.....	1.5 " 2.3	1.6
Fatty matter.....	1.0 " 2.5	1.2
Salts.....	1.4 " 2.9	1.7
Water.....	12 " 16	13.5
		100.0

According to analysis made by Professor Cameron, ordinary wheat bran shows the following components:

Starch, etc.....	47.98
Albuminoids.....	16.29
Water.....	14.77
Cellulose.....	10.66
Oil.....	4.30
Mineral ash.....	6.00
	100.00

Numerous analyses of wheat and its products have also been made by O. Dempwolf but as they are made with Hungarian wheats they differ slightly from the above tables, which give the mean average.

If we examine the analysis of bran we shall at once see that by our present modes of milling we cannot avoid leaving nearly 50 per cent. of the starch on the bran. Now, according to F. Kick, the starch body of the wheat berry amounts to 82 per cent. of its total weight, and therefore the husk, with its embryous membrane and germ, amounts to 18 per cent.

In the "Pester Walzenmuehle" the following percentages of wheat products were obtained:

Pure middlings and three first grades of flour.....	18.724
Flour IV. and V.....	32.682
Flour VI. and VII.....	22.224
Flour VIII.....	2.576
Bran and pollard, etc.....	18.516
Smut dust.....	1.290
Loss.....	3.988
	100.000

From this we can glean the fact that, as about 50 per cent. of the bran is starch, and as 18 per cent. is separated from the flour, only about half the husk (husk and starch amounting to 18 per cent. of the weight of the wheat) is rejected, even by highly perfected machinery. The other half of the bran has been ground into flour, and is chiefly found in the lower grades from IV. to VIII. Only a very small amount has been rubbed off in the smutter, etc.

Mr. O. Dempwolf also gives a table of the flours, etc., mention in the last table, as follows:

Per-centage	Water	Ash	Gluten	St'rch
18.742 Flour from middlings and the 3 first grades.....	10.60	0.41	11.70	70.00
32.682 Flour IV. and V.....	10.50	0.60	13.30	67.20
22.224 Flour VI. and VII.....	10.70	0.96	15.40	63.50
2.576 Flour VIII.....	9.50	1.55	14.90	61.00
18.516 Bran and pollard.....	10.70	5.46	14.30	43.60
1.290 Smut dust.....	9.20	2.65	15.20
87.00 Stone flour.....	10.50	1.00	14.40	65.60

The stone flour mentioned in this table, was made by one passage through the stones, and by removing 13 per cent. of bran.

If we compare these values of chemical components of the different flours, we shall find that the stone flour is about equal to roller flour V. in its contents of water and starch, but that it contains more gluten and more mineral ash. Its comparatively large percentage of mineral ash shows that a large percentage of branny particles must have been in the flour, and consequently also a large percentage of cerealine, which will have the tendency to convert part of the starch into dextrine, and which will cause an excessive amount of lactic fermentation during the panification process, thereby causing the decomposition of a large amount of gluten into several ammoniacal products. These facts have been so fully proved by Mr. Mége Mou-

ries, that it is unnecessary for us here to say more about the relative nutritive value of stone flour and roller flour.

We only want to state that the more effective the entire rejection of the bran and of the germ is accomplished in any mode of milling the more durable will be its products and the better will be its baking quality.

If we consider the different modes of milling with regard to their efficiency in accomplishing such perfect separation of bran and germ, we shall find that the gradual reduction system is the most effective. In low grinding a large amount of bran is rubbed so small as to mix with the flour, and only very little germ is rejected, if any, in the tailings. Especially in the treatment of husky, fine middlings on stones is a large amount of the embryous membrane, containing the injurious cerealine, mixed with the flour. In high grinding a large amount of the germ is rejected by the treatment with smooth rollers; very little of the bran is rubbed so small as to pass the silk meshes, and in the treatment of the husky middlings by purifiers and smooth rollers most particles of embryous membrane are rejected.

Mr. Benoit gives the following percentages as obtained by the American milling system (stone milling):—Flours, 75 per cent; bran, pollards, etc., 23 per cent; loss, 2 per cent.

The flours consisted of—

First run stone flour	64 per cent.
Flour from middlings & tailings & reground middlings	3 " " " " " "
Bran flour.....	6 " " " " " "
Coarse bran.....	6 " " " " " "
Small bran.....	7 " " " " " "
Pollard.....	6 " " " " " "
Tailings.....	4 " " " " " "

First quality.
Second quality.
Third & fourth quality.
Weight 16½ lbs per bush.

By comparing this table with that of the high grinding products as given by O. Dempwolf, it may at first sight appear as if far more bran is separated by the American system, but if we refer to the weights of bran, pollard, and tailings we can form an estimate about their quality. A better comparison is shown in the following table of a trial grinding made in the Victoria Mill in Pesth, where the same wheat was ground on stones and also on rollers, both working on the high grinding system:

Flour No.	STONES. Per cent.	ROLLERS. Per cent.
" 1	6.5	8
" 2	7.0	8
" 3	5.0	6
" 4	5.5	6
" 5	6.0	8
" 6	15.0	5
" 7	25.0	27
" 8	25.0	27
" 9	25.0	27
Fine bran	21.0	25
Coarse bran	0.5	25
Feed for fowl	3.5	25
Loss	3.5	25

This last table gives us at the same time an idea of the superiority of the rollers over stones, even if the latter grind high. By rollers as much as 43 per cent. of high grade flour is obtained, against 35 per cent. by stones. The percentage of bran in both these grists was equal, but if we refer to our tables we find that stone bran has 47.98 per cent. of starch, 14.77 per cent. of water, 6.00 per cent. of mineral ash, and 16.29 per cent. of albuminoids. Roller bran, on the other hand, shows 43.6 per cent. of starch, 10.7 per cent. of water, 5.46 per cent. of mineral ash, and 14.3 per cent. of gluten. These percentages show the roller bran to have been better cleaned than the stone bran, it having only 43.6 per cent. of starch, against 47.98 per cent. of starch in the stone bran. The roller bran also shows a far smaller percentage of water, which is another indication of the more perfect separation of starch by means of rollers. In fact some stone millers are said to have sent some of their finished bran to some of the roller exhibitors in the last milling exhibition; they were not a little astonished at the quantity of starch which was so stripped off the bran and not a few of them now finish their stone bran by rollers. But as we have seen even fine fluted rollers still leave 43.6 per cent. of starch in the bran, this shows us where millers and milling engineers can effect a further perfection in milling.

Every improvement in milling machinery which effects a further reduction of the percentage of starch in bran will prove to be of great value to its inventor, and to the millers. Such improvements must effect the stripping of the bran in such a manner as to avoid any excessive heat to be produced during its progress, because, although starch is insoluble in water under ordinary temperature, as soon as it is subjected to a high temperature it will burst its cells and become soluble. This soluble starch will then at once be transformed into dextrine in contact with the moisture and the albumoids which are contained in the wheat. This is also the reason why bran if cleaned by rollers, will produce a far better flour than if cleaned by stones.

We incline to the belief that the more cutting and scraping the action of the reduction machines is, the better will the perfect separation of the bran be effected and the less heat will be evolved. The rubbing and tearing action of the stones must of necessity cause a large amount of heat to be produced in the material reduced by them, and the consequence of this is, that the heat in combination with the natural moisture of the wheat, causes some amount of starch to become soluble. This is clearly shown by the great amount of sticky half-decomposed paste, which settles in the stone spouts, on the worm-blades in the elevators, and on the ribs of the dressing machines. It is a fact, also, that low grinding rollers show this paste.

Millers ought to bear in mind that whatever milling system they employ, they ought to avoid the production of soluble starch, and that they can do so only by the adoption of the gradual reduction system. The value of flour is in direct proportion to its contents of soluble starch, and the value of a milling system can best be tested by the heat it evolves during its different stages. The formation of soluble starch during the manufacture of flour can be, to some degree, diminished by the use of wheat-heaters, and by flour-drying appliances, and we need only mention the extensive use of machines in the United States to show their advantage. Everywhere where durable flour is required, the employment of such drying appliances will certainly pay.

Notwithstanding all this, we do not condemn the stones as reduction machines, but only the way in which they are used. We believe that stones or rather horizontal discs, are capable of improvement, because we think it ought to be possible to make them work in such a manner as to avoid as much as possible rubbing and tearing, and simply allow them to act as cutters or scrapers? If milling engineers would bestow a little more of their ingenuity on this problem, they might, perhaps, find that our old friend is capable of doing good work still. It must never be forgotten that the action of two horizontal discs seems to possess special advantages for a slow reduction. The material has to make a longer way during its passage between the discs, and it ought, therefore, to be possible to effect its reduction in a very gradual way, step by step. During its passage through the rollers the material is subjected to a sudden pressure and friction, which must undoubtedly cause momentarily a high temperature. We are well aware of the fact that so far rollers have produced less heat than horizontal discs, but if we bear in mind that the same work of reduction could be so distributed over a longer way on the latter than on cylinders, it seems possible that the amount of heat evolved during such reduction, ought to be less on the longer way than on the short one. In fact, it might be said, that if horizontal discs could be so improved they would be the very best means for gradual reduction. There are many milling engineers who recognize this advantage of horizontal discs, and some have already tried to improve them, but millers ought to thoroughly test their efficiency before adopting them, and rather stick to their ordinary millstones, than employ anything which is only fitted with all sorts of mechanical complications, without doing anything better than their simple and durable stones. On the Continent porcelain millstones have lately been introduced by a firm in Berlin, and from all we can hear they have given very satisfactory results. The furrows when once shaped will keep sharp for more than two months and they are said to evolve hardly any heat. In any case it appears that such stones can be made of very even hardness over the entire surface, and they therefore also keep very true.

We will now consider the various machines which are employed for the conversion of the wheat berry into flour and its bye-products, with regard to their efficiency in the perfect separation of husk and germ.

We know that it is first necessary to remove all admixtures and the exterior impurities from the wheat berry before reducing it, and it will suffice here to say that millers will do well, not only to consider improvements in gradual reduction, but first and foremost improved modes for cleaning the wheat thoroughly.

Even by gradual reduction they cannot obviate the injurious effect of extraneous impurities, and if they can remove the germ and the seam impurities before they produce any flour, they ought to spare no trouble to do so.

In the different stages of gradual reduc-

tion the wheat berry is cut into pieces, so that the endosperm, (or the starch body) is exposed to the action of the reduction machines, then the starch is scraped off the husk, and next the endosperm is reduced to powder. At the same time we have to separate after each successive reduction as much of the husky particles as possible.

Until horizontal discs can be so improved as to work in a cutting and scraping manner, we shall find that fluted rollers present the best means to granulate the wheat berry; but it seems to us as if the starch which is still attached to the bran during the last breaks, could best be stripped off by some improved form of horizontal discs. For pure, or nearly pure middlings also, a reduction by means of horizontal discs seems to be the one specially suited, if the two discs could be made perfectly rigid and equi-distant. Such discs would reduce the middlings by rolling them and thus slowly reduce them to powder. In smooth rollers the pure middlings always cake more or less, and although often so-called detachours are employed to give them a slight rub, the flour particles obtained in this way preserve their flattened form, and as they pack close, and are to a certain extent compressed, their baking quality is slightly lowered.

Those middlings which have a larger amount of husk still attached to them, ought to be reduced by smooth or very fine fluted rollers, according to their size. The very fine fluted rollers seem to be the best means for either cutting or scraping the large husky middlings, and thus to effect a separation of starch from husk, whereas the smaller husky middlings can probably only be effectually treated by means of smooth chilled iron or porcelain rollers, with good differential speed. It seems impossible to treat these small and thin particles on horizontal discs, so as to scrape the starch off them, without at the same time to reduce the husk and cause excessive heat.

A further most important means to effect a more perfect rejection of the husk, are the purifiers. The purifiers enable the miller to reject the light husk, which has been separated from the husky middlings, by stripping the endosperm off them during their passage through the smooth rollers. Of course this stripping off of the starch is not generally effected in one passage through the rollers, but by two or more passages. The middlings ought to be purified; that is, classified or separated according to their specific gravity and size, after each passage through the rollers.

If we remember the great injurious influence of the embryous membrane on diluted starch, or rather that of the cerealine contained therein, we shall at once see the great importance which the purifiers possess in the perfection of the manufacture of flour, and in the entire removal of some of those components of the wheat berry which cause a conversion of starch into dextrine.

It is especially the embryous membrane, the light yellow husk or pollard, which is so strongly attached to the endosperm, and the separation of which is effected by the smooth rollers and the purifiers.

Quite another separation is effected by the dressing machines. Whereas purifiers chiefly separate, according to specific gravity, dressing machines only separate according to size. Of course the material treated on purifiers is generally also sized; but this is only done to adjust the force of the suction blast to the size of the middlings. If the middlings were not sized, the blast would have the tendency to throw large, heavy middlings among the small, light one; or small, pure middlings would be thrown among the husky, heavy ones. It is, therefore, an important point also in gradual reduction, to employ effective means for properly sizing the middlings. If possible, each size of middlings should have a separate fan and a separate exhaust pipe.

Great care should also be taken, if it be necessary, to join any exhaust pipes before they enter the stove room. The section of the main trunk must not only be equal to the total area of all its branches, but also the branches must not form an angle with the main trunk where they enter. If this point were always properly attended to, much trouble in the proper working of the purifiers might be spared, and a great amount of exhaust spouting from purifiers to the stove room might also be saved.

To return to the dressing machines, although they mainly effect a separation according to size, they also cause a slight separation according to gravity, which may be turned to advantage in the production of the finest grades. As the meal enters into the dressing machines it is agitated, and thereby

the heavier particles move next to the silk, whereas the lighter ones will float at the top. Dressing machines are generally divided into a number of compartments (mostly four in centrifugals), and the heavier particles will therefore pass the meshes already in the first compartments, whereas the lighter particles will only pass through the meshes of the following compartments.

This floating of the lighter particles at the top does not, however, take place as soon as the meal enters the dressing cylinder, but only gradually, and we, therefore, believe it to be better, if, contrary to general custom, the first sheet of silk be coarser than the succeeding ones. On the first sheet of silk the layer of meal is thicker and more mixed than on the following ones; but the finer particles have greater facility to slip next to, and through the silk, than the larger particles. Thus, if the first sheet of silk be coarser than the next, the flour dressed through the first will be equally as fine as that from the second and third sheet, although the latter may be finer. We are aware that many millers hold contrary opinions; but it seems to us very plausible, that there is less tendency in the lighter and impure particles to pass through the first sheet, than though the following ones, and that, therefore, the flour silks ought to become finer as the meal proceeds. Of course certain limits must be observed with regard to the finest and coarsest meshes.

There are two different classes of dressing machines chiefly in use, the ordinary silk reels and centrifugals. Vertical centrifugals have often been attempted, but we are not aware that any of them have been successful or are extensively in use. In the silk reels the dressing material enters a slowly revolving polygonal prism, where, by the longitudinal bars, it is continually turned over, so that it may be said that every particle of the meal is successively brought in contact with the dressing surface; consequently the small particles will fall through the meshes and the large ones will be passed over the silk and be delivered at the tail end. The forward movement of the meal over the silk is caused by a slight inclination of the dressing cylinder. In all reels where the silk lies next to the wooden longitudinal ribs, as in most cases, a floating of the light particles on top of the heavy ones cannot take place because the meal is continually turned over. We know, however, a reel, in which the silk is fastened round steel ribs covered with linen, which are fastened at a distance of about 2 in. from the wooden ribs. In this reel the meal continually slides backwards as the cylinder revolves; the meal is not turned backwards because it can pass between the silk and the wood ribs. A distinct floating must in this case take place, especially as the above mentioned steel ribs are supported by elastic springs, thus avoiding all shocks. The floating of the light particles is a great advantage in all dressing machines, because light husky particles which are small enough to pass the meshes of the silk, cannot go into the flour if they are floated, and thus do not come in contact with the silk. But even in the best reels the dressing action is not very intense; the reel must, therefore, travel very slowly over a large dressing surface. They therefore take up much valuable space, and although they are simple and durable machines, they do not effect a good separation of husk and starch particles, as there is no tendency to detach those starch particles which may still be very lightly attached to the husk.

In centrifugals the meal also enters a slowly revolving cylinder, clothed with silk or wire, but within this cylinder a number of blades revolve at high speed, so that the meal is continually thrown against the dressing surface and all round the cylinder. The centrifugal force of the impact of the beaters will throw the heavier particles with greater force against the silk than the light ones; the starch particles will therefore keep next to the silk, and prevent the husk particles from coming into contact with the dressing surface, that is, if no longitudinal bars are used in the dressing cylinder. But when longitudinal ribs are present, the meal will always get into a moving state in each corner formed by the rib and the silk, the floating action will be disturbed, and the beaters will have to overcome an increased resistance where the meal accumulates in the corners. The working of such centrifugals is very intermittent, as can be observed from the trembling motion of such dressing cylinders. On the other hand the dressing action of the centrifugals is very intense and a great amount of starch, which is still lightly attached to the husk, will be severed by the action of the beaters, so that the separation of husk and starch will be to

some extent enhanced. Much less dressing surface is required, and if no longitudinal bars be present the floating of the light particles would be perfect.

Centrifugals not only effect a better separation of the husk from the starch, but they also dress a greater quantity of flour through a much smaller surface of silk with finer meshes than those in use on ordinary reels.

Wherever millers want to make a clean, strong flour, without specks, they must employ centrifugals without longitudinal bars, because, if the feed is sufficient, the husk will never come in contact with the silk.

If we bear in mind that the white particles are the heavy ones, and that they must therefore cover the inner surface of the silk, till they are enabled to pass, and that there is always a certain amount of white particles contained in the meal, which cannot pass through the fine meshes of the flour silk (No. 13 to 16—they pass through No. 7), it will be clear that these last mentioned coarse, white particles, will prevent the light husk from coming into contact with the silk.

Of course this floating is much disturbed, not only by the occurrence of longitudinal bars, but also by the mostly polygonal shape of dressing cylinders. Round cylinders without longitudinal bars will admit the floating without disturbance, and as the beaters find no obstruction, they will throw the meal all round, thereby decreasing the resistance of the meal against the beaters, and materially increasing the available dressing surface. Great attention should also be taken to give the beaters a backward inclination, so as to lessen not only the blast which is unavoidably caused in centrifugals, but also the resistance of the meal against the revolving of the beaters. The entrance and delivery openings ought also to be closed up as far as practicable, in order to reduce blast.

Having thus compared the two different constructions of dressing machines with regard to their efficiency in separating husk, we will now consider the purifiers in the same light. Purifiers may be divided in three classes. In one the middlings are first sized in a riddle with flat horizontal sieves, and they then fall separately through a system of small hoppers, passing through a suction blast, by means of which the lighter particles will be thrown over into separate compartments. In the other class the middlings pass over a horizontal riddle enclosed in the machine, and the suction blast is drawn through the silk meshes of the riddle, thereby floating the light particles on the top, and allowing the heavy middlings to pass through the silk according to their size. There are also some centrifugal purifiers where the middlings or seminola are fed on a horizontal disc, and by the centrifugal force thrown further from the centre than the light ones. A suction blast is passed through them, and thus the very light particles are drawn into separate ring-shaped compartments. This kind of centrifugal purifier is generally built in a multiple form, that is, a number of discs are used above each other, so that the middlings pass the suction blast several times, and are sorted into several grades of different weight and purity.

If we compare these different classes of purifiers, we shall find that the separation of husk is more effectively accomplished in the first class, than in the second. The centrifugal purifiers, are very efficient in their separation, but they are of very limited capacity, and they are so very sensitive, that the product varies as soon as any irregularity occurs. They will turn out quite a different product with a loose belt than with a tight belt. They are however, at present, the best means for treating soft semolina, a material in the treatment of which the utmost sensitiveness and a frequent repetition of the purifying process is required. In the purifiers with enclosed riddles, with a suction blast passing through the same, the middlings pass over the silk in forming a layer of a certain thickness, and the thickness of the layer causes an impediment in the separation of the light husk. In these purifiers a good feed is nevertheless an advantage, because it avoids the contact of the light particles with the silk. Of course a stronger suction blast would be required for a thick layer, than for a thin layer of middlings, and this forms one of the weak points of these machines. The feed can never be so regulated that an equal resistance will have to be overcome in every part of the riddle, there will always be spaces on the silk, where the suction blast finds the least resistance, where consequently the blast will be stronger than on other places. Such spaces of smaller resistance are not fixed to a certain place of the riddle, they vary continually, and they therefore cause great irregularities in the

floating of the light particles. There will always occur in such purifiers moments when a certain place in the riddle is subjected to a very light suction, and where light husky middlings can fall through the meshes into the pure middlings. If millers will look through the window of such a purifier on to the riddle, they will easily observe the irregularity of the suction as indicated by the small clouds of very light bran which are continually changing their place and form irregular lines. If the suction were regular, the light particles would not form clouds, but would form an even trembling surface. No blast adjusting and cloth cleaning appliances will ever overcome this irregularity, as it is chiefly caused by the irregular size and the consequent accumulation of the heavier middlings in certain parts of the riddle. In the first class of purifiers with outside riddle, where the middlings fall through a system of small hoppers and pass several streams of the suction blast, every particle is individually subjected to the same diverting force of the moving air; there are no places of smaller resistance, at least none need be. The separation of the particles according to their specific gravity is, therefore, more efficient, and only a very gentle blast is required. Generally this class of purifiers is more compact and more simple than those with enclosed riddles. As they require less blast they also require less power to drive them, and, when compared with regard to price and capacity, they are generally cheaper.

Those machines which we have so far investigated with regard to their efficiency in separating husk and germ from the starch body of the wheat—namely, stones, fluted rollers, smooth rollers, dressing reels, centrifugals, and the different purifiers—form the main part of the machinery in most mills, and we have now only to examine some special machines, such as disintegrators, disc mills, and detachers.

Disintegrators consist of two studded discs, which revolve at a very high speed in different directions. The studs of these machines are either round pins or oblong studs, covered with small corrugations. This last kind we think is a very good means for cleaning bran if they are run at a moderate speed. They may also turn out good results in low grinding systems, but seem to be more suitable for soft wheats. They must unavoidably cause a greater reduction of the bran to powder small enough to pass the silk meshes than is effected in rollers, and their high speed must increase the amount of motive power necessary for a certain capacity.

Disc mills have till now been employed mostly in the granulation of the wheat. In these machines one disc is stationary and the other is driven at a moderate speed. They have the advantage of adaptability to small capacity, but they perhaps nevertheless exert a more rubbing and tearing action on the wheat than rollers. They must, therefore, make a greater percentage of break flour, and less middlings, than break rolls. Also the friction of the bran on the stationary disc in the last breaks, when the disc have to work very close, becomes great, and much motive power will be required to overcome this friction. Whatever the shape of the flutes of disc mills may be, they may work very well in the first breaks, but for the last breaks, disintegrators at slow speed would probably work better and require less power.

Although disc mills of small capacity can very easily be made without impairing their results, the centrifugals, dressing the meal produced by them, cannot be economically reduced below a certain size of cylinder and a certain length, so that the smallest capacity of a disc mill plant must chiefly depend on the smallest size of centrifugals.

Detachers do not effect a separation of husk and starch properly speaking, but they may be regarded as important auxiliary machines for repairing soft semolina coming from the smooth rollers before entering the centrifugals. But these detachours ought never to consist of even discs with any kind of furrows or flutes. They ought to be more like disintegrators, to give the meal passing through them more liberty. Those millers that have had some experience with the smooth detachours will know that their use is often, if not always, imaginary. If they are set close enough to detach they are very liable to cause their belt to slip, and thus to produce stoppages. Smooth detachours are generally set so wide apart that they have hardly any influence on the meal passing through them. If they were made disintegrator like, as here suggested, if they would fulfil their purpose and not be liable to stoppage.

[Continued on page 74.]

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→*JACKSON, MICHIGAN.*←

[Continued from page 72.]

There are of course a multitude of milling machines which we cannot here specially examine, but they will all bear a certain relation to those here mentioned, and their influence on the separation of husk and germ will be corresponding. Our purpose was chiefly to show the importance of a perfect removal of husk and germ, as shown by chemical analysis of the products of milling, and the means by which such removal is effected, and where it might be improved.

We believe that the future will bring still more different machines for the manufacture of flour than those already in use. The tendency of this present time goes towards employing special improved means for special purposes. In milling this means that the successful systems need not be those which work by stones alone, or by rollers alone, or by discs exclusively, but those systems which everywhere adapt their tools specially to the different materials.

The milling system of the future will be gradual reduction, but the nature of the tools employed will be decided by their suitability for their special purpose.—THE FITTEST WILL SURVIVE.

"GERM."

Recent Milling Patents.

JANUARY 24, 1882.

Corn sheller, Henry A. Adams, Sandwich, Illinois.

Bag-holder, Perry Allen, Flint, Mich.

Roller-mill, Charles Gates, Brooklyn, O.

Grain grinding and reduction machine, John Stevens, Neenah, Wis.

JANUARY 31, 1882.

Roller-mill, Noah W. Hoti, Buffalo, N. Y.
Corn sheller, Leonard Kissner, Lancaster, Ohio.

Grain drying apparatus, Henry Scholfield, New York, N. Y.

Roller-mill, C. Seck, Dresden, Saxony, Germany.

FEBRUARY 7, 1882.

Grain pulverizer, Lewis S. Chochester, Jersey City, N. J.

Waterwheel, R. N. Davidson, Weaverville, California.

Grain cleaner, separator and cleaner, Jas. M. Hawley, Odin, Ill.

Grinding-mill, John T. Obenchain, Logansport, Ind.

Roller-mill, J. Fiechter & Sons, Minneapolis, Minn.

Flour-dressing machine, J. Fiechter & Sons, Minneapolis, Minn.

FEBRUARY 14, 1882.

Anti-friction roller bearing, Heinrich Buesing, Brunswick, Germany.

Millstone-driver, Amos Callahan, Maryville, Tenn.

Millstone dressing machine, W. W. Cleveland, Marshall, Mich.

Roller grinding mill, Cyrus T. Hanna, Allegheny, Pa.

Grain separator, Charles E. McNeal, Silver Creek, N. Y.

Grain separator, Lyman Morgan, Port Washington, Wis.

Corn sheller, J. W. Rickey, Chelsea, Mass.
Grinding-mill, C. D. Ross, Rutland, Vt.

Funnygrafs.

"Papa, me has been baptized, ain't me?" asked a three-year-old son.

"Yes, my boy."

"Then we won't have to be baptized again?"

"No; but can you remember anything about being baptized?"

"I dess I can. The minister shoved up my sleeve and stuck a knife in my arm!"

"When I am gone, dear Joseph, will you come and press the earth down on my lonely grave, when the wind sobs mournfully through the trees and the rain patters down on the dead flowers and the night its holy vigil keeps? Say will you, darling?" "Naw! do'u think I'm going out in the rain and wind at midnight and wander in ghostly grave yards to stamp the mud down on your coffin? You must be sick if you do!" "You're a nasty, mean thing, Joe Saunders," screamed the poor girl, "and if you ever speak to me again I'll slap Hades out of your freckled face!" and Arabella flounced in and slammed the front door.

The fork in the roads—Gracefully dropping on one knee, he busied himself fastening a skate to the pedal phenomenon which she exhibited to his astonished gaze. All at once he stopped in the very middle of his task and appeared to be reflecting profoundly. "George, darling," she asked, "what are

you thinking about?" "I'm thinking," he answered abstractedly, with a look that indicated how deeply he was affected by the idea that passed his mind, "I'm thinking, dear, whether, if Noah had had one one of your shoes, he would have found it necessary to build the ark." From that moment their souls floated toward the infinite future by different routes.—*Brooklyn Eagle.*

THE BAD EFFECTS OF STRADDLING.—Two blooming ladies, fair to look upon and elegantly dressed, rode down on the street car together yesterday morning, to attend to their duties on the Woman's Grain Exchange. One was a blonde, the other a pronounced brunette, and both had the external graces of lovely womanhood. They were much interested in discussing the present unsettled condition of the market, especially the decline of wheat. So deeply engaged were they in the consideration of this weighty matter, they did not stop to think how extraordinary their conversation sounded in the ears of the uninitiated listeners. Said the blonde, "Oh, this drop is to be accounted for in many ways. The millers have shut off grinding, and because of the late fall, farmers will not need so much grain for feed. Besides, there is a good deal of monkey business among speculators, and they are banging away at each other without regard to the propriety of things or the actual condition of the supply and demand."

"I tumbled into a pretty good thing on that last bust," said the brunette. "I don't care if the whole bottom falls out."

"I do," retorted the other; "I'm an awful big bull; I believe in crowding. I'm long now, and stood in for \$1.30."

"Maybe I'd better straddle," suggested the other.

"No. Don't you straddle anything. That'll break up the best of 'em. You might as well try to ride a buzz saw."

This was too much for one of the passengers, a board of trade man, who smiled so ardently that the ladies were confusedly interrupted, and signaled to the conductor to stop the car. There was a twitter as the two got out.—*N. Y. Journal of Commerce.*

New Wheat-bearing District in India.

The India office is lending its sanction just now to an enormous scheme for the reclamation of the waste lands in the Punjab. The waters of the five rivers which give a name to that region flow wastefully away to the sea, leaving a large tract of desert land, some of which was once fertile, to be the home of nothing and nobody. Those same rivers are sufficient to make that same desert blossom as a rose. The work of cutting canals, which would afford means both for navigation and irrigation, would be enormous; but so far is it thought feasible, that the India office has undertaken to use the canals, paying tolls for its transits, and to buy the irrigating water, undertaking on its own account to collect the water rent from the natives. Engineering experts declare that the special work can easily be done, and reports have been made to the India office which show that the land to be reclaimed has soil so rich in alluvial deposit from the Himalayas that we may reasonably anticipate the time when a great region, now suffering only from want of water, will become the great wheat-bearing territory of India. Some portions of the great doab which it is proposed to reclaim—a doab 50,000 square miles in extent—have undoubtedly been both inhabited and highly fertile in their day. In some cases the canal is almost made, the unused bed of diverted rivers lying ready to be again filled with the life-giving stream. So that the earlier portion of the great work will be comparatively easy. But, whether easy or hard, the reclamation of 50,000 square miles of land in an over-populated country, the irrigation of a tract so enormous in a country visited so frequently by famine, is a task the magnificence of which, from an engineering and from a political point of view, almost overweighs the imagination.—*Produce Exchange Bulletin.*

A Barrel Full of Boys.

On the property of Howes, Babcock & Ewell, at Silver Creek, N. Y., stands an old house no longer in use and falling to decay. The building has gradually settled into the soft soil, and the land around it has been raised until the roof of the building is nearly level with the ground. Recently Mr. Carlos Ewell, of the above-named firm, was looking over the premises, and noticed a barrel standing near the ice-house. Looking into the barrel, he was astonished to hear a confused murmur, like human voices, coming therefrom. He at

once summoned the owners of the voices to come forth, and in a short time a boy with a blackened face rose up out of the barrel. Before the horrified gentleman could ask for an explanation another good-sized boy squeezed his way out of the barrel. Then another and still another came to the surface, until about thirty boys, most of them with blackened faces, capered around the barrel, making mysterious remarks about "the cave," "the captain," and sundry other things supposed to belong to bandits, brigands, and that class of heroes. It was easy enough to understand how one boy could hide himself in a barrel, but how thirty could find room, was a puzzle only solved by the leader of the dusky band, who explained that the boys had made a tunnel from the surface down into the old ice-house, and placed the barrel at the mouth to conceal their work. Two or three of the older boys pressed the younger ones into the service, and the compact tankard in the interior had been excavated and divided up into rooms, as the "captain" explained, "for the officers and the common workmen." The work was begun before Christmas, and was just about finished when discovered.

In a report on riveting in locomotive boiler work, made by a committee of the American Master Car Builders' Association, is found the following: The operation of "driving" rivets consists in placing a set on the end of the rivet, and sledging it down to form the head, the operation requiring two men to sledge—one to hold the set, one to manage the holder—and a boy to heat the rivets. "The rivet is not struck direct by the sledges at any time during the operation of driving, but the head is formed entirely by driving the set down squarely on the end of it. To drive a rivet requires about twenty-four blows with the nine pound or ten-pound sledges, at the rate of about eighty blows per minute; a flatter, with a face about one and one-half inches square, is then placed on the lap alongside the rivet, and given five or six blows to close the sheets together; the set is then placed on the rivet head again, and given five or six more blows, and the rivet is finished, the whole operation of driving requiring about thirty-five seconds of time to the rivet. In practice we find that a riveting gang will drive in the seams of the shell of a boiler an average of thirty rivets per hour, or three hundred per day, and in the seams of the firebox, in throat and back sheets, dome, mud ring, braces, etc., an average of about twenty-two rivets per hour. This includes the time necessary for taking out bolts, drifting holes, adjusting the tools and work. In hand riveting two riveters will drive, on an average, taking the whole boiler, only about one hundred and twenty-five rivets per day, or twelve and one half per hour."

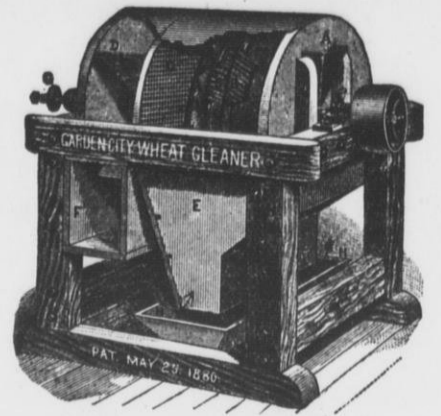
The developments of the financial result of the new German tariff, as shown by the receipts, appears on the whole, says a German contemporary, to have disappointed the expectations that were raised regarding it. And no better proof of this could be adduced than the fact that in the estimates of the budget for 1882-83 the receipts for duties have been set down as 1,783,000 marks lower than in the preceding year. It would be interesting to know what reasons have induced the German government to make this estimate, but they have not seen fit to inform the Reichstag, and one is left entirely in the dark as to this. In the absence of these reasons the journal referred to, in order to judge, falls back upon the statistics of imports during the last four quarters for what statistics exist—i. e., October 1, 1880, till the end of September, 1881. It is found that the necessities of life have contributed to the present surplus far more than was estimated two and a half years ago; so, for instance, the duties on grain yielded 17,250,000 marks, instead of 12,000,000; petroleum, 26,500,000, instead of 16,500,000; lard, 4,250,000, instead of 3,750,000; bacon, 2,500,000 instead of 750,000; flour, 1,666,000, instead of 333,000; rice, 3,333,000, instead of 2,250,000 marks. The indispensable necessity of importing these articles is incontestably proved by these glaring figures, and it cannot be denied that the heavy burden of taxes which by these new duties is laid upon the very necessities of life used by the great mass of the population, in truth, greater than was anticipated in 1879.

BURNED.—The flour mills of Thornton & Chester, Arnold & Little and Oliver Gibson, Lockport, N. Y., were destroyed by fire January 31. Assistant chief Engineer George Woods, was cut off by fire, and compelled, as a last hope, to jump from a sixth story and was killed instantly. Several firemen were badly hurt. Loss, \$100,000.

"BEST IN THE WORLD."

GARDEN CITY

WHEAT BRUSH!



Gathmann's patent "inclined bristles" prevents all clogging when the brushes are run close together. This is the

ONLY DOUBLE BRUSH

Which can be set up close so that it will

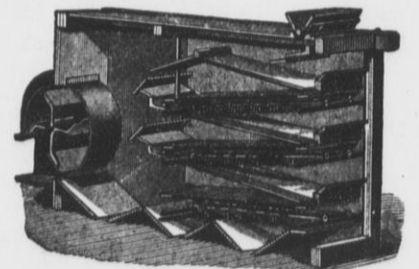
Thoroughly Brush Wheat.

It don't break or scratch the grain. Removes all the dust. Very light running. Send for circular and prices.

GARDEN CITY

MIDDLINGS

PURIFIER!



Travelling Cloth Cleaners.

Our improved Purifier has every device requisite to make it perfect, and every one in use is giving the greatest satisfaction to the users. The Cloth Cleaners are guaranteed to clean the cloth better than is done on any other purifier. Send for our new circular.

We are agents for the

BODMER

Bolting Cloth,

Which has long been acknowledged as the best made, and which has lately been further improved, making it now beyond competition. We make it up in the best style at short notice. Send for prices and samples.

Garden City Mill Furnishing Company,
CHICAGO, ILL.

Mention this paper when you write us.

Stock Brokers' Methods and Profits.

The membership of the New York Stock Exchange is limited to one thousand seats. A member can sell his seat, but the sale is contingent on the approval of the purchaser by the Committee on Admissions. If the committee reject his application, which is not a rare event, the member desiring to sell must find another purchaser. The price of seats varies with the state of business. At this time it ranges between \$27,000 and \$30,000. During the years of depression following the panic of 1873 the price fell as low as \$5,000. Two years ago a member considered himself fortunate in being able to sell out for \$17,000. Three years of enormous crops, each larger than its predecessor—such as we had in the years 1878-79-80—caused the price of seats on the Stock Exchange to rise to their present figures, which we believe are the highest in the history of that institution. Abundant crops make fat the New York broker; therefore, it may be understood how important the "crop question" is in Wall street. The Exchange is not an incorporated body. It is a voluntary association of individuals, unknown to the law, having neither charter nor franchise; owing as a body allegiance neither to the state nor the United States; having its own courts and a code of law which, like other law codes, has been the slow growth of experience. All disputes arising out of transactions on the Exchange must be settled by appeal to the tribunals which the Exchange provides. Expulsion is the penalty for an appeal to the law courts of the state by one member against another in a stock transaction. The Exchange has its own code of penalties, the highest being expulsion. It is found sufficient to enforce entire obedience.

The Exchange prescribes all the rules which govern a member in dealing with his customers. They are very stringent, and most rigidly enforced. First, he is required to charge a commission of $\frac{1}{4}$ of 1 per cent. on every sale and purchase. He can make no deduction for any one. He must not "split commissions," as it is called, under pain of losing his seat. This rule is enforced with relentless severity, as a protection against unfair dealing. Splitting is done sometimes, but discovery is invariably followed by the infliction of the penalty. By compelling every broker to charge the same, the poorer members are protected against the richer, who, on account of the large business they do, could do it at less rates, and thus in time the whole business of the Exchange would be monopolized by a few large houses. No such thing can happen while every broker makes the same charge.

The $\frac{1}{4}$ of 1 per cent. is on the par value of the shares or bonds in which the transaction takes place. Thus, it costs no more in commissions, nor no less, to buy or sell 100 shares of New York Central at 130 than to buy or sell 100 shares of Ohio Central at 24. The commission is equally \$12.50 for either. This is the broker's first profit. He is sure of that, however the transaction goes. The customer is as sure to have to pay it. The effect is, on all speculative dealings, to make the customer bet \$125 against \$75. For example: A buys 100 shares of Union Pacific at 117 and sells at 118. He pays \$12.50 for buying and \$12.50 more for selling, and his profit is therefore \$75. But suppose, after buying at 117, he has to sell at 116, then he loses the 1 per cent. on the stock and the \$25 commission beside—\$125.

The usual deposit of margin on a speculative purchase or sale is 10 per cent. Brokers may be found who will take less, but they are, as a rule, not the best people to deal with. Purchases on margin of less than 100 shares are not customary. It is only under special circumstances that a reputable broker will take an order for less. While 10 per cent. is the customary deposit, more may be called for according to circumstances, as in times of panic or great excitement; or when the price of a stock has been manipulated up to top-heavy figures; or on a very heavy purchase, say, 50,000 shares of one kind of stock. If the market turned against the purchaser, such an amount of stock could not probably be thrown upon it without breaking down the price considerably more than 10 per cent. In such a case the broker would require, say, 30 per cent. margin.

The Stock Exchange requires the broker to charge his customer 6 per cent. on the money he lends him to buy the stock. This rule is as rigid as that about the commissions, because the same effect as charging a reduced commission could be brought about by means of reduced interest charges. Here comes in the broker's second profit, namely, his gains

by interest. The broker must charge his customer 6 per cent., but he generally borrows the money he lends that customer at much less than 6 per cent. Every day in the year, therefore, that money on call loans is less than 6 per cent. (and most of the year it is) the broker is gaining the difference between 6 per cent. and the actual market rate on all money he has borrowed and lent to his customers at the time. It is considered to be a rule with the large houses to make the interest profits pay the annual working expenses.

Of course, the broker does not actually put the money he lends his customer into his customer's possession; but the effect of "carrying" the stock for him is actually the lending to him of the difference between the 10 per cent. margin deposit and the price at which the broker buys the stock in the market. The broker buys the stock and keeps it until it is sold. Then he renders his account, with interest charges and commissions, and the profit or loss, as the case may be.

A customer has the right to order his broker to keep in the office any stock bought for his account; but this is rarely done, and only under special circumstances. The usual course is for the broker to lend it, if he can. The borrowing broker pays for it the regular market price. The lender may call for the stock at any time on tendering the market price; the borrower may demand his money at any time on tendering the stock. So long as the borrower holds the stock, he must, under the rule, send daily to the broker of whom he has borrowed it, a check for the increased price if the stock has risen; on the other hand, the lending broker must send daily to the borrower a check for the amount the price of the stock may have fallen. Keeping the balance good in this way is the duty of the clerks and bookkeepers in the various offices. Prices are made up for the day at 2.15 P. M. In actual practice, however, this rule of keeping the balances good daily on all stocks is scarcely ever observed between well-established houses. Only when the market has gone several per cent. away from the range of prices at which the transaction was made is a call made by either party on the other.

The profit that a broker may make by lending stock lies in interest charges again. Suppose that a stock is in great borrowing demand by reason of having been extensively "sold short;" then those who borrow it are willing to pay something for the accommodation of getting it. The lender of the stock receives from the borrower a check for its market price, and so long as this money pledge remains in his hands he pays interest on it to the borrower of the stock; but on such occasions the borrower may say, in effect: "Lend me 1,000 shares of Western Union, and you need pay me no more than 2 per cent. interest for the money I pay you for it, the open interest rate now being 5 per cent." If the demand for the stock be very urgent, it may lend "flat"—that is all charges being at the expense of the borrower—and on rare occasions a commission in addition may be paid. These are the profits of the broker who has stock to lend. On such a transaction he would be charging his customer 6 per cent. on the money he lent him to buy the 1,000 shares of Western Union, while he was paying only 2 per cent. for the money he borrowed himself, or might be paying nothing at all and getting a small commission besides.

In another way the broker may make his 6 per cent. interest charge clear profit. Suppose he has two customers, one of whom (A) is "long" 1,000 shares of Western Union, the other (B) "short" the same amount. The broker has bought the 1,000 shares for A, and charges him 6 per cent. on the cost price so long as it is carried; he has sold the 1,000 shares for B, and gets the money back; but, instead of borrowing the stock for delivery, he uses A's stock for that purpose. Thus the two transactions balance each other, and the 6 per cent. interest charged to A is clear profit.

It must be remembered that, in selling stock "short," the thing sold has to be delivered to the purchaser the same as in any other sale and purchase. The delivery must be made before 2.15 P. M. of the following day unless the terms of the sale provide for a different time. The one difference is that when the broker has sold the stock he borrows it of some other broker who has the stock to lend, giving his check for the market price, and makes his delivery with it. When the time comes that the broker "covers his shorts," he buys the stock in the open market and returns it to the one he has borrowed from, receiving his money back. The profit or loss

is the difference between the price the stock was sold at and the price at which he "covered." Of course, a customer has no interest to pay his broker on a "short" sale (unless the stock could only have been borrowed at a commission), as the broker gets his interest paid by the lender of the stock, with whom he pledged the market price of it. There are no data for computing the aggregate amount annually paid by customers to the brokers of the Stock Exchange for interest; but the sum total paid yearly as commissions may be approximately estimated by the number of stocks and bonds bought and sold. The amount is simply enormous. Let us take the transactions of a single day only. A moderate day's business will be 300,000 shares, to say nothing of bonds. Knock off from this 50,000 shares as representing the trading of brokers operating on their own account—the "room traders" as they are called. We have 250,000 shares left as bought and sold on commission. The par value is \$25,000,000. One-eighth of 1 per cent. of this sum is \$32,250. Over \$32,000 paid to the 1,000 brokers of the Stock Exchange for commissions on one day's transactions in shares alone—and a very moderate day's business at that—will give some idea of the amount paid in the year.—*Bradstreets.*

Things Worth Knowing.

To reduce bushels of American maize to quarters (480 lbs.), multiply by 7 and divide by 60.

To reduce cwt. of flour to barrels (196 lbs.), multiply by 4 and divide by 7.

A sack of flour weighs 280 lbs.

A barrel of flour weighs 196 lbs.

A barrel of pork weighs 200 lbs.

A barrel of rice weighs 600 lbs.

A barrel of powder weighs 25 lbs.

A firkin of butter weighs 56 lbs.

A tub of butter weighs 84 lbs.

100 Russian chetwerts of wheat equal 72 qrs.

100 Russian chetwerts of seed equal 83 qrs.

100 Russian chetwerts of barley equal 88 qrs.

100 Russian chetwerts of rye equal 74 qrs.

100 Russian chetwerts of oats equal about 68 qrs.

100 Egyptian ardebs of wheat equal 62½ qrs.

100 Egyptian ardebs of beans equal 65 qrs.

1000 Egyptian ardebs of cotton seed equal 115 tons.

1015 French kilogrammes equal 1 ton.

816 Constantinople kilos equal 100 qrs.

100 Galatz kilos equal 143 qrs.

100 Ibrail kilos of wheat equal 232 qrs.

2½ French hectolitres equal about 1 bushel.

A Dutch last of wheat equals 10½ qrs.

A Dutch last of barley equals 10½ qrs.

A Dutch last of oats equals 10½ qrs.

A German last of wheat equals 13 to 14 qrs.

A Smyrna kilo equals 1 bushel.

100 Malta salmas of wheat equal 94½ qrs.

5 Spanish fanegas of wheat equal about 1 qr.

5 Chilian fanegas of wheat equal 160 lbs.

350 Austrian stajas of wheat equal 100 qrs.

1 maund of Indian wheat and seed equal 80 lbs.

25 Portuguese alqueire of wheat equal 1½ qrs.

Barcelona cras of wheat equals 1.925 bush.

10 Norway maas—1 maller—4.126 bushels.

12 German scheffela—1 maller—18.145 bush.

1 Vienna metzen equals 1 7-10 bushels.

472.81 Vienna metzens equal 100 qrs.

German centner equals 100 lbs. German.

2082 lbs. German equal 2240 lbs. English.

19 Austro-Hungarian minots equal 4 qrs.

Calcutta linseed is sold per 410 lbs.

Calcutta rapeseed is sold per 416 lbs.

Calcutta poppyseed is sold per 368 lbs.

Calcutta nigerseed is sold per 374 lbs.

Calcutta teelseed, sesame and gingellyseed is sold per 380 lbs.

A French quintal equals 100 kilos—220½ lbs.

180 French charges equal 100 qrs.

217.68 French kilogrammes equal 480 lbs.

225 French kilogrammes equal 496 lbs.

The following American produce is sold by weight and bushel:

Wheat, beans and cloverseed, 60 lbs. per bushel.

Maize, rye and flaxseed, 56 lbs. per bu.

Buckwheat, 42 lbs. per bu.

Barley, 48 lbs. per bu.

Oats, 35 lbs. per bu.

Bran, 35 lbs. per bu.

Timothy seed, 45 lbs. per bu.

In cost, freight and insurance business—

A quarter of California wheat weighs 500 lbs.

A quarter of other American wheat weighs 480 lbs.

A quarter of Chilian wheat weighs 480 lbs.

A quarter of American maize weighs 480 lbs.

A quarter of Danubian maize weighs 480 lbs.

A quarter of Odessa maize weighs 492 lbs.
A quarter of Galatz maize weighs 492 lbs.
A quarter of barley weighs 400 lbs.
A quarter of oats varies from 304 to 336 lbs.
A quarter of rye weighs 480 lbs.
A quarter of beans weighs 480 lbs.
A quarter of peas weighs 504 lbs.
A quarter of lentils weighs 504 lbs.
A quarter of Danubian wheat weighs 480 lbs.
A quarter of South Russian wheat weighs 492 lbs.—*European Exchange.*

Grain Gambling Decisions.

In Chicago, February 27, a decision of interest to the middle men in grain speculation was rendered by Judge Moran in the case of Foote vs. Pierce, assignee of S. G. Hooker & Co., grain commission dealers. The action was to recover on a promissory note for \$5,000, which Foote had turned over to Hooker & Co., as settlement of an account growing out of certain dealings on 'Change by the firm for the plaintiff. The difference out of which the suit grew was on the nature of the arrangement, one side contending that the dealing was to be in differences only, while the other side held that regular option deals were understood. The court held that it was not the intention of either that legal or legitimate deals in grain should be made, and that the law made the contract an illegal one. Citing various authorities, Judge Moran remarked that "The broker who receives the money of his principal in payment of losses made by the broker in gambling for the principal in grain is practically and to all intents and purposes the winner of such money. In such transactions the loser knows no other winner than the commission man. To make the law effective, all the penalties it denounces against such gaming must be made applicable to those who most actively engage in its violation. Without the aid of commission men like Hooker & Co., parties like this plaintiff would have little opportunity to indulge in forbidden speculation. The commission men furnish the access to the board; they open the door of temptation, and by agreements such as made in this case, they encourage and actually induce a violation of the law." Judgment was given for Foote for the sum of \$7,265.

In St. Louis, on February 28, the Court of Appeals decided that a note given in consideration of a difference in an option deal is not void in the hands of a bona-fide holder, the note having been acquired before maturing and without notice of illegality. This seems to be just the opposite of the decision of Judge Moran, of Chicago.

The American Exchange in London.

Our readers, or many of them, have doubtless heard of the American Exchange in London, the combined banking-house, post-office, reading-room and bureau of information, which was established several years ago for the accommodation of Americans abroad and Englishmen at home. Started as a private business venture, the enterprise grew to such proportions that it became necessary, a couple of years since, to organize it as a company, with a capital of \$1,000,000, upon which, it is said, 6 per cent. dividends have been paid from the outset, and more has been earned. It is now proposed to form a similar establishment in Paris under a distinct organization, but practically to be closely associated with the London concern under the same general management. The capital of the Paris enterprise will be \$500,000, which Mr. Gillig finds no difficulty in securing from both American and French sources. It will be conducted on the same comprehensive and conservative plan that has proved so successful in London, not only affording Americans all manner of conveniences and comforts while in Paris, but facilitating the commercial and social relations of France and the United States. Speaking of this enterprise, the *Springfield Republican* says: "There is an undoubted field for such an establishment in Paris, the favorite city of American travelers, and, with the prudent administration that long experience has taught Mr. Gillig to exercise, its financial success would seem to be assured."

ONE of the workmen at J. B. A. Kern's mills, named Joseph Magnus, living at 613 Walnut street, sustained severe internal injuries February 16th, while loading a wagon with bags, each containing 200 pounds of flour. One of the bags got caught in the slide leading to the wagon, and when Magnus tried to move it he strained his kidneys so severely that he dropped powerless. Dr. Schorse, who attended the man, pronounces the case hopeless.

NEWS.

Everybody Reads This.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

MINNEAPOLIS will soon be lighted by electricity.

Work on the Artic mill is progressing favorably.

BURNED.—B. McCabes mill at West Lebanon, N. H.

ADAMS & CRAWDEN of Merion, Ind., have sold out to Thos. J. Cushman.

THE St. Paul, Minn. Roller Mill has been idle but four days in fourteen months.

McMILLANS MILL in Winnipeg, Manitoba is to be remodeled to a 400 barrel roller mill.

BURNED.—Henry Torgard's mill at Blair, Wis. Loss \$8000. Insured. Mill will be rebuilt.

THE name of the Arctic Mill Minneapolis, has been changed to "St. Anthony Roller Mill."

REPORTS from nearly all portions of Kansas are extremely favorable for a good wheat crop.

THE Steam Planing Mill Co. will build this season a 100 barrel steam mill at Rose Valley, Kansas.

WILKINSON & TOMLINSON of Plainfield, Ind., have dissolved partnership. Moses Tomlinson continues.

DANIEL F. SMITH will commence at once to build a mill of 100 barrels capacity at Benson, Swift Co., Minn.

MESSRS. HUNTLEY, HOLCOMB & HEINE of Silver Creek, N. Y., have discontinued their branch house in St. Louis.

O. H. PRAY the veteran mill furnisher and builder, will it is reported undoubtedly be the next Mayor of Minneapolis.

MESSRS. KEPPEL & DE ROO, millers of Zeeland, Mich., have dissolved partnership. Mr. De Roo retires from business.

J. B. FICKLEN & SONS, proprietors of the Bridgewater Mills, at Fredericksburgh, Va. suspended Feb. 21, with liabilities of \$130,000.

THE RECENT RAINS in California encourage farmers in all parts of the state to believe that they will harvest an excellent crop of wheat.

CHARLES SAHLER a miller got caught in the gearing in May & Webers mill at Watertown, Wis., February 16th and received fatal injuries.

FEB. 23, a terrible boiler explosion occurred in the Vulcan Iron Works, St. Louis, Mo., killing three men and badly injuring several others.

MR. GEORGE A. CHRISTIAN of Minneapolis is contemplating the erection of a 200 barrel roller mill at Grand Forks, Dakota, during the present year.

THE GARDEN CITY Mill Furnishing Co., Chicago, Ill. have made a very large shipment of purifiers and wheat brushes to San Francisco during the past month.

OWEN C. CLARK'S saw, planing and flour mill at Stephens Point, Wis. burned Feb. 21. Loss is said to be about \$20,000 with no insurance. The mill will be rebuilt this year.

ON SATURDAY, Jan. 28th, the Blair Custom Mill, owned and operated by H. Thorsgaard, burned, together with about \$500 worth of grain. Total loss \$6000. Insured for \$1500.

W. G. PENNYPACKER & Co. of Philadelphia have made extensive changes in their mill putting in Garden City Purifiers and Wheat Brushes. They are well pleased with the results.

THE CASE MANUFACTURING Co. of Columbus, O. are meeting with gratifying success in introducing their reduction machines. Some of the mills in Milwaukee are putting in these machines.

THE Stilwell & Bierce Manufacturing Company, Dayton, Ohio, have sold one of their Victor turbines to the Crocker Manufacturing Company of Holyoke, and one to H. C. Bowen of Cheshire, Mass.

SOME ST. LOUIS millers recently purchased 100,000 bushels of wheat in California to be ground in St. Louis mills. It is transported entirely by rail at special rates. Part of it has already arrived and the balance is in transit.

A New York inventor claims to have invented a process by which he can force oxygenated air through damp and musty wheat and put it in first class condition for being made into flour at an expense of 1/4 cent per bushel.

THE VALUE of the products of flour and grist mills in St. Paul for 1881 is stated by the *Pioneer Press* at \$1,006,906, an increase over 1880 of \$379,200. The number of mills is six, a decrease of one from the previous year. The number of men employed, sixty-four in all, is five more than during the past season.

INVENTIONS which meet human wants are now readily adopted in the most unexpected quarters. The telephone has been put into use in Russian Turkestan, where Samarkand can talk at a moments notice to Katty-Kourgan. And yet it is only a few years since that instrument received respectful attention in civilized countries.

THE Garden City Mill Furnishing Co., of Chicago, Ill., are about to establish a manufactory in Canada, so that Canadian millers can get the Garden City Purifiers and Garden City Wheat Brush without paying heavy duties. The company have also made arrangements for manufacturing their machines in Great Britain, Germany and Austria.

A dispatch from Washington says that the Senate Committee on patents gave a hearing to George Wilson, Henry Spendlow, and George W. Watson, of Buffalo, in favor of an extension of the patent they hold for unloading grain from vessels and cars. The Committee took no action, but the members seem to be inclined to report the bill to the Senate favorably.

THE report that unsound flour is being shipped from this city to the East is indignantly denied by our millers. There is a class of unprincipled dealers and traders who send to market bad flour, branded as from St. Louis, and the spurious stuff sells well because of the high reputation of the brand. The trick, however, is always found out, and reacts speedily upon the promoters of the swindle. St. Louis does not ship bad flour to any market. It cannot afford it.—*St. Louis Miller*.

THE Gratiot Bros., now at Platteville, Wis., propose establishing a flouring mill in this city which shall have a capacity of 125 barrels per day. Mr. Chas. L. Gratiot is the inventor of a new vertical rolling-mill device for thoroughly grinding grain. In its operation only three breaks are necessary to reduce wheat to flour and middlings. They are also manufacturers of an improved wheat heater, which is recommended and used by millers everywhere. The gentlemen will find Dubuque just the place for them.—*Dubuque Trade Journal*.

TWENTY-FIVE years ago the great Victoria bridge at Montreal was the sensation of the day. Now this wonderful triumph of engineering skill is about to take a place in the public mind subordinate to the new railway tunnel under the St. Lawrence, which is to have the following dimensions: Entire length, about 21,700 feet; actual length of tunnel proper, 14,930 feet. It is to be 26 feet wide inside, and 22 feet high. It will be lined with brick masonry throughout, except the fronts, which will have from 20 to 30 inches in thickness, according to the character of the ground to be supported.

Houses built of Cotton.

Of all substances apparently the least likely to be used in the construction of a fire-proof building, cotton would perhaps take the first rank, and paper the second; and yet both these materials are actually being employed for the purpose indicated, and their use will probably extend. Compressed paper pulp is successfully used in the manufacture of doors, wall panelings and for other similar purposes, with the result that all risk of warping and cracking is obviated, while increased lightness is attained and the fear of dry-rot is forever banished. Papier-mache, after having served a useful purpose in an unobtrusive manner for years as a material for small trays, paper-knives and other such light articles, has now suddenly assumed a still more important position in the industrial world. A still more sudden and striking advance has been made in the employment of cotton as a building material. A preparation called celluloid, in which cotton is a leading ingredient, has been used lately as a substitute for ivory in the manufacture of such articles as billiard-balls and paper-cutters, and now a Canadian manufacturer has invented a process by which compressed cotton may be used, not merely for doors and window-frames, but for the whole facade of large buildings. The enormous and increasing demand for paper for its normal uses as a printing and writing material prevents the extended use of papier-mache as a

building material, for which it is so well suited in so many ways; but the production of cotton is practically unlimited, and there seems to be a large field available for its use in its new capacity as a substitute for bricks—or at least plaster—and wood. Treated with certain chemicals and compressed, it can be made perfectly fire-proof and as hard as stone, absolutely air and damp proof; and a material is thus produced admirably adapted for the lining—internal or external—of buildings of which the shell may or may not be constructed of other material, while it easily lends itself to decorative purposes.—*From Colonies and India*.

MEASURING POWER.—At a recent meeting of the Polytechnic Association of New York city, Mr. John W. Sutton remarked that there were two general systems. One extinguished the power it measured by friction induced for the purpose, and could only be used a short time as a test. The other measured without much retarding, and could in theory be used all the time. The horse power of engineers' parlance is a little more than an average horse can do steadily ten hours a day. It is thirty-three thousand foot pounds per minute. It is 550 pounds lifted one foot high each second. On the transmission system, Mr. Sutton's favorite dynamometer was a pulley connected to the shaft by springs with delicate devices for observing while running exactly how far the springs were deflected to know the strain in pounds, which, being multiplied by the velocity in feet per minute, gives the number of foot pounds per minute. For a crude measurement a belt just able to do the required work without slipping could, with cheap apparatus, be made a test of power. Find by repeated trials just how much strain on a lever of a given length will slip the belt when the machinery is stopped, and we have the strain under which the belt is acting while in use, which, multiplied into the speed, gives the power.

New Zealand Correspondence.

WAITEMATA MILLS, AUCKLAND,
January, 28th 1882.

EDITOR UNITED STATES MILLER!

*** Regarding the milling interest, there is now a considerable number of new machine and machinery in our mills, but none as yet have gone in for a complete set of rollers.—We can do nothing with a low grade of flour in this country,—the millers principally preferring to work one straight grade,—another thing is,—we are out of the way, of having any conversation with those millers who are going in for an entire set of rollers, or the gradual reduction, and I have not yet seen a miller's produce notes from any of those who have adopted the roller system, with a miller's name attached to it as against stone or a gradual reduction. Waste is one of those insidious things that millers have to be on the watch for, and if we run over a pound of waste to a bushel of wheat, it soon tells on the pocket; and, although I have written direct to several millers asking for a produce note, I have not been able to obtain one, I have read with interest the article of Mr. Gray in the UNITED STATES MILLER, on the Roller System and Roller Mills. One great objection is the number of changes, and the sooner a roller mill is made having the desideratum, viz., that would finish without a change, the better. Such would supersede all others, and the work would be less; and if rollers are to supercede stones—of which I have my doubts—this, in my opinion, is the only way they will do so.

We are now in our harvest. The season has been of a varied character—in the Southern portion of the country the want of rain has been much felt, and the crop stunted—while in the northern portion, there has been abundance of moisture, and the crops being harvested are turning out remarkably well. Our wheats here are of a very superior grade and the return per acre, is not unusual up to forty bushels, and over—and the weight per bushel seldom under sixty-four pounds, and frequently runs as high as sixty-eight pounds. I have frequently seen statements published questioning this as being correct—but there is no mistake about it. Of course the genial climate is the cause both of the quality and the return per acre. Our Government and yours have arranged for International Post-office Money Orders now which is a great convenience.

I am Yours truly

JOHN LAMB.

Mistakes of Life.

Somebody has condensed the mistakes of life, and arrives at the conclusion that there are fourteen of them. Most people would say, if they told the truth, that there was no limit to the mistakes of life; that they were like the drops in the ocean or the sands of the shore in number; but it is well to be accurate. Here, then, are fourteen great mistakes: "It is a great mistake to set up our own standard of right and wrong, and judge people accordingly; to measure the enjoyments of others by our own; to expect uniformity of opinion in this world; to look for judgment and experience in youth; to endeavor to mold all dispositions alike; not to yield to immaterial trifles; to look for perfection in our own actions; to worry ourselves and others with what cannot be remedied; not to alleviate all that needs alleviation, as far as lies in our power; not to make allowances for the infirmities of others; to consider everything impossible that we cannot perform; to believe only what our finite minds can grasp; to expect to be able to understand everything. The greatest mistake is to live only for time, when any moment may launch us into eternity."

WET AND DRY THUNDERSTORMS.—A correspondent of the *London Times*, writing from the Transvaal, South Africa, says: "Every afternoon tremendous storms of thunder and lightning burst upon us. These were of two kinds, the wet and the dry. The first is harmless, though noisy; the second exceedingly dangerous. During the dry thunderstorms, which were prevalent toward the end of October, the lightning seemed quite stupefying. It was unaccompanied by either wind or rain. The angry flashes were followed almost simultaneously by awful crashes of thunder, which seemed to shake the earth. One or two tents were struck, and the grass was set fire to in several places within sight of our camps, but no life was lost, only some arms damaged. The dry thunderstorms were soon followed by wet ones. The rain, mixed up with enormous hailstones, soured the thirsty earth, and every little crack on the veldt bore its burden of water to the Vaal, which rose and became impassable."

DEATHS FROM SINGULAR CAUSES.—Two distinguished men have just died in Paris from a singular cause. Col. Adan, Director of the Institute Cartographique, thought he had a chair behind him, and in sitting down fell with all his weight on the floor. He died within a short time from the effect of the accident. About 10 days before M. Pirson, Governor of the Banque Nationale, went to a dinner party at the Spanish Legation, and sat beside the hostess. She rose from the table, and then, continuing a conversation, resumed her seat. M. Pirson followed her example but a footman had meanwhile removed his chair, and in his fall he injured his spine and survived only a few days.

FLOUR MILL FOR SALE.

Situated on the Chesapeake & Ohio Canal, 2 1/2 miles above Georgetown, D. C., with a perpetual water supply. Has three run of stone, and is capable of making 75 barrels of flour per day. A good home market for the flour. The building is of stone, with a large frame shed attached. Address THOS. P. MORGAN, 1718 Rhode Island Ave., Washington, D. C.

FOR SALE.

A good two run, water power Grist Mill, 36x50, stone foundation. Good dwelling house and barn with 23 acres of land, situated in fine grain growing country, 1 1/2 miles from railroad station and 9 miles from Manitowoc, Wis. For further particulars address,

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We handle 45 bushels per hour on one reel successfully. C. B. SLATER & CO.,
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SITUATION WANTED.

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Feb., 21

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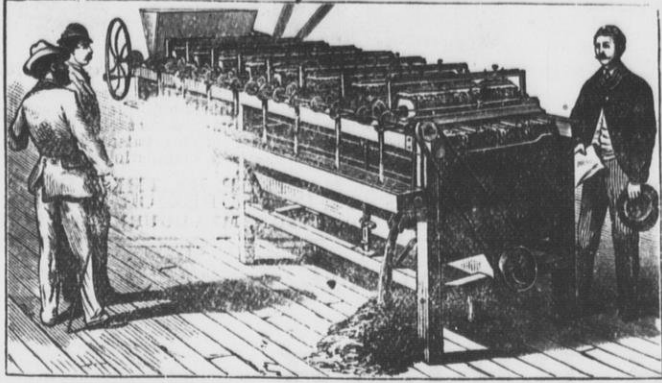
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—OF—
New Haven, Conn.

Factory, New Haven, New York Office, 17 Moore Street.

This Company was Organized at New Haven on the first of March, 1881, with a Capital of \$300,000.

Electric Middlings Purifiers.



HAVING PURCHASED THE SMITH-OSBORNE PATENTS GRANTED BY THE

United States, Great Britain, France, Belgium, Austria and Canada.

The first Machine manufactured was put up soon after the United States patent was granted, in February, 1880, in the ATLANTIC MILLS, BROOKLYN, and has been in almost constant practical use since, demonstrating beyond a question that it possesses the following advantages:

- It Purifies Middlings Absolutely without Waste.
- It Purifies Middlings with Greatly Reduced Power.
- It Purifies Middlings with Greatly Reduced Space.
- It Purifies Middlings with Greatly Increased Rapidly.
- It Purifies Middlings from Spring and Winter Wheat Equally Well.
- It Purifies Middlings with the Best Results.
- It Dispenses with the Use of Air Blasts.
- It Dispenses with the Use of all Dust Houses.
- It Dispenses with the Use of all Dust Collectors.
- It Dispenses with the Dangers of Explosion and Fire.
- IT PURIFIES DUST HOUSE MATERIAL OF ALL KINDS.
- IT PURIFIES THE FINEST MIDDINGS OF ALL KINDS.
- It is Remarkably Adapted to Custom Mills.
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Samples of work will be sent upon application, by mail, and all inquiries answered from the New York Office. Parties contemplating building new mills, or reconstructing old ones, should see the superior working of the ELECTRIC SYSTEM before making contracts for Purifiers elsewhere.

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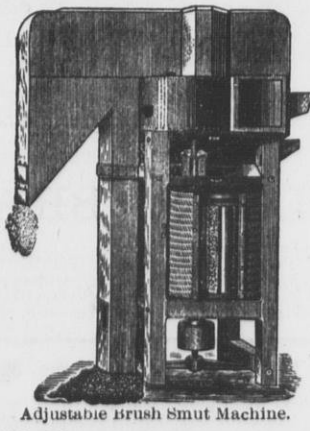
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Smut Machines,
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Nearly Two Hundred of these Machines are now in operation in the city of Minneapolis, Minn., alone, and more than sixty in the city of Milwaukee, Wis. They are also extensively used in many other sections, both on Winter and Spring Wheat.



Adjustable Brush Smut Machine.

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—BUILT BY—

WM. A. HARRIS, Providence, R. I.

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- That is subject to the most complete control possible.
- That gives double the capacity of any other in the same floor space.
- That has two Screens, each with its own Feed Bar, and each falls off.
- That has the best (patented) ever used on a Purifier.
- That has the most thorough control of the blast.
- That has the most convenient method of "cut-off."
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- That has the perfection of cloth tighteners used while running.
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- That has its bearing boxes detached from the wooden frame.
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- That has many new and important devices, convenient and simple.
- That does not infringe any patent, (can convince any one of this).
- That is not an experiment, but has been tried and tested by hundreds.
- That is in use from Long Island to San Francisco, from Dakota to Texas.
- That not one of which has ever been returned by any miller.

These are some of the things we have to say about the Case Purifier, and if one lot or tit of them is found to be untrue, we will take the machine back and pay all expenses, including freight both ways. Can fill orders promptly.

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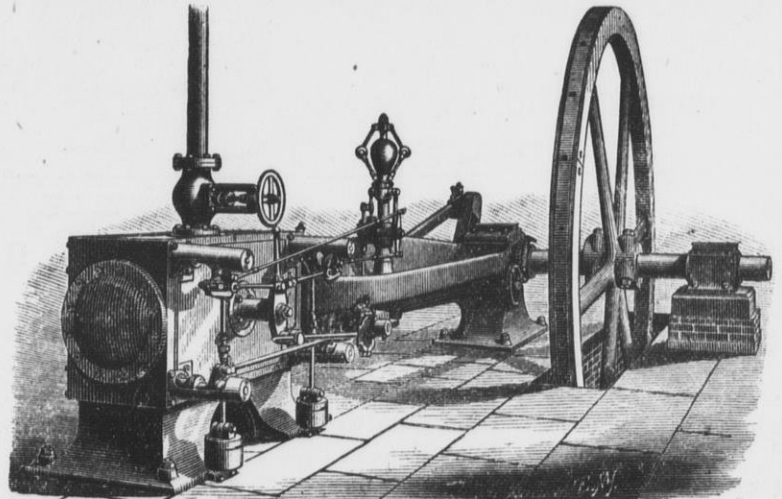
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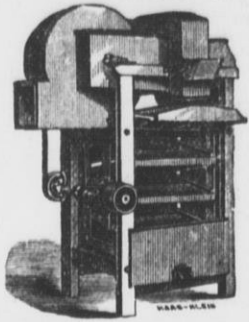
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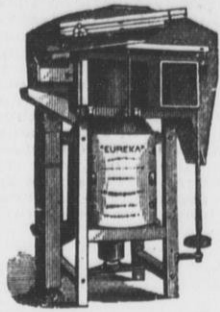
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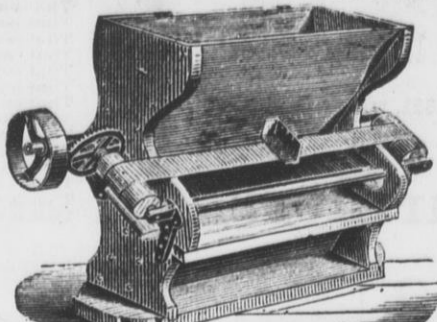
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occupies but little space, does its work in an effectual manner. Is also built for use in Elevators and Warehouses, with a capacity of from 100 to 1,000 bushels per hour.



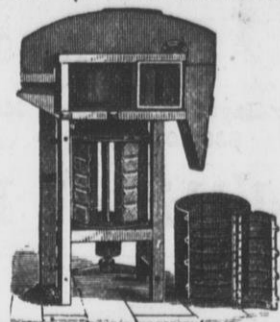
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A combined Smut and Separating Machine, having thorough ventilation. Over 14,000 of these Machines are now in use.



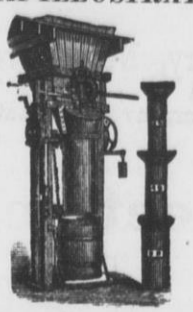
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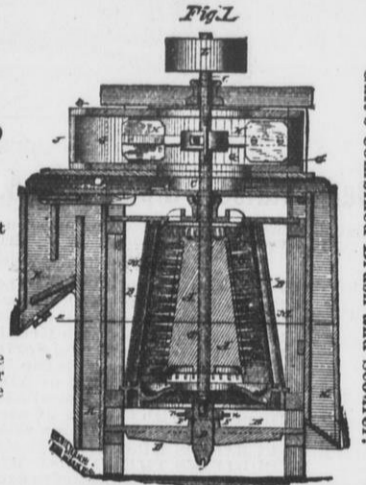
ADJUSTABLE WHILE IN MOTION.

Nearly 1,000 of these Machines in Use.

In the United States and foreign countries, and so far as we know all that use them are pleased. Millers, millwrights, and milling experts claim the Cone Shape Solid Cylinder Brush is the true principle to properly clean grain. All machines sent on trial, the users to be the judges of the work. For price and terms apply to

EUREKA MAN'G CO., ROCK FALLS, ILL., U. S. A.

[Mention this paper when you write.]



Galt's Combined Brush and Sifter.



POOLE & HUNT'S Leffel Turbine Water Wheel

Made of best materials and in best style of workmanship.

Machine Molded Mill Gearing

From 1 to 20 feet diameter, of any desired face or pitch molded by our own SPECIAL MACHINERY. Shafting, Pulleys, and Hangers, of the latest and most improved designs.

Mixers and General Outfit for Fertilizer Works.

Shipping Facilities the Best in all Directions

POOL & HUNT, Baltimore, Md.

N. B.—Special attention given to Heavy Gearing for Pulp and Paper Mills.



James Leffel's Improved WATER WHEEL.

NEW PRICE LIST FOR 1881.

The "OLD RELIABLE" with Improvements, making it the Most Perfect Turbine now in Use, comprising the Largest and the Smallest Wheels, under both the Highest and Lowest Heads used in this country. Our new Pocket Wheel Book for 1881 and 1882 sent free to those using water power. Address

JAMES LEFFEL & Co., Springfield, Ohio.

and 109 Liberty Street N. Y. City.

[Mention this paper when you write us.]

CAWKER'S AMERICAN FLOUR MILL DIRECTORY FOR 1882:

Is Now Ready for Delivery, February 1st, 1882.

It has been compiled with the utmost care, and contains 22,844 Addresses

Of Flour Mill Owners in the UNITED STATES and CANADA.

It give the Capacity and Motive Power of Mills wherever obtained.

MILL FURNISHERS, FLOUR BROKERS,

And Every one Desiring to Reach the Trade,

WILL FIND THIS WORK SIMPLY INVALUABLE.

PRICE, TEN DOLLARS PER COPY.

Address THE UNITED STATES MILLER, Milwaukee, Wis.

Will be sent to any part of the world by Mail, REGISTERED, on Receipt of Price.

Stout, Mills & Temple, DAYTON, OHIO.

MANUFACTURERS OF THE

American Turbine Water Wheel,

Best Quality French BURR MILLSTONES.

Sole Agents in Dayton for the sale of

DU FOUR & CO'S CELEBRATED BOLTING CLOTHS.

Flour and Paper Mill Machinery, Best Chilled or Porcelain Rolls for Crushing Wheat and Middlings and

GENERAL MILL FURNISHINGS.

The AMERICAN TURBINE, as recently improved, is unequalled in the power utilized from a given quantity of water, and is decidedly the BEST PART GATE Water Wheel ever known. It has also been otherwise greatly improved.

Large Illustrated Catalogue Sent Free on Application.

[Mention this paper when you write us.]

PURIFIERS.

Redfield's Combined Elevator and Purifier.

The Cheapest and the Best. Machine will Elevate its Own Material any Hight and Distance, thereby Saving the Expense of Building Elevators. Also

REDFIELD'S PORTABLE BOLTING CHEST for SCALPING or DUSTING PURPOSES.

Send for Catalogue and Price List before purchasing. It will pay you.

Address J. H. REDFIELD, Salem, Ind.

[Mention The United States Miller when you write.]

BOTTLED BEER.

VOECHTING, SHAPE & CO.,

SOLE BOTTLERS OF

JOSEPH SCHLITZ BREWING COMPANY'S

CELEBRATED MILWAUKEE LAGER BEER,

Cor. Second and Galena Streets,

MILWAUKEE, WISCONSIN

BOTTLERS' SUPPLIES CONSTANTLY ON HAND.

[Parties corresponding will please state where they saw this advertisement.]

CHOICE BEVELED EDGE

FLOUR BRANDS

For two dollars and upwards. Also RUBBER STAMPS, BURNING BRANDS, SEALS, STEEL NAME STAMPS, LETTERS AND FIGURES, Etc. Orders promptly attended to. CHAS. H. CLARKE, 82 Wisconsin St., Milwaukee.

FOR SALE.

A good water power and mill with two run of stone at Stone Bank, Waukesha County, Wis. Mill is doing a good business, which with a moderate amount of improvements, could be largely increased. One half or the whole will be sold to the right party. For full particulars, address, U. S. MILLER, Milwaukee, Wis.

IMPORTANT NOTICE TO MILLER

The RICHMOND MILL WORKS, and RICHMOND MILL FURNISHING WORKS are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to NORDYKE & MARION CO. INDIANAPOLIS.

BIRGE & SMITH, Practical Millwrights.

PLANS, SPECIFICATIONS & ESTIMATES

MADE FOR ALL KINDS OF

MILLWORK, MACHINERY, ETC.

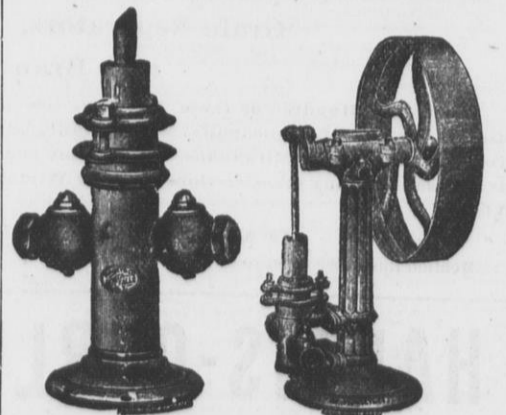
Flour, Sawmill, Tanners' and Brewers' Machinery, and General Mill Furnishings,

Corner of East Water and Knapp Sts.,

MILWAUKEE, WISCONSIN.

[Mention this paper when you write us.]

STEAM BOILER PUMPS



We manufacture over forty different styles and sizes of Steam Boiler Feed Pumps, for hand and power, at prices from \$10 to \$100.

Catalogues furnished on application.

RUMSEY & CO., SENECA FALLS, N. Y.

STEEL CAR PUSHER

Made entirely of STEEL. ONE MAN with it can easily move a loaded car. Will not slip on ice or grease.

Manufactured by E. P. DWIGHT, Dealer in Railroad Supplies, 407 Library St., Philadelphia, Pa.

[Mention this paper when you write us.]

THE CALDWELL Water Mill For Sale!

The best water mill property in north-east Missouri located at Monticello, the county seat of Lewis Co., Mo. The Mill House is 30x40 feet, 3 1-2 stories high, made of stone, brick and frame, with two run of Buhrs, Leffel, improved Wheel, 10 feet dam, stone foundation and machinery almost new, and now doing a good custom business. If desired, will also sell 250 acres of good farming land with three dwelling houses. The land could be divided into two good farms. Terms easy. Address, J. P. CALDWELL, Monticello, Mo.

WEGMANN'S PATENT

PORCELAIN ROLLS

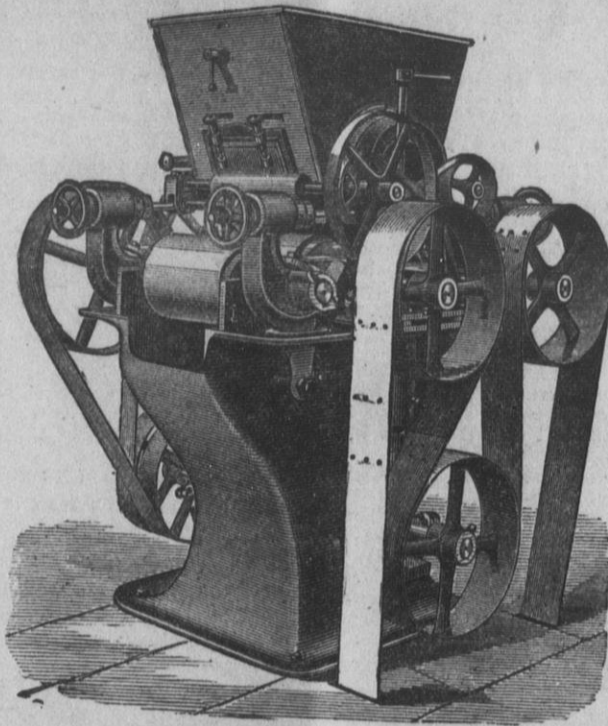
THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!



THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!

"AWARDED SPECIAL PREMIUMS."

OVER 6,000 OF THESE ROLLS IN USE

IN THIS COUNTRY AND EUROPE.

The Superiority of Porcelain over Chilled Iron for Reducing Middlings for Tailings is as under:

CHILLED IRON ROLLS, whether polished at first or scratched with fine grooves, soon become, through wear, smooth and glassy, and will only squeeze instead of grinding.

PORCELAIN presents a continual inherent sharpness, which no art can give to any other material in equal fineness and regularity, which enables it to act upon the smallest particles of flour and to separate them.

CHILLED IRON discolors the flour, by reason of the carbon that exudes from it, and also by its liability to rust.

PORCELAIN does NOT discolor the flour and is entirely indifferent to any and all chemical influences.

CHILLED IRON ROLLS are smooth and "cake" the meal; more especially is this the case on soft material.

PORCELAIN ROLLS possess a certain porosity, and no matter how finely ground, or how long they have been used, still re-

tain this granular and porous texture, and will reduce the middlings without "caking."

CHILLED IRON can be cut with steel.

PORCELAIN can ONLY be cut by the best black diamonds.

CHILLED IRON ROLLS require great power to reduce middlings to the proper fineness on account of their smooth surface.

PORCELAIN ROLLS will do the same amount of work, on account of the slight pressure required, and the gritty nature of the Porcelain, with one-half the power. The flour produced by Porcelain Rolls is sharper, whiter, stronger and more even than that produced by Iron Rolls.

No remarks need be made as to the superiority of Porcelain Rollers over Millstones, as it is a recognized fact by all. Porcelain Rollers are the only Rollers that will entirely supercede Millstones and Metal Rollers.

THESE MACHINES RECEIVED the FIRST PREMIUM!

At the late Millers' International Exhibition, Cincinnati.

Gold Medals at Nuremburg, 1876; Paris International Exhibition, 1878;

Lille International Concours, 1879; First Gold Medal of the State, Berlin International Exhibition of the German Millers' Association, July, 1879; and Gold Medal Le Mans, 1880.

Full Instructions regarding the system of using Rolls in place of Stones given to parties purchasing. Address

EDW. P. ALLIS & CO., Sole Mfr's.
MILWAUKEE, WISCONSIN.

Mention this Paper when you write us.

COCKLE SEPARATOR MANUFACTURING CO., MILWAUKEE,

GENERAL MILL FURNISHERS

AND MANUFACTURERS OF

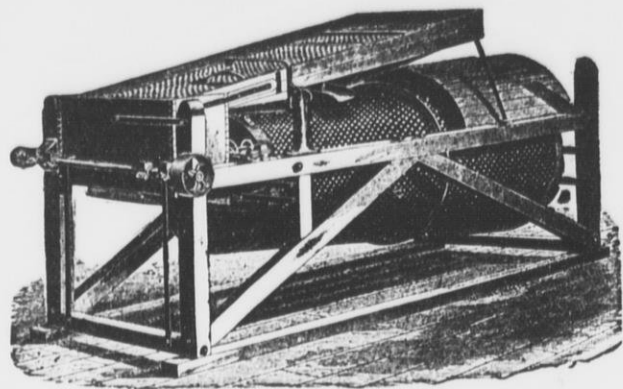
IMPROVED **COCKLE SEPARATORS**

(Kurth's Patent.) Also built in combination with

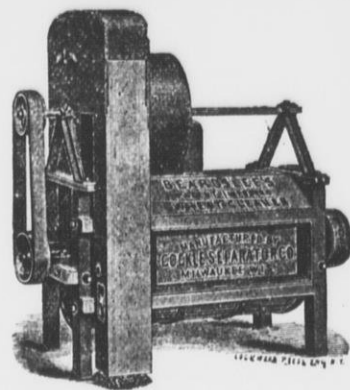
Richardson's Dustless Wheat Separators!

Also Sole Manufacturer of **BEARDSLEE'S PAT. GRAIN CLEANER**

We will contract to furnish entire Wheat Cleaning Machinery for mills, and guarantee the best results.



PLAIN COCKLE MACHINE.



BEARDSLEE'S WHEAT CLEANER.

Perforated Zinc at Bottom Figures.

Send for Illustrated Catalogue.

We GUARANTEE GREAT CAPACITY combined with GOOD QUALITY OF WORK. Any common Sieve will separate the cockle from wheat but to separate it WITHOUT WASTE is the GREATEST FEATURE of our Machine. A WASTEFUL machine is a DAILY LOSS OF MONEY in a mill. There is NO MACHINE IN THE MARKET which can stand comparison with ours.

Carbondale, Ill., Dec. 2, 1881.
Cockle Separator Mfg. Co., Milwaukee.
Gentlemen:—Replying to your late favor, would say that we can cheerfully recommend your Cockle Separator as doing all that you claim for it. We have tested ours thoroughly by this time and know whereof we speak. We would not think of doing without it, having tried it once, and can conscientiously vouch for its good work.
Yours respectfully,
BROWN & WINFREY,
Perrysville, Ind., Nov. 24, 1881.
Cockle Separator Mfg. Co., Milwaukee.

Hixton, Jackson Co., Wis., Dec. 30, '81
Cockle Separator Mfg. Co., Milwaukee.
Gents:—In answer to your inquiry of the 28th inst., I would say that the combined machine I bought of you last summer, works to my entire satisfaction.
Respectfully yours,
W. T. PRICE,
per D. G. THOMAS.

Sirs:—The combined machine I bought of you has been running about three weeks. It certainly does all you claim for it, and is the most perfect Separator that I have any knowledge of.
Very respectfully,
B. O. CARPENTER.

P. S.—I have been milling now for twenty-seven years, but never have I seen anything that will equal yours in cleaning wheat.
As an Oat Separator it is No. 1, and for Cockle it cannot be beat. I can take screenings and separate the cockle from it without wasting any of the small wheat. In my opinion every mill in the United States ought to have one, and if I were to build a mill I would have no other. I remain
Yours, etc.
D. G. THOMAS.

Minneapolis, Minn. Aug. 22, 1881.
Cockle Separator Mfg. Co.:

We have been using two of Beardslee's wheat cleaners, a scourer and finisher, for nearly two years, and are passing one hundred and fifty bushels per hour through them, one third more than rated capacity, and are not using any other cleaners, and consider our wheat as well cleaned as any in Minneapolis.
Yours truly,
CAHILL, FLETCHER & CO.
La Crosse, Wis., July 30, 1881.
Cockle Separator Mfg. Co., Milwaukee.

time with very satisfactory results. I cannot see that it breaks the wheat or requires an unusual amount of power to run it.
Yours truly,
WILLIAM LISTMAN.

Milwaukee, Wis., Aug. 23, 1881.
Cockle Separator Mfg. Co.

Gentlemen:—The Beardslee's Grain Cleaners which we have purchased from you for our New Era and Milwaukee Mills give us the best of satisfaction. Experienced millers having seen the work done by the machine agree with us, that it cannot be beat. You are at liberty to use our names as a reference, and any party calling on us we will be pleased to show the machine in operation.
Yours truly,
NEW ERA MILLING CO.

Pott's Patent Automatic Feeder!

The best device for regulating the FEED ON ROLLER MILLS, PURIFIERS, and other machines requiring a regular feed, spread out the full width. Very cheap and simple. Sent on trial upon application. Write for circulars with illustrations. Perforated Zinc of all sizes at low rates. Send for Illustrated Catalogue.

STEEL CASTINGS

FROM 1-4 to 10,000 LBS. WEIGHT.
True to pattern, sound and solid, of unequalled strength, toughness and durability.
An invaluable substitute for forgings or cast iron requiring threefold strength.
Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for Locomotives, etc.
15,000 Crank shafts and 10,000 Gear Wheels of this steel now running prove its superiority over all other steel castings.
CRANK SHAFTS, CROSS-HEADS and GEARING, specialties.
Circulars and price list free. Address

CHESTER STEEL CASTINGS CO.,
407 LIBERTY ST., PHILADELPHIA, U. S. A.

Works, CHESTER, PA.
[Mention this paper when you write us.]

Genuine Dutch Anker, DU FOUR & CO'S, Excelsior Bolting Cloths,

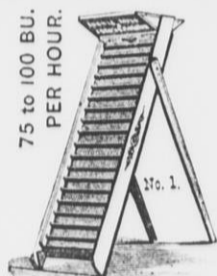
AT IMPORTERS LOWEST PRICES.
Sold by the piece, or cut and made up in any quantity desired. Plans of bolting complete for stone or roller mills. Address,
C. F. MILLER,
Mansfield, Ohio.

Northwestern Mill Bucket Manufactory

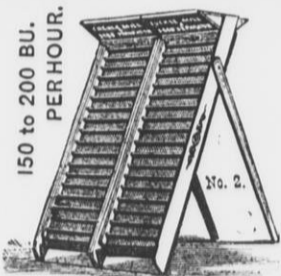


310, 312, and 314 FLORIDA STREET.
Is furnishing Mills and Elevators in all parts of the country with their superior BUCKETS. They are UNEQUALLED for their SHAPE, STRENGTH and CHEAPNESS.
Leather, Rubber, Canvas Belting and Bolts at lowest market rates. We have no traveling agents. Sample Buckets sent on application. Large orders will receive liberal discounts. Send for sample order.
Address all inquiries and orders to
L. J. MUELLER, 197 Reed St., Milwaukee, Wis.
[Mention this paper when you write us.]

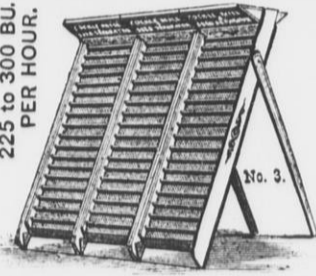
KING COCKLE MILL AND SEED SEPARATOR!



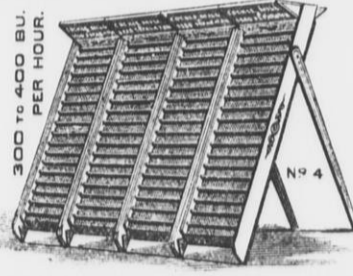
75 to 100 BU. PER HOUR.



150 to 200 BU. PER HOUR.



225 to 300 BU. PER HOUR.



300 to 400 BU. PER HOUR.

Pat. November 9, 1880. Gives 25 Grades of work by Change of Elevation. No change of Screen. Requires no power. When used in Connection with Kurth Cockle Mill your cleaning capacity is more than Doubled. When used alone you have more Merit for the money than in any device yet invented. Write for circulars to La Du & King, Manufacturers, Rochester, Minnesota.

The Geo. T. Smith Middlings Purifier

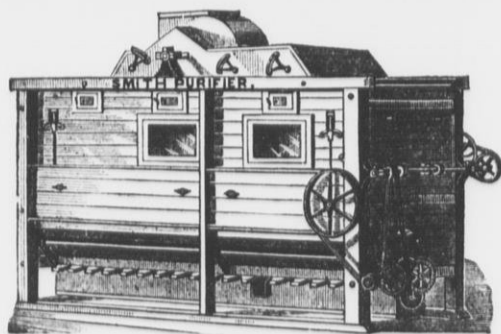
Low in Price!

Quantity and Quality of Work Considered.

LICENSED

Under ALL Patents owned by the Consolidated Middlings Purifier Co.

SIMPLE, EASILY ADJUSTED.



Adapted to all Systems

Of Milling and Every Grade and Condition of Middlings.

FOURTEEN SIZES, SINGLE, DOUBLE AND SPECIAL MACHINES.

DURABLE, LIGHT RUNNING.

TWO THOUSAND SMITH PURIFIERS WERE SOLD IN 1881.

More than FOUR THOUSAND now Running in the United States.

The Smith Purifier

Is in Use in Every Milling Country in the World.
Has GRADED, CONTROLLABLE AIR CURRENTS.
Has a POSITIVE AND EFFICIENT means of cleaning the Silk of the Sieve.

It is Impossible to do Good and Economical Work without these Features.

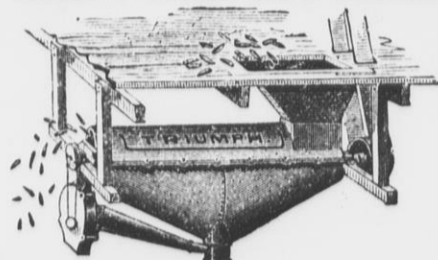
OUR CLOTH TIGHTENER makes it both Easy and Convenient to keep the Silk always properly stretched.
OUR AUTOMATIC FEED is Positively SELF-ADJUSTING and RELIABLE.

Write for Descriptive Circular and Price List to

GEO. T. SMITH MIDLINGS PURIFIER CO., Jackson, Mich., U. S. A.

[Mention this paper when you write us.]

TRIUMPH POWER CORN SHELLER.



Shells and Cleans 2,000 Bushels Ears per Day.
The Cheapest, Best, and most Simple Power Corn Sheller in use. Send for Circular and Price List.
Manufacturers of Steam Engines, Mill Builders and Mill Furnishers.
HULBERT & PAIGE, Painesville, Ohio.
[Mention this paper when you write us.]

The Perfect Feed Box.



It insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address,
CASE MANUFACTURING CO.,
COLUMBUS, OHIO.

W. E. CATLIN & CO., 68 LAKE ST., CHICAGO, ILL.,
AGENTS.
[Please mention this paper when you write us.]



Nickle FLOUR TESTERS mailed for 25c.

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U.S. PATENT OFFICE.

The United States

MILLER

Published by
E. HARRISON CAWKER. { Vol. 12, No. 6. }

MILWAUKEE, APRIL, 1882.

{Terms: \$1.00 a Year in Advance.
Single Copies, 10 Cents.

THE STEVENS ROLLER MILLS

Remove all Germs without Breaking or Crushing them, and Hull the Black Cockle and Remove the Hulls, Clean Bran thoroughly, and make a Higher Grade of Flour than any other Mill known.

OVER 2,000 PAIRS NOW IN USE!

Having Secured the BEST BELT MOVEMENT ever offered

We are prepared to furnish mills to be run entirely by belt, obtaining the nearest approach to a Positive Motion Without Gears.
We also manufacture the

Celebrated Cosgrove Concentrated Mill

Which is the Most Compact and Convenient Arrangement of Break Rolls and Separators.

READ THE FOLLOWING LETTER FROM A WELL-KNOWN FIRM:

MESSRS. JOHN T. NOYE & SONS, Buffalo, New York—

Gentlemen: We take pleasure in addressing you in regard to the introduction of the "Cosgrove Roller System" in our Mills at Brooklyn. By removing four pairs of our Millstones and putting in their place the two sets of the Cosgrove System, purchased from you, we find that with our former bolting and purifying arrangements, we can turn out flour, all roller ground, in quality from 50 to 75 cents per barrel superior to that made from the same wheat by Millstones. We are now grinding no wheat with stones. In making the change, our Mill was shut down but 4 1/2 days to make connections with Elevators, Conveyors, etc. We drive the Cosgrove Machines advantages that we find are principally, viz.: Saving from 1/4 to 1/3 power required to make the same amount of flour by stones; uniformity of work of the Rolls, and the ease with which they are managed, one man being fully able to give proper attention to two or more sets if we had them; the separations made by the cylinders are perfect; any miller can quickly adjust them exactly to suit the wheat he wishes to grind and the work required; the capacity of our machines we find fully 50 per cent. above the amount you guaranteed (200 barrels). In conclusion, we will say, that the result generally of the system is entirely satisfactory to us for the best of reasons, our customers are thoroughly pleased and satisfied with our flour.

BROOKLYN, NEW YORK, February 20, 1882.

Yours truly,

F. E. SMITH & CO.

Among Recent Orders We Name the Following from Prominent Millers:

Lexington Mill Co., Lexington, O., 12 pairs,
Pollock & Co., Vincennes, Ind., 12 pairs,

E. O. Stanard & Co., St. Louis, Mo., 28 pairs,
Penfield, Lyon & Co., Oswego, N. Y., 2 Cosg's.,

E. T. Archibald & Co., Dundas, Minn., 12 pairs,
Crocker, Fisk & Co., Minneapolis, Minn., 54 pairs.

James Norris, St. Catherines, Ont., 28 pairs,

McNeil & Baldwin, Akron, O., Cosgrove and 10 pairs.

Jno. T. Noye Manufacturing Company, Buffalo, N. Y.

[Please mention the United States Miller when you write to us.]

ODELL'S ROLLER MILL.

Invented and Patented by U. H. ODELL, the Builder
of several of the Largest and Best

GRADUAL REDUCTION FLOUR MILLS IN THIS COUNTRY.

Embodies the Very Latest and Best Improvements in Style of Frame, Adjusting and Driving Devices and Character of Corrugation. Driven entirely with Belts, and Noiseless in Operation. Can be Stopped Instantly without throwing off any belt. One movement of Hand Lever sets the Rolls apart and Shuts Off the Feed at the same time. Occupies less space than any other Mill of equal capacity.

Our Corrugation Differs from All Others, and Produces

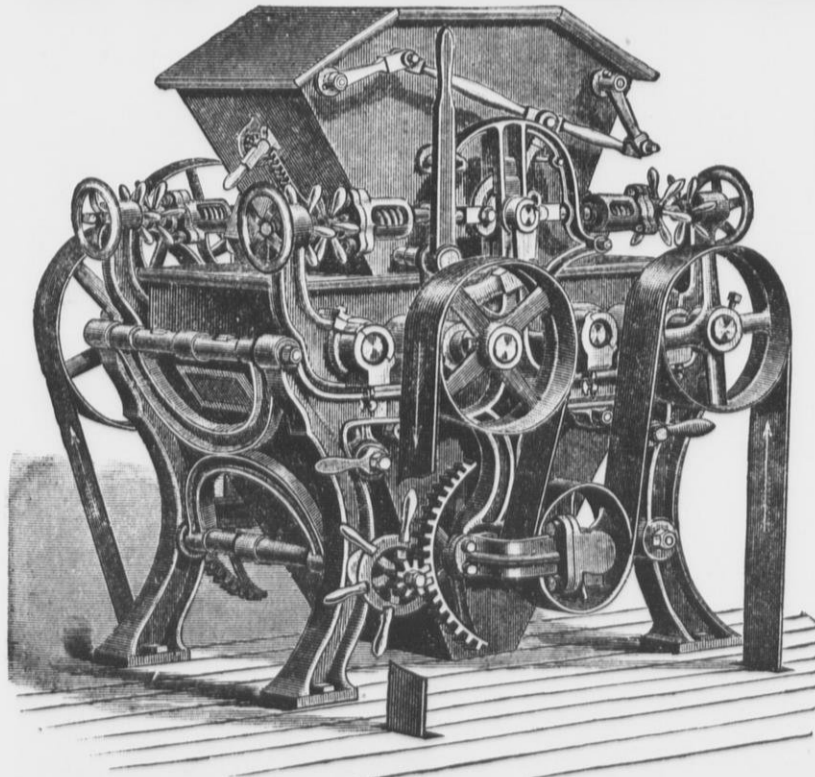
LESS BREAK-FLOUR & MIDDINGS OF BETTER QUALITY.

Can Furnish Machines on Short Notice. We use none but the Best ANSONIA Rolls.

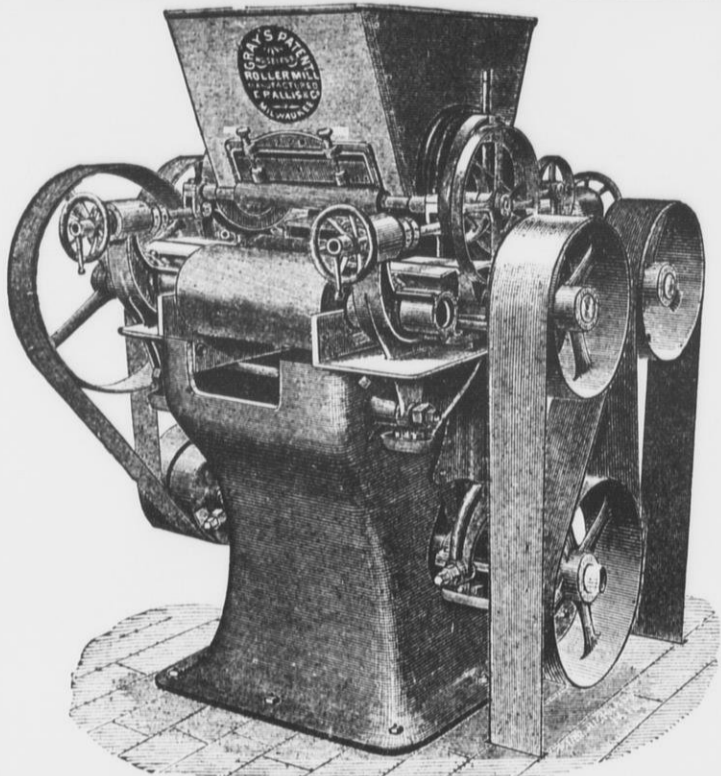
For further information, apply in person or by letter to the Sole Manufacturers,

STILWELL & BIERCE MANUFACTURING CO., DAYTON, OHIO, U. S. A.

[Mention this Paper when you write to us.]

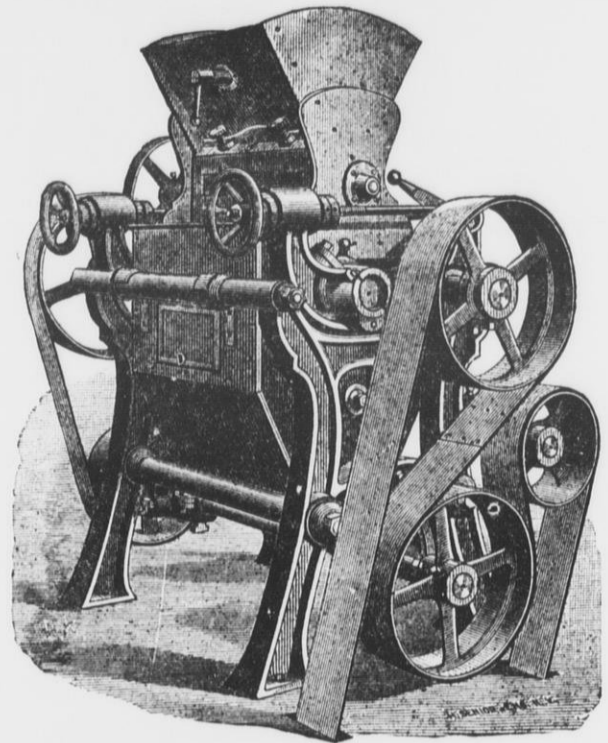


GRAY'S PATENT NOISELESS ROLLER!



DOUBLE MACHINE.

MILLERS



SINGLE MACHINE.

WITH

CORRUGATED CHILLED IRON ROLLS.

CORRUGATIONS CUT OF ALL DESCRIPTIONS.

OVER 5,000 IN USE.

First Premium Awarded at Millers' International Exhibition.

These Machines require little power, are perfectly noiseless, being driven entirely by belt; are simple in construction; strong and durable; perfect in every adjustment; adapted to both soft and hard wheats.

We refer to the following prominent millers who are each using from 50 to 150 of these machines:

Winona Mill Co., Winona, Minn.
 C. A. Pillsbury & Co. Minneapolis, Minn.
 C. C. Washburn, " "
 Washburn, Crosby & Co., " "
 W. D. Washburn & Co., " "
 Sidle, Fletcher, Holmes & Co., " "
 E. V. White & Co., " "
 John Glenn, Glasgow, Scotland.
 Jones & Co., New York City.
 Geo. V. Hecker, New York City.
 Becker & Underwood, Dixon, Ill.
 Schurmeier & Smith, St. Paul, Minn.
 E. T. Archibald & Co., Dundas, Minn.

Jesse Ames' Sons, Northfield, Minn.
 J. B. A. Kern, Milwaukee, Wis.
 Edw. Sanderson, " "
 Daisy Roller Mill, " "
 C. E. Manegold & Sons, Milwaukee, Wis.
 Commins & Allen, Akron, Ohio,
 L. H. Gibson & Co., Indianapolis, Ind.
 L. H. Lanier & Co., Nashville, Tenn.
 LaGrange Mill Co., Red Wing, Minn.
 Waggoner & Gates, Independence, Mo.
 Horace Davis & Co., San Francisco, Cal.
 And Hundreds of others

To all parties purchasing our Rolls we give full information regarding the system of Roller Milling.

ADDRESS:

EDW. P. ALLIS & CO.,

Mention this Paper when you write us.

MILWAUKEE, WIS., U. S. A.

The United States

MILLER

Published by
E. HARRISON CRAWKER. { Vol. 12, No. 6. }

MILWAUKEE, APRIL, 1882.

{ Terms: \$1.00 a Year in Advance.
Single Copies, 10 Cents. }

The Miller's Daughter.

It is the miller's daughter,
And she is grown so dear, so dear,
That I would be the jewel
That trembles at her ear:
For hid in ringlets day and night,
I'd touch her neck so warm and white.

And I would be the girdle
About her dainty, dainty waist.
And her heart would beat against me,
In sorrow and in rest.
And I should know if it beat right,
I'd clasp it round so close and tight.

And I would be the necklace,
And all day long to fall and rise
Upon her balmy bosom,
With her laughter or her sighs,
And I would be so light, so light,
I scarce should be unclasp'd at night.

Tennyson.

Millstones v. Roller-mills.

BY W. B.

As millstones and roller-mills have existed from patriarchal times, and as the former for a long period in the history of milling well nigh superceded the latter, it is not surprising that in the battle of the buhrs v. rolls, now being fought, both combatants should lay claim to victory as looming in the future. There are, however, in the progress of things, certain facts that speak for themselves; facts which, acting as mediators as it were, will eventually settle the day on a satisfactory and permanent basis. Looking back over the historical page of milling, the universal testimony of all ages bears witness to the fact that the roller turns out the finest quality of flour, and that of Dr. Livingstone, hailing from Central Africa, that the fine flour prepared by Sarah for the angels was made by the roller-mill is singularly suggestive of argument. First: Did not Abraham have a quern mill for grinding? Every Hebrew family had one. Was the patriarch an exception? Certainly not. Second: Had not every Hebrew family a roller-mill? Most undoubtedly they had; for however much commentators may have differed in opinion hitherto on the domestic utensils and economy of the Hebrews, in the days of the Patriarch Abraham and those of Moses, the progress of science and a more practical acquaintance with Oriental times, point to the conclusion that Abraham used both the quern and roller-mill, and that he had also two kinds of mortars, the first, a small one for decorticating barley, wheat, etc., by the wet process, and the second a large one for husking split wheat and rice. A very brief common-sense view of the matter will illustrate this.

The meaning of the Hebrew word translated "mortar," Numbers xi. 8—"And the people went about and gathered it (manna) and ground it in mills, and beat it in a mortar," means "to boil up," and this is a practical definition of decorticating wheat and barley according to the wet process, and also according to the dry process, viz., Proverbs xxvii, 22—"Though thou shouldst bray a fool in a mortar amongst wheat with a pestle yet will not his foolishness depart from him." Both these practices have come down to the present day. Hence there is now no diversity of opinion. It is otherwise with the grinding of fine flour for the angels and the pounding of manna in a "mortar" in the wilderness, for although the general opinion of commentators is in favor of the hand roller-mill, still in use in the East, yet there are some who think Sarah only sifted out the fine flour from the ordinary milling with the quern, and that the manna was beaten in a small mortar such as was used for decorticating wheat and barley by the wet process. There may be some

truth in the latter, as the wet process mortar is often at the present day so applied. We have seen it done. After the wheat or barley is "skinned," as it is generally termed, and the skins or bran removed, the groats are well washed in a charge of pure water so as to clean them. They are then put back into the mortar, and reduced to a paste with the pestle. The paste is then made into "scones" or cakes, and baked on the bread stone; or the paste is otherwise used in cooking. Manna may have thus been reduced to paste, but the more common-sense and practical view of the question is that the manna was generally reduced to flour by the roller-mill, as it was the most suitable for the purpose. The quern, on the other hand, was not so well adapted for grinding manna, and therefore, of the two plans we conclude the Hebrews had sense enough to choose the best, there being no Divine law to the contrary.

Sifting the rough meal produced by the quern would not supply the angels with the finest flour with which the Patriarch Abraham was familiar, and therefore it is more reasonable to suppose that Sarah set some of her maids to grind with the roller-mill, so as to have it fresh and sweet, of the best quality just as the Arab does at the present day when a stranger arrives at his tent.

The reason why the roller mill makes finer flavored flour than the quern is, because all the bran, including the cereal, maltin, and germ, which it contains, is removed by the sieve, and none of the aroma driven off, only the pure flour of the kernel being used in cooking and baking. Although the ancients were not acquainted with the fact that their dark coloured and badly flavored bread, &c., was due to the presence of cereal, maltin and germ as ferments, they were familiar with the fact itself, and their knowledge thus far is recorded in the history of milling and baking. Thus the writer of the article "Mills," in Partington's British Cyclopaedia, 1835, in describing the grinding of hard wheats in Italy, in which a large portion of the bran was ground into flour, says, "However carefully the flour may be sifted, the bread which it produces, although very wholesome and agreeable, is always dark coloured, and sometimes almost a black." At that time the dark color of the bread was attributed to the kind of millstones used. But since then the discoveries of Mége-Mouriés (of cereal) and Dubrunfaut (of maltin, *Compt. Rend.*, vol. 66, p. 274) and others have proved by experiment to the satisfaction of the scientific world, that the dark color is mainly, if not wholly, due to fermentation, and the decomposition of the more valuable nutritive properties of the flour of which the bread is composed.

Dubrunfaut is of opinion that diastase is merely a product of the decomposition of maltin, and that the latter is the active principle or primary ferment in malt, and as it exists in wheat, maize, and other grain, it follows that it (maltin) exists in the neck of the embryo or germ, between the radicle and cotyledon, as it is there where the nitrogenous matter of the germ is converted into diastase for the purpose of changing the starch and gluten into soluble matter (glucose and probably pepton), so as to start germination, the plumule upwards and the radicle or roots downwards.

In roller milling, when the wheat is cracked and broken down throughout by rollers, the semolina offal contains a large proportion of the germ, mostly flattened into three fragments—the cotyledon, the neck and the radicle, and the light colored bran that lies between the germ and the kernel, in which it (the germ) is embedded, as may be seen on examining the offal, or by dissecting a wheat berry or a grain of maize. These flattened fragments of the germ and bran are easily distinguished under the microscope. In the

case of maize, when broken down by a disintegrator and the germ and cuticle separated from the semolina by a fan and sieve, the germ is generally found adhering to portions of the cuticle. In America in the manufacture of hominy, roller mills were at one time used, the cuticle and germ being removed by sifting, but there is too much oil in the germ of maize for successful crushing, whilst the cuticle and germ are easily removed as above by fan and sieve. Hence most modern American patentees adopt the disintegrator plan, but there is a wide difference in the details of manufacture which ought to be attended to by our milling engineers and millers, before taking out patents for milling maize for brewing, distilling, and other purposes, as not one of the English patents hitherto obtained for this purpose are worth the paper on which the specifications are printed. All the American, Canadian, and French patents are published in the reading room of the English Patent Office, with a fine selection of agricultural and scientific works, giving illustrated descriptions of such machines, so that patentees are inexcusable if they do not consult them.

Where a combination of millstones and rollers are used, the former for breaking down the wheat to semolina, the semolina offal contains less of the germ, as will be seen on examining it, than the semolina offal of the roller mill, and millers ought to experience no difficulty in accounting for this difference. In practice, however, the eye of the miller is generally so closely concentrated on the flour, as almost to lose sight of the offal. The latter fetches so little money in the market as hardly to be worth looking after, and if the neck and radicle end of the germ with the white bran can be ground into second flour, so much the better for his balance-sheet at his bankers. As to the baker, *alum* will prevent the cereal and maltin from producing dark coloured bread and it is so cheap that no difficulty stands in his way of keeping accounts square. The day, however, is gone by for thus arguing the subject matter in question, for the public stomach is sick of alum; and brown bread, in spite of all that has been said in its favor, is becoming more and more unpopular as we progress in milling science.

Fine flour is the order of the day—flour that will not change its colour in the baking, white flour and white bread are now household words all the world over, whilst adulterations of every kind are tossed to the winds. If it be true, as doubtless it is, that fine flour, free from cereal, maltin, and bran ferments can only be produced by the roller milling system, the battle of the buhrs v. rolls is already fought and won by the latter. The duty of the milling interest is therefore manifestly to improve the roller milling system, and this is just what is now generally being done. The improvements of last year (1881) are very remarkable, proving the truth of foreign observation that "When Englishmen go in for a thing they soon get a-head of all rivalry." No doubt the Continent of Europe and the United States of America, with our Colonies, are more powerful rivals than hitherto; but, granting this, England does and doubtless will continue to lead the van of progress in milling.

Not a little may be said after all this in favor of millstones in combination with rolls and improved dressing machines. Such wonderful progress has been made with the latter flour dressing machines, that it is not surprising that French milling engineers and millers should throw rollers overboard and go in exclusively for their native buhrs. The germ, about which so much is being said, is chiefly composed of vascular tissue that cannot be reduced to a granular form, so that however finely it may be ground by millstones it can be sifted out and separated from

the fine flour. By improved dress and form of the millstones, and the gradual process of grinding, injury to the flour from heating and killing is obviated under proper management.

There is a great deal of truth in this, but when we come to the aromatic properties of the wheat berry and the impossibility of separating cereal, maltin, and other ferments from the fine flour by sifting, electric purifying, or dressing of any kind, the case of the buhrs become less hopeful. The rasping and tearing action of the dress is objectionable, and the finer and sharper it is the greater the objection, as more of the volatile and aromatic properties are liberated, and the normal medicinal principles destroyed. Millstones cannot be successfully used in pulverising medical drugs, and the argument applies with equal force to the grinding of wheat. The velocity of the running is greatest where it should be least, and the larger the millstones the more objectionable they are in this respect. At the same time very fine semolina is now made by millstones, but at too great a sacrifice, all things considered.

The objection to rollers that they cake the flour is due to mismanagement, and not to the principle of disgranulating by rolls. It is either due to feeding the rolls too thick, or to too few breaks. Something also may be due to an excess of moisture in the wheat and the excessive crushing of the bran, so as to remove the last particles of flour with the fatty or waxy matter which it contains, a very objectionable process on other grounds, as it also removes cereal, maltin and other ferments. But the drying of wheat, the enlargement of rolls, the better separation of flour and offal between breaks, with a better knowledge of ferments and their action, and the increased value of the bran or offal for feeding stuffs for cattle are fast obviating objections of this kind.—*Millers' Gazette* (London.)

A Plan for Re-Bolting

Mr. Rathbun gives his plan for re-bolting in small mills as follows: "Before proceeding to notice the best arrangement of cloths and system for small mills, we wish to say that our plans and systems are elastic and not rigid; or, in other words, we adapt everything to circumstances, such as planning to use all the cloths we possibly can that are on hand and good, knowing as we do, that a great many different numbers can all be made to produce equally good results." He then gives plans for the different kinds of wheats, and recommends for winter wheat medium low grinding with a mill with one run of four-and-a-half foot stones on wheat, grinding eight bushels an hour, one single reel twenty feet long and thirty-two inches in diameter, and running thirty revolutions per minute, no purifier. First, he recommends to put the reel on an eighth-of-an-inch pitch to the foot, and clothe it with two feet of No. 8, three feet of No. 9, five feet of No. 10, five feet of No. 11, three feet of No. 12, one and one-half feet of No. 6, and six inches of No. 2 cloth. The middlings or product of No. 6 cloth accumulate until there is enough to make a second grinding, and in grinding them do not grind too close or make too close a finish. When grinding wheat again, mix this flour in by means of a little feeder, so that it will go in the bolts with the wheat chop and bolt again. The product of No. 2 cloth accumulates with the tailings from the middlings and regrind for low grade, but do not work it into the first flour, as it will injure the quality, but the first middlings, if properly managed, will improve the first flour. Any method which tends to improve the flour should be followed, and if a more uniform flour can be made by re-bolting than by bolting once, then we should re-bolt.

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DURING the year ending June 30, 1881, \$329,010 worth of bolting cloth were imported from Europe; also \$1,072 worth of buhrstone in the rough.

DURING the fiscal year ending June 30, 1881, bags of foreign make, in which flour and grain were exported to the value of \$162,212 were re-imported free of duty,

NEARLY seven million pounds of rice valued at \$389,016 were imported during the last fiscal year. Our Southern rice planters should "brace up" and try and stop this leak.

THE total value of imports for the year ending January 31, 1882, was \$681,691,921. The exports for the same were \$824,177,326. The imports for similar period last year were of the value of \$686,883,546 and exports \$896,765,211.

WE have just received the very handsome catalogue of C. F. Miller, of Mansfield, O., a well-known mill furnisher. Mr. Miller is doing a large business, and is prepared to fill orders of any dimensions for anything in the mill furnishing line.

MR. CARMICHAEL, a member of the Wisconsin legislature, recently introduced a bill substituting a half bushel measure for the brass tester now in use by grain buyers. The bill was discussed at considerable length and was defeated by a vote of 38 ayes to 54 noes.

THE number of immigrants arriving in the United States during the year 1882 will doubtless greatly exceed in number any previous year. They are also, generally speaking, in better circumstances than those arriving heretofore. They bring good amounts of money with them wherewith to purchase the supplies necessary for opening farms and beginning life in America. The money they have brought has had a visible influence on Western trade already, and it is probable that it will be much more apparent as the season advances.

THE enormous quantity of \$1,000,000 worth of blasting powder was used in Colorado during the past year.—*Min. and Sci. Press.*

A "blasted country" is the Centennial state.

THE total values of the exports of domestic breadstuffs from the United States during February last were \$11,173,239, and during February, 1881, \$13,919,046; for two months ended February 28, 1882, \$23,150,760, and for two months ended February 28, 1881, \$28,848,452; for eight months ended February 28, 1882, \$135,294,678, and for the same period the preceding year, \$182,428,626.

THE recent floods which have overwhelmed the country tributary to the Mississippi river, will call the question of remedying the trouble anew to the minds of the hydraulic engineers of the world. This great section of the country so seriously involved is one of the most fertile regions in the world, and it must be reclaimed and protected at any cost. Doubtless there are engineers who can submit feasible plans that can be carried out for a sum of money not too great to be raised by a Nation like ours.

THE Garden City Mill Furnishing Co. of Chicago, Ill., have lately put in their factory new and improved machinery, thereby greatly reducing the cost of manufacturing the Garden City Purifiers. With their usual liberality, they have given millers the benefits of these improvements, and have greatly reduced the price of these machines. This will be good news to many millers who need a first-class purifier at a reasonable price. Read their advertisement and correspond with them.

WE have received from the Chicago & Northwestern Railway Co. a copy of a handsome little book entitled "My Rambles in the Enchanted Summer Land." It is designed for the use of summer tourists in the Great Northwest, and those intending to make a summer trip will certainly do well to read this little book carefully and make up their route from it. Boating and fishing facilities are good at all of the resorts along the line, and all who spend a few weeks amongst the woods and lakes of Wisconsin and Minnesota will never have cause, we think, to regret it.

DURING the month of February there arrived in the United States, 30,447 passengers—of whom 28,247 were immigrants, 1,631 citizens of the United States returned from abroad, and 569 aliens not intending to remain in the United States.

OF this total number of immigrants, there arrived from England and Wales, 3,037; Ireland, 1,464; Scotland, 501; Austria, 698; Belgium, 27; Denmark, 289; France, 275; Germany, 8,626; Hungary, 1,534; Italy, 1,777; Netherlands, 235; Norway, 193; Poland, 353; Russia, 1,052; Sweden, 431; Switzerland, 431; Dominion of Canada, 3,771; China, 3,389; and from all other countries, 164.

Oatmeal Milling Overdone.

A well-known oatmeal miller says that oatmeal milling is entirely overdone in this country. Americans do not take very kindly to oatmeal as a regular thing—they look at it as a sort of medicine—a good thing for babies and sick folks. The oatmeal export trade has not been profitable during the past two years. The increased exports of good wheat flour to Scotland, where more oatmeal is used than anywhere else, is reducing the consumption of oatmeal in that country. Choice brands from a few well-known mills only command a fair paying price.

Mechanical Schools.

THE days of master and apprentice in America may be said to have gone by. Public schools for the free education of our rising generation in the ordinary fundamental branches of learning are universal. Laws have even been enacted in several states already, compelling parents and guardians to send their children or wards to school while they are at certain ages. These laws, we are sorry to state, are not energetically enforced, and in many instances are doubtless violated with impunity. There is an opportunity, however, for all to obtain a respectable education at little cost, if so disposed. But there is a lack of facilities for teaching our young, useful trades by which to earn a respectable livelihood when they are grown. This deficiency has already been a subject of grave consideration by some of the best minds in our country, and in some of the eastern cities technical schools have been established within the past few years, which have been

more or less successful. It has mattered little where these efforts to inculcate mechanical education have been made, the projectors have always had more applicants for their benefits than they were able to receive. This shows that there is a universal demand for schools in which the American youth can be taught useful trades. It is too much to expect that the graduates of one of these schools, after a course of a year or two, should be first-class journeymen, but it is certain that they have gained the fundamental principles of their trades and will soon become first-class journeymen if they are possessed of a reasonable amount of tact and common sense. Too many of our intelligent youths are seeking to earn a livelihood in the professions, which they are wrongly taught to believe are more *high-toned* than other pursuits; but to our mind there is none more high-toned than the liberally educated and skillful mechanic. He is able to use both brains and body for the benefit of himself and his fellow-man. We shall watch with interest all efforts to establish technical schools or to improve the course of instruction therein.

THE idea of establishing a school for the education of young millers has long been agitated, and the day will certainly come when there will be such an institution in this country. There are several institutions of the kind now in operation in Germany and Austria, and one, we believe, in France.

THE changes in our methods of milling have been great during the last generation, and it has been ascertained that many of the old line of journeymen millers are sadly out of place in a modern mill. Our young men must be taught by those capable of teaching, to become the millers to operate the mills of the future when the advanced millers of the present are gone.

That Germ Question.

THE British millers are now enjoying a controversy over Thomas Muir's patented method of removing germ from grain and making germless flour. In a letter recently written by Muir, in speaking of the late George Motley's American patent, he says it is no anticipation of his patent, though it may be to Hay's (English) patent. He says: "It is one of the many devices for eliminating the germ, referred to in my specification as not effective; the result was obtained at too great cost. I tried it and found it both ineffective and costly."

MR. Muir has so far not succeeded in obtaining a settlement with the British Millers' Association, but many outside of the Association are said to be compromising.

Getting up Steam.

BY F. B. ALLEN.

THE records of boiler explosions demonstrate unmistakably the importance to the steam user of the most careful supervision over boilers at the time of getting up steam. Some of the most destructive explosions of which I have any knowledge occurred either on Monday morning, or at the time of getting up steam after the boilers had been out of service; while cases in which plates are bulged, furnaces distorted, and flues and tubes badly injured, are of quite frequent occurrence, all due to ignorance and carelessness, or both, in getting up steam, or neglect of necessary precautions in filling boilers; or, having filled them, a failure to detect leaky gaskets, imperfectly closed blow-off valves, or cocks that had permitted the escape of the water before fires were lighted.

IN filling boilers, I have found it a good plan to raise the safety-valve and block it open: this will permit the escape of air, besides indicating the time boilers begin to steam, after which the valve may be lowered. I have observed most stationary engineers, in charging furnaces, put the kindling-wood on the grate-bars. Another and I think a better plan is, to first scatter a thin layer of coal all over the bars—atop that the wood is placed; the latter plan, if tried, will be found a more economical and expeditious way in obtaining a good bright steaming fire.

THE masonry or setting of externally fired boilers now almost universally employed in our larger cities where aqueduct water is used, is frequently ruined by heavy forced firing, when steam is first got up; the cement and mortar, instead of being allowed to set properly as they would do if slowly and judiciously heated, speedily crumble away, losing the strength of the joint; the brick wall cracks open, the draught is impaired, heat lost, and perhaps the girth seams of the

boilers strained by the unequal settling of the walls. In a few months, it is necessary to reset the boilers again, for which the innocent mason may be cursed loud and deep, the engineer in all probability being his chief accuser.

FORCED firing is not only injurious to the setting, but to the boiler as well. This is most apparent in the use of the common upright or vertical tubular boiler, in which the water is carried some distance below top of tubes; the tube-heads soon begin to leak, and require frequent expanding in order to keep them tight. It will be found a good plan, when troubled in this way, to have defective tubes ferruled. Horizontal tubular boilers are often set to return heat over the top of shell; the disadvantage of this plan of setting is the danger of the exposed shell above water-line being injured in getting up steam from cold water. The shorter the boiler, the greater the danger of injury; the lower part of the boiler being at a temperature due to that of the contained water, while the upper part is exposed to that of the escaping products of combustion. A recent experience was that of three boilers 42 inches by 10 feet, used for heating purposes only, at a pressure never exceeding 25 pounds. Yet under these favorable circumstances, they were ruined in about five years. More or less trouble had been experienced during the preceding season from leaks above the water-line. On examination, it was found that the upper half of the shell was badly cracked in several places; and when it was attempted to cut out the defective sheets, the surrounding metal was found so brittle and badly crystallized that the boilers were condemned. The shells below water-line had never given any trouble and appeared to have suffered no injury during their brief service. There can be no doubt, I think, that their failure was due to the plan of setting; for they were built of selected iron, by one of our best boiler-makers, and while in service were under the care of a first-class engineer. Under less favorable circumstances, their failure would have occurred sooner. Fractures in the sheets of boilers set in this way are of common occurrence, the danger increasing with the frequency of getting up steam.

IN some parts of the country, local ordinances for smoke prevention are now in force, and many worthless smoke-burning appliances (so-called) have been sold to steam users in those localities. A roomy furnace, ample combustion-chamber, and a clean, bright, even fire, not exceeding eight inches thick, with systematic firing, will be found helpful in lessening the smoke nuisance. When there is more than one furnace, the firing and cleaning must be alternated, the fireman having his fire tools within reaching distance, and damper closed before he opens the furnace door, which must be closed again as quickly as possible.

THERE are two principal methods of firing, known to the initiated as "spread-firing" and "side-firing." Each has its advocates, who are convinced theirs is the only plan. I have practiced both, and, so far as I could tell, with about equal results; am inclined to attach greater importance to having an experienced fireman, careful attention, regularity of firing, and rapidity of movement than to any prescribed form of covering the fire, which must of necessity vary in different localities, according to the quality of the fuel. But a careful attention to the details enumerated will result in economical consumption of fuel, lessening of smoke, and greatly increased efficiency of the boilers whenever practiced.—*Locomotive.*

JOHN R. SCHALL now owns the largest mill in Lehigh County, Pa. It is at Laury's Station, has a capacity of 150 barrels per day and is fitted up with the Stevens roller mills. The machinery was furnished by the Jno. T. Noye Mfg. Co., of Buffalo, N. Y.

MESSRS. N. S. GREENE & SON, of Milford, Wis., have at last effected a compromise with the farmers, of the troubles arising from overflowage caused by their dam. The terms of the compromise are as follows: From the breaking up of the ice in the spring until Sept. 15, each year, flush boards limited to 6 inches and for the balance of the year 8 inches in height. The space for the escape of water over the dam is lengthened to 35 feet more than when suits were commenced. Cost in suit tried in the Circuit Court at Madison, waived, and each party to pay their own costs on all suits tried and untried. The farmers waive all claims of damages for flowage as long as the dam is maintained in said condition with flush boards as above stated.

The Odell Roller Mill.

We present herewith to our readers an illustration representing the Odell Roller Mill. It is the invention of Mr. U. H. Odell, a mill-engineer and mill builder of long experience and one whose work is spoken of in the highest terms in various parts of the country. This roller mill which has met with a flattering reception since its introduction to the general market a few months ago is manufactured by THE STILWELL & BIERCE MANUFACTURING Co. of Dayton, O., who have been so long and favorably known to the public as manufacturers of turbine water wheels, feed water heaters and filters, etc.

Our illustration represents the double machine. The machine contains two pairs of 9 inch by 18 inch chilled iron rolls, either corrugated or smooth, and is driven by belts. The entire machine is easily accessible in all its parts, occupies but little floor space, and can readily be taken apart, if necessary for convenience in locating it in the mill. For each double mill two driving-belts from a power-shaft are employed. The open belt on the front side of the machine drives the two fast-speeded rolls. The other a cross-belt (crossed below the floor), at the opposite side of the machine, drives two slow-speeded rolls. This driving arrangement permits the use of long belts over large pulleys, securing a positive differential speed, and obviating the slipping of belts and heating of journal-bearings. All the pulleys are hung close up to the journal-bearings.

The tightener devices, which are alike on both sides of the machine, consist of a tightener pulley, running in an oscillating frame, which is fastened to the roller mill by a stud. On the back of each of these tightener frames is fastened the segment of a gear-wheel, and the same are actuated by means of pinions fastened to each end of a shaft running through the machine, on one end of which is fastened a hand-wheel. These tightener pulleys, with the devices for operating them, perform the double office of giving proper tension to the driving-belts for starting and operating the roller mill, and also for instantly stopping the same without the necessity of throwing off a driving-belt.

Provision is made for reversing the position of tightener devices, by which means the same roller mill can be made either right-hand or left-hand, which convenience is sometimes of great value in meeting the conditions in old mills. Another convenience and safeguard consists in being able by one movement of a hand-lever to simultaneously throw both movable rolls apart from the stationary rolls and at the same time shut off the feed. This is accomplished by means of the hand-lever. Pulling this lever towards you, spreads apart the rolls and shuts off the feed; and pushing it back again restores the rolls to their original position, without disturbing any of the adjustments, and turns on the feed. The two inside rolls run in stationary boxes, which are bolted securely to the frame and always remain in perfect line. The two outside rolls run in boxes which are bolted to the swinging arms, which admit of both vertical and horizontal adjustment.

These adjustments are accomplished as follows: The vertical adjustment is obtained by means of the lever eccentrics, by which the swinging arms can be raised or lowered at pleasure. The horizontal adjustment is obtained by means of the rods, one end of which is fastened to the link, the other end to the barrel, which contains the tension spring, as clearly shown in cut. By turning the hand-wheel, the distance between the rolls can be varied at will; and having obtained the desired set, it is retained by means of the lock-nut. Any desired tension of the spring in barrel can be obtained and is not affected by the subsequent adjustment of the rolls. These springs allow the rolls to yield apart and permit the passage of any hard substance without injury to them.

Solidity of construction has not been lost sight of, and the adjustments, peculiar to this machine, have attracted much attention, and, by those familiar with them, are very highly spoken of. Those desiring information, fuller than that here presented, can readily obtain it by writing to the manufacturers, STILWELL & BIERCE MANUFACTURING COMPANY, Dayton, Ohio.

R. G. SHULER & Co. of Minneapolis, Minn. have just taken contracts for building a 200' barrel roller-mill for Michael Simmers at New Prague, Minn.; also one for J. S. Lord, at Ogden, Ia., and a 150 barrel roller-mill for Gravel & Goulet at Gravelville, Minn.

[Translated from *Die Muehle* for the UNITED STATES MILLER.]

About Roller Milling.

BY DR. H. SELLNICK.

As has been already repeatedly explained the employment of one or another kind of rolls in milling depends eminently on the material to be ground and the result desired to be obtained. Rolls are not universally adapted to the grinding of the most heterogeneous millstuffs, which can be ground with equally good results on millstones, provided their dress is made to suit the circumstances. Rolls are constructed to do specific work; their grinding surfaces are finished for a specific purpose by the manufacturer; the miller cannot change the nature of the surface; cannot make it smooth or dull for one day and corrugated or sharp for another to conform to the quality of millstuffs he desires to grind.

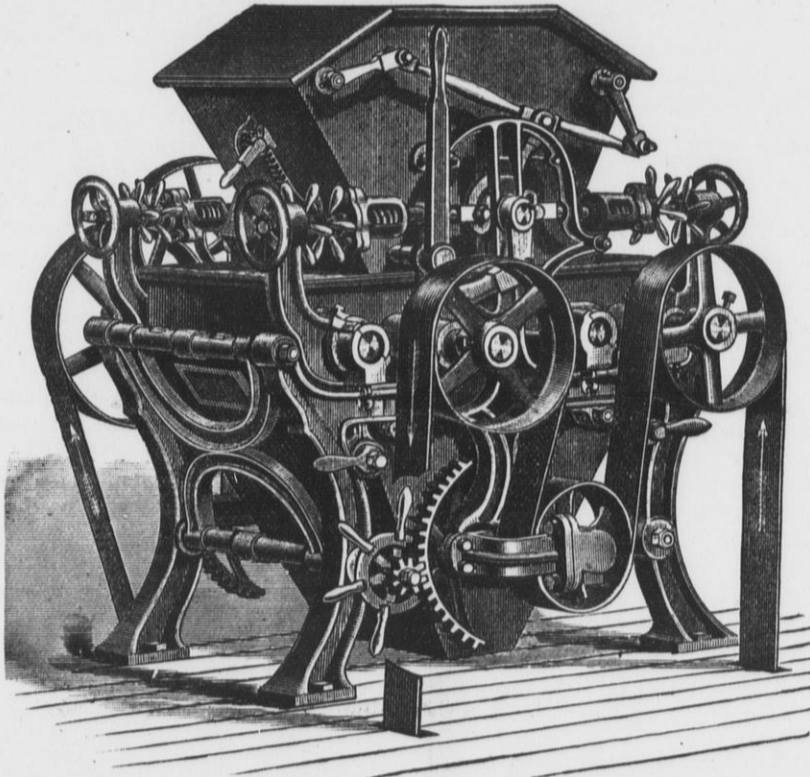
Rolls can only serve the purpose for which they are intended by the manufacturer and must be criticized only from this point of view. Comparisons of roller machines ought to be made with the idea in view that the manufacturer is only responsible for the results when performing the specific work for which they were built and not from the results obtained by the miller when working the machine on millstuffs on which it was not designed to work.

Porcelain rolls are intended principally to grind middlings, making therefrom the finest flour. It is therefore not quite plain, how, in an article entitled "Smooth Rolls" (translated from *Die Muehle* and published in a recent number of THE UNITED STATES MILLER

are meeting the above-named three requirements entirely and satisfactorily. He who thinks himself justified in ignoring or even disputing the value of these machines, their work, their construction and durability only furnishes proof that he is unconscious of the latest aim of modern milling and the means of accomplishing it.

To press gently, it is necessary to employ such means of pressure as are sufficient to hold the rolls together so elastically that the limit of elasticity of the material being ground is not greatly exceeded. This is accomplished by the double spring pressures so characteristic in Wegmann's rolls. These double springs not only hold the rolls to their work but also (by a late invention of Mr. Wegmann's) are the means of throwing the rolls apart automatically in case the feed should stop.

To rub apart carefully, it is at first necessary to rub between two surfaces, which must not be mis-understood as the friction of one surface on the other. For this rubbing apart, it is necessary that the surfaces shall grip the object to be reduced in size to the required degree of fineness, and hold it to let it receive the rubbing movement of the frictional surfaces—an utter impossibility between absolutely smooth surfaces. The *ground biscuit-porcelain* however has solved the problem for such a length of time and with such perfection as cannot be paralleled by any other material. The rubbing apart is done carefully, because even though the surfaces travel fast, the real rubbing and pulverization takes place rather slowly. It is entirely different from the rubbing action between two millstones. The uniform slow rubbing action of



THE ODELL FOUR-ROLLER MILL

as a report on Russian Milling) a comparison of the work of porcelain and iron rolls could be drawn, provided, as the authors of the article distinctly emphasized only coarse flour or rather fine dust middling ("groats") were to be produced.

Feeling not at all inclined to criticize the singular and personal ideas developed by these authors, I desire to contribute something tending to refute such erroneous views as appear to me to still exist. It has never been denied that smooth rolls, either porcelain or iron were capable of grinding or rather pulverizing up to a certain degree of fineness, provided that the condition of the grain is such as to readily allow a bursting apart by pressure. This degree of fineness however does not reach further than to that state of granulation which millers call fine dust middlings (groats) and in case of soft wheat that points even can not be reached. The most difficult service desired to be effected by rolls was to grind not only hard dust middlings but also soft middlings, without the aid of further appliances, as fine as millstones could do, and thereby enjoy all the advantages universally accredited to rolls. This could only be accomplished by an action on the middlings which first, pressed gently; second, rubs apart carefully, and third, allows the product to pass off organically sound.

Wegmann determined to solve this problem. He has succeeded by the invention and introduction of his porcelain rolls, under the many difficulties of construction, by the shrewdness of competitors or advocates of iron rolls. His porcelain roller mills with differential-speed of roll surfaces

the Wegmann differentially speeded rolls could nearly be effected between two millstones if both stones revolved in the same direction, one moving a little faster than its mate, but the differential motion of a pair of porcelain rolls has not by far the tearing, atomizing action afforded by the surfaces of a pair of millstones and the representation of equality of the work of millstones and porcelain rolls attempted by the Russian authors referred to is entirely "en vogue." The "grip", or gritty texture of porcelain rolls assisted by the differential motion and gentle pressure—in using the Wegmann rolls—affords a careful rubbing apart of the middlings—so much so, that bran and germ particles remain unreduced and will respectively be flattened, while the flour particles are reduced very evenly to sharp flour.

Rolls, smoother than porcelain—this includes all metal rolls—can only produce a rubbing action by differential motion under increased pressure—that is at the expense of the gentleness of pressure,—thereby having the tendency to squeeze, which means to overcome the limit of elasticity of the middlings by far, so that not only the cohesion of the flour particles in the natural middlings—is annihilated but also these flour particles are stuck together, that is "caked." If this result is prevented, less fine flour can be obtained, and more coarse flour or rather fine dust-middlings ("groats")—which are called for in Russia. Coarse flour can also be made on porcelain rolls provided they are set and run properly which is necessary with any roller mill. It is not necessary to work with a differential motion. If "rubbing apart" is

[Continued on page 92]

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MILWAUKEE, APRIL, 1882.

We respectfully request our readers when they write to persons or firms advertising in this paper, to mention that their advertisement was seen in the UNITED STATES MILLER. You will thereby oblige not only this paper, but the advertisers.

Flour Mill Directory.

CAWKER'S AMERICAN FLOUR MILL DIRECTORY for 1882, was completed, ready for delivery February 1, 1882.

It shows that there are in the United States 21,346 flour mills and in the Dominion of Canada 1,488. The mills in the United States are distributed as follows:

Alabama, 388; Arizona, 17; Arkansas, 234; California, 209; Colorado, 52; Connecticut, 309; Dakota, 44; Delaware, 96; District of Columbia, 7; Florida, 81; Georgia, 514; Idaho, 18; Illinois, 1258; Indiana, 1163; Indian Territory, 3; Iowa, 872; Kansas, 437; Kentucky, 642; Louisiana, 41; Maine, 229; Maryland, 349; Massachusetts, 363; Michigan, 831; Minnesota, 472; Mississippi, 297; Missouri, 942; Montana, 29; Nebraska, 205; Nevada, 10; New Hampshire, 292; New Jersey, 445; New Mexico, 28; New York, 1942; North Carolina, 556; Ohio, 1462; Oregon, 129; Pennsylvania, 2786; Rhode Island, 47; South Carolina, 205; Tennessee, 629; Texas, 548; Utah, 129; Vermont, 231; Virginia, 689; Washington Territory, 45; West Virginia, 404; Wisconsin, 789; Wyoming, 3; Total, 21,356.

The directory is printed from new Burgeois type on heavy tinted paper and is substantially bound. It makes a book of 200 large pages. The post offices are alphabetically arranged in each state, territory or province. The name of the mill, the kind of power used and the capacity of barrels of flour per day of 24 hours are given wherever obtained which is in thousands of instances. This work is indispensable to all business men desiring to reach the American Milling Trade.

Price Ten Dollars per copy on receipt of which it will be sent post paid to any address. Remit by registered letter, post-office money order or draft on Chicago or New York made payable to the order of E. Harrison Cawker, publisher of THE UNITED STATES MILLER, Milwaukee, Wis.

A Word To Our Patrons.

This number closes the twelfth volume of the UNITED STATES MILLER. We take this occasion to thank our friends for their patronage and good wishes. We have striven to make the UNITED STATES MILLER valuable to the trade and know that we have succeeded. We have no space to spare in which to publish the many complimentary testimonials we have from time to time received, neither do we think it necessary or appropriate. We shall endeavor to make the UNITED STATES MILLER even more useful in the future to our readers than it has been in the past.

JOHN M. STOWELL, Esq. of the Cream City Iron Works, a well-known manufacturer of flour-milling machinery, engines, etc., is the nominee of the Democrats and the Trades Union parties for Mayor of Milwaukee. His election is considered certain.

MESSRS. Miller, Bros. and Mitchell, mill furnishers in Montreal, Canada, report business quite active in their line. Canadian millers find it greatly to their advantage to be able to secure all kinds of American flour-milling machinery without going outside of the Dominion.

GLUCOSE MANUFACTURE.—Some points in the growth of this important industry were brought out before the Committee of Ways and Means in testimony referring to the proposed tax on its production. It appears that \$20,000,000 capital is invested in the manufacture in this country, 50,000 people employed, and last year 20,000,000 bushels of corn were used.

AN ELECTRIC PILE-DRIVER.—At Hatfield Park, England, the piles to support a cofferdam across the River Lea have just been successfully driven by the power from a water-wheel situated at a distance, which power was transmitted by two dynamo-machines and a couple of wires to the gearing connected with a pile-driver of ordinary construction, erected on a barge floating in the river. The machinery, although rather roughly constructed, worked well, lifting a dolly weighing from four to five hundred-weight with ease and regularity.

MR. RICHARD GETHIN, superintendent of the millwright work on the new roller mills at Marshall, Mich., made us a brief call. He reports the new mill as doing excellent work.

ALBERT HOPPIN Esq., now a private citizen residing at La Crosse, Wis., was in the city during the month with his wife, visiting their numerous friends. Mr. Hoppin, we understand, will soon embark in the manufacturing business at La Crosse.

MARCH 25, L. Schoenthal's store-room in New York City, in which was stored over \$6,000 worth of Passover bread, intended for the use of the Hebrew citizens of New York during the coming Passover, was destroyed by fire. The price of "hard-tack" has advanced in New York.

SEED WHEAT.—Too much care cannot be taken in securing good seed wheat. In the first place, every foreign weed seed and every kernel of oats, rye, barley, broken wheat, etc. should be removed by machinery such as can be found in every well regulated flour-mill; and then, if possible, the wheat should be graded in regard to size and none used for seed except large, full and plump kernels. Mill-owners all over the country will consult their own interests by talking this idea into the farmers. The result will be a large harvest of good wheat. Farmers in the Northwest should be urged to sow nothing but the hard varieties of wheat, as on hard wheat depends the excellent reputation of the flour produced in the great mills of the Northwest, which has enabled the millers to pay to the farmers in the Northwest a price for their wheat which was in former years deemed to be impossible.

New System of Grain Transfer at Chicago.

The Chicago & Western Indiana Railroad Company are developing at the South Englewood suburb of Chicago a new plan for transferring grain from the Western to the Eastern roads. An immense transfer house, one thousand feet long, is to be built. The loaded cars from the West will be run into the house on a track twenty-three feet above the ground; and then with elevator shovels the grain will be unloaded into hopper scales holding a car load each, thus accurately ascertaining the weight of each car load. The grain will then be spouted into an Eastern car standing on the track below. The grain will be inspected at the yards, and the loaded Eastern cars made up into trains and started Eastward. The transfer thus made is quick and cheap, and the weighing accurate. The new house is expected to have the capacity of transferring five hundred car loads per day.

Grinding Damp Wheat.

One of our Oregon subscribers sends us the following questions.

What change is required in dressing a millstone for dry and wet or damp wheat? Would widening the furrows be better for damp wheat, or sharpening the furrows and cutting the surface of the stone away so as to leave the grinding surface nearer the outer skirts of the stones? The wheat is damp in in Oregon, and I hear complaints of flour making sticky bread.

ANSWER. The leading idea in grinding damp wheat is to grind it on sharp grinding implements, preventing the heating or even the warming of the meal. Best adapted for damp wheat are corrugated rolls with sharp corrugations. They grind cool, for the meal is held but a very short time between the rolls; it is not dragged for any distance, not more perhaps than one half of an inch. If you want to grind such damp wheat with stones, you must employ a pair of sharp, open stones, and not run them too fast. If they are four feet in diameter do not run them faster than 120 revolutions per minute and feed very moderately. Provide such stones with much draft, so they "throw out" readily. The stones must be cut away in the bosom considerably, i.e., a 4-foot stone ought to do all the grinding within six inches of its circumference. The sharper the stone the cooler it will grind. The slower a stone runs (of course, fast enough to keep steady when working) the less it will heat. The less land the stone has the less chance the meal has to be dragged along and get warm. It is proven that the starch of wheat when damp and warm changes partly into dissoluble glucose and dextrinose—both, sweetish and sticky, and products of fermentation. They will impair the baking qualities, and such flour will keep

on fermenting continually and spoil,—get sour. It is a bad practice to grind damp wheat, and no one's flour-mill will gain any reputation by it.

Why do you not dry the wheat? Steam-drying apparatus would help you indeed. Heaters, through which steam and heat are passing entirely independent of each other without contact, would be very advisable to use in your case. I thought your wheat was far from being naturally damp; and should you have reference to dampened wheat, this also should be re-dried before grinding. Should you want to grind your damp wheat on the stones dressed now for dry wheat, cut away the face of stone in center sloping up to land about six to seven inches inside of skirt. I would also widen the furrows a little and make them deeper towards the eye, then keep the lands sharp. Furrows ought to be smooth. All this is necessary to enable stones to throw out well by slower speed, as the draft of the stones cannot be changed so easily.

Recent Milling Patents.

FEBRUARY 21, 1882.

Grain-tally, James Griffith, Flint River Township, Des Moines County, Ia.

Process of, and machinery for gradual reduction of grain from flour to middlings, Noah W. Holt, Buffalo, N. Y.

Alarm for mill-stones, William Lauhoff, Detroit, Mich.

Roller for gradual reduction flour-mills, William M. Mills, Dayton, O.

Middlings purifier, Thomas B. Osborne New Haven, Ct. (Two patents.)

Roller-mill, Henry N. Pomeroy and C. E. Ball, Madison, Wis.

Feed-water heater, Edwin Reynolds, Milwaukee, Wis.

FEBRUARY 28, 1882.

Combined flour and meal-sifter, Napoleon Du Brul, Cincinnati, O.

MARCH 7, 1882.

Middlings purifier, P. S. Brown, Guthrieville, Pa.

Grain-mill, Louis Hottmann, Grünbach, Würtemberg, Germany.

Hominy-mill (re-issue), Theodore Hudnutt, Terre Haute, Ind.

Machine for separating middlings, William R. Middleton, Commonwealth, Wis., assignor to Messrs. Huntley, Holcombe & Heine, Silver Creek, N. Y.

Grain-cleaner, J. M. Shackelford and J. W. K. McClure, Blue Mound, Ill.

Manufacturing whole } Wallace Warren and
wheat flour and bran } F. C. Taylor, Chi-
flouring-machine. } cago, Ill.

MARCH 14, 1882.

Grain drying machine, John Barclay, Toronto, Ontario, Canada.

Grain-measure and tally, Thomas F. Dodge, Lawton, Mich.

Machine for splitting } Louis Gathmann,
grain, grinding-mill, } and mill disk, } Chicago, Ill.

Wheat-feeder, Frank J. Grow, Alpha, Ind.

Grain-drier, Henry R. Heffner, Circleville, Ohio.

Grain reducing-machine, John Hollingsworth, New York, N. Y.

Grain cleaner, John Russell, Berlin, Pa. (Two patents.)

Barley bearding-machine, James Sendall and D. Richards, Brockport, N. Y.

Middlings purifier, Andrew J. Seyler, Cedarville, Ill.

MARCH 21, 1882.

Grain drier—James H. Catron, Nebraska City, Neb.

Manufacture of flour—Robert L. Downton, St. Louis, Mo.

Oatmeal machine—Anton Heinz, Muscatine, Ia.

Grinding mill—Johann Matzner, Mount Pleasant, D. C.

Rice cleaning and scouring machine—David L. Shoemaker, Washington, D. C.

Grain drying apparatus—Frederick W. Weisebrock, New York, N. Y.

THE new 200 barrel roller-mill built by Edward P. Allis & Co. at Marshall, Mich., is now complete. It uses the Gray rollers and works on soft wheat. The millwright work was superintended by Mr. Richard Gethin. The mill contains 6 sets break rolls, 2 sets smooth iron rolls, 7 sets porcelain rolls, 15, 16-foot silk-reel and 8, 7-foot break-reels, 5 middlings purifiers, 6 break purifiers, 12 Kick dust-catchers, Throop's centrifugal flour-dressing machine, Richmond grain-cleaning machinery, and Throop's brushes and everything else needful for a complete mill. Adjoining the mill is a 45,000 bushel grain elevator, fitted up in the most approved manner for holding grain for the use of the mill

Bad Tasting Bread.

A sample of bread having a disagreeable taste was brought to Mr. C. Bernbeck according to the "Pharmaceutische Zeitung" for analysis.

It contained:

Water, 42.8; ashes, 0.632; salt, 0.78; dextrine, 16.8; glucose, 4.2; proteine substances and starch, 34.788; total, 100.00.

The sweetish taste is caused by the exceedingly high percentage of glucose.

The flour was also analyzed and a great percentage of dextrine and glucose was found. Thus the idea of adulteration by corn-flour was discarded and it was assumed that the starch of the wheat had become transformed chemically on account of the extreme dampness of the wheat. It was cut in the fall of 1880 which as will be remembered, was a very wet season.

State of the Hungarian Flour Trade.

The Vienna *Walzenmüller* in a recent issue, had a long and doleful article on the situation of the Pesth steam flour mills, which it says got a great deal worse during the year just closed in consequence of American competition, which has ousted Hungarian flour from markets considered under its absolute sway. Then there was the difficulty about procuring the precise grades of wheat required, the home crop not furnishing, them on reasonable terms. The Pesth mills made strenuous efforts to maintain their position, but in this they failed. They consequently applied to the government for assistance, placing before it the actual facts of the case. The only thing the Hungarian government was able to do in the way of aid was the lowering of railroad freight rates, but even this help has in reality not met the case fully. In this manner most of the Pesth mills have throughout 1881 worked at a loss, and not more than two of them are in a position to declare a dividend. Last year was one of the worst the Pesth milling industry had ever had to toil through. Not only has the field in which sales could be effected been lessened in extent, but the sales made did not on any average cover cost; the German frontier has been sealed against Hungarian flour.

New Publications.

COMMERCE AND NAVIGATION OF THE UNITED STATES, from the Treasury Department of the United States, Washington, D. C.

HARPER'S MAGAZINE for April, 1882. Published by Harper & Brothers, N. Y. Subscription price \$4.00 per year.

Harper's Magazine for April is excellent, as usual. Among the articles of especial interest we will mention the few following: "Spanish Vistas," by George P. Lathrop (illustrated); "What we Owe to Trees," by N. H. Egleston; "Silver San Juan," by Ernest Ingersoll (ill.); "History of Wood Engraving," by G. E. Woodberry (ill.); "Mr. Gladstone at Hawarden," by H. W. Lucy (ill.) This number contains also a number of acceptable poems, and many other entertaining features.

THE CENTURY MAGAZINE. The Century Co., New York, Publishers. Subscription price, \$4.00 per year.

The Century for April is at hand, full of entertaining illustrations and instructive articles, which will be perused with pleasure by thousands of intelligent Americans. The frontispiece is a full-page portrait of Mathew Arnold. We note the following articles deserving of especial attention: "Tunis and its Bey" (illustrated), by Ernst von Hess-War-tegg; "Through one Administration," by Francis Burnett; "Opera in New York (ill.), by Richard Grant White; "Some American Tiles (ill.), by Frank D. Millet; "Russian Jews and Gentiles," by Mme. Z. Ragozia; "Was Lord Beaconsfield a Representative Jew?" by Emma Lazarus.

ST. NICHOLAS FOR APRIL. Published by the Century Co., New York. Subscription price, \$4.00.

This opens with a charming frontispiece picture by Rosina Emmet, illustrating a timely little poem by Mary Mapes Dodge, entitled "An April Girl." "Brigham, the Cave-dog," is an account of a clever animal that was lost in the Mammoth Cave of Kentucky, but found his way out after wandering for thirty-six hours among a maze of pitfalls and dark windings. Mrs. Abby Morton Dias contributes "The Story of Wange Pah and The White Elephant," an illustrated sketch of Siamese life. "Lord Malapert of Moonshine Castle" is a bright comedy for children, by E. S. Brooks. It is easy to learn, not difficult to get up, does not require many speaking characters, and bids fair to be popular with our younger Thespians. The veracious legend of "Mr. Weathercock" is given by "Ann Fanny" Barrow. Walter Satterlee has drawn four page-illustrations for some poetical stanzas, called "Lament of the 'Cat-tail'."

Dr. Eggleston's serial, "The Hoosier School-boy," and the "Recollections of a Drummer-boy," by Harry M. Kieffer, are brought, all too soon, to their conclusions, in stirring and spirited instalment; and "Donald and Dorothy" have a grand good time in their "House Picnic." The illustrated "Northern Myth" stories are continued with the legend of "The Hoard of the Swarthy Elves."

Latest Improved Grain Cleaning Machinery.

Milwaukee manufacturers of milling machinery have established a very high reputation for the excellence of their product throughout the civilized world. They have the advantage of having the best of materials from which to construct machines and first class careful workmen to build them. We have the pleasure of presenting to our readers herewith two illustrations of machines of great value to the miller which we believe have well nigh reached the point of perfection. These machines are a combination of cockle separator and oat separator and as built the combined machine which answers the double purpose of removing cockle and other weed-seeds, and also of eliminating oats, sticks, white caps, straws, chaff, dust and dry wild garlic. It does all this without wasting the wheat upon which it operates. The first illustration represents a double suction machine, the first suction acting upon the wheat as it enters the machine and the second as it is leaving it, removing from it all the foreign matter rubbed off the kernels of wheat by the scouring process of passing through the cylinder. Each of these suction is entirely independent of the other and can be quickly and easily regulated. The second illustration shows a single suction machine. The machines are constructed in accordance with the best known rules of mechanics. They are all fitted with double sets of closed eccentrics, which give an equal motion both ways, thus overcoming all shaking and straining of the frame. One set of eccentrics shakes the sieve riddle and the other shakes the feed and discharging spouts. The feed hopper is provided with a feed roll which prevents all clogging. The machines are kept in stock in five numbers, viz: Nos. 00, 0, 1, 2, 3, No. 3 being the smallest and having a capacity of 15 to 20 bushels per hour, while No. 00 has a capacity of 110 to 125 bushels per hour. A No. 3 machine when set up ready for operation occupies a space 8 feet 6 in. high, 8 ft. 1 in. long and 4 ft. 6 in. wide. A No. 00 machine occupies a floor space of 12 ft. 3 in. by 7 feet and is 11 feet high.

Many machines have been built to order with more cylinders and having a much greater capacity. These machines have been introduced in almost every country during the last six years and give universal satisfaction. Millers who have not yet used these machines or who are now building will do well to address the manufacturers for their latest catalogues showing all sizes and styles. Their address is "The Cockle Separator Manufacturing Co., Milwaukee, Wis., U. S. A."

Why Purifiers Do Not Work.

BY J. H. REDFIELD, SALEM, INDIANA.

While the method of construction, and principles of operations, of some purifiers render them easier to understand, and give them greater capacity for work than others; yet, it sometimes happens that the best of them are condemned by the millers who have not given proper thought to what is required to obtain from their use, satisfactory results; and, although the instances of condemnation are yearly lessening in numbers, still it will not be out of place to enumerate some of the cases which, in the past, have led to the substitution of a very much inferior machine for one, which, had its requirements been properly studied, would have given very much more valuable results to the miller. In the first place, it will be well to bear in mind that a middlings purifier is designed to purify or cleanse middlings, not flour, and material which passes through No. 12 Cloth, is by the majority of millers, considered flour (although we have seen millers occasionally, who claimed it as middlings), and probably the appearance of this material, mixed up with the middlings as they are spouted to the purifier, has occasioned more trouble than any other one cause. If middlings mixed with flour are passed to the purifier, it matters not what purifier is used the inevitable result is a waste in the dust room, and the fault is, of course, attributed to the machine; again, should this flour be a little damp it will adhere to the cloth, choke or fill up the meshes, and render it impossible for the machine to produce satisfactory results.

It is essential then that this flour should be wholly taken out before the material goes to the purifier; in fact, if it is desirable to save it it must be taken out before, therefore, thoroughly dust your middlings before attempting to purify them.

In the third place, the manner of grinding has much to do with the operation of the purifier.

When the buhrs are roughly and carelessly dressed, the middlings are rough, jagged, uneven, and of all imaginable shapes and to many of them particles of bran adhere, which, of course, the purifier cannot remove, and after purification they present a specky appearance, and this, in too many instances, is said to be the fault of the purifier, but if

surface should be less than furrow surface, say, $\frac{1}{2}$ land to $\frac{3}{4}$ furrow surface; stones should be bosomed slightly from the eye half way out to skirt. In dressing care should be taken not to break the surface up with dull pick, diamond cut is the best crack, unless done by an experienced stoneman. Stone should have a true running balance. Follow these hints and you will make good middlings.

While it is impossible to make middlings

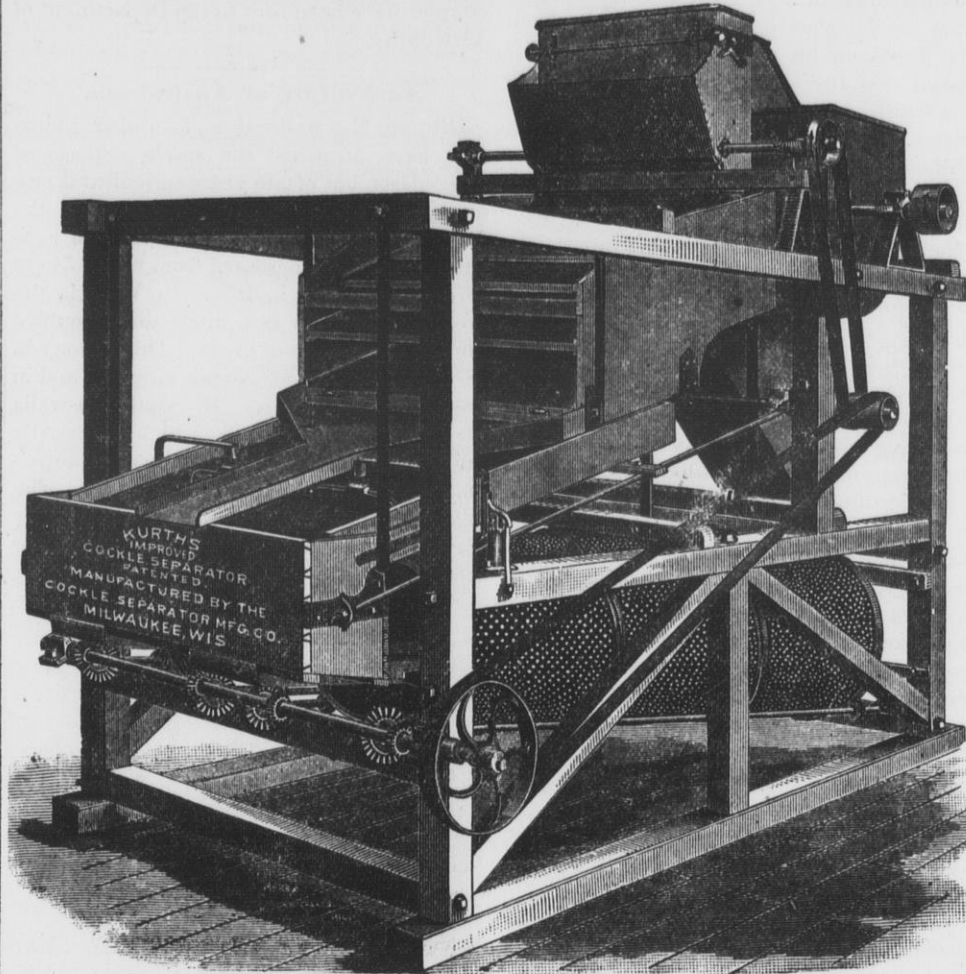


Fig. 1. LATEST IMPROVED COCKLE SEPARATOR AND OAT SEPARATOR COMBINED—TWO CYLINDERS AND SINGLE SUCTION.

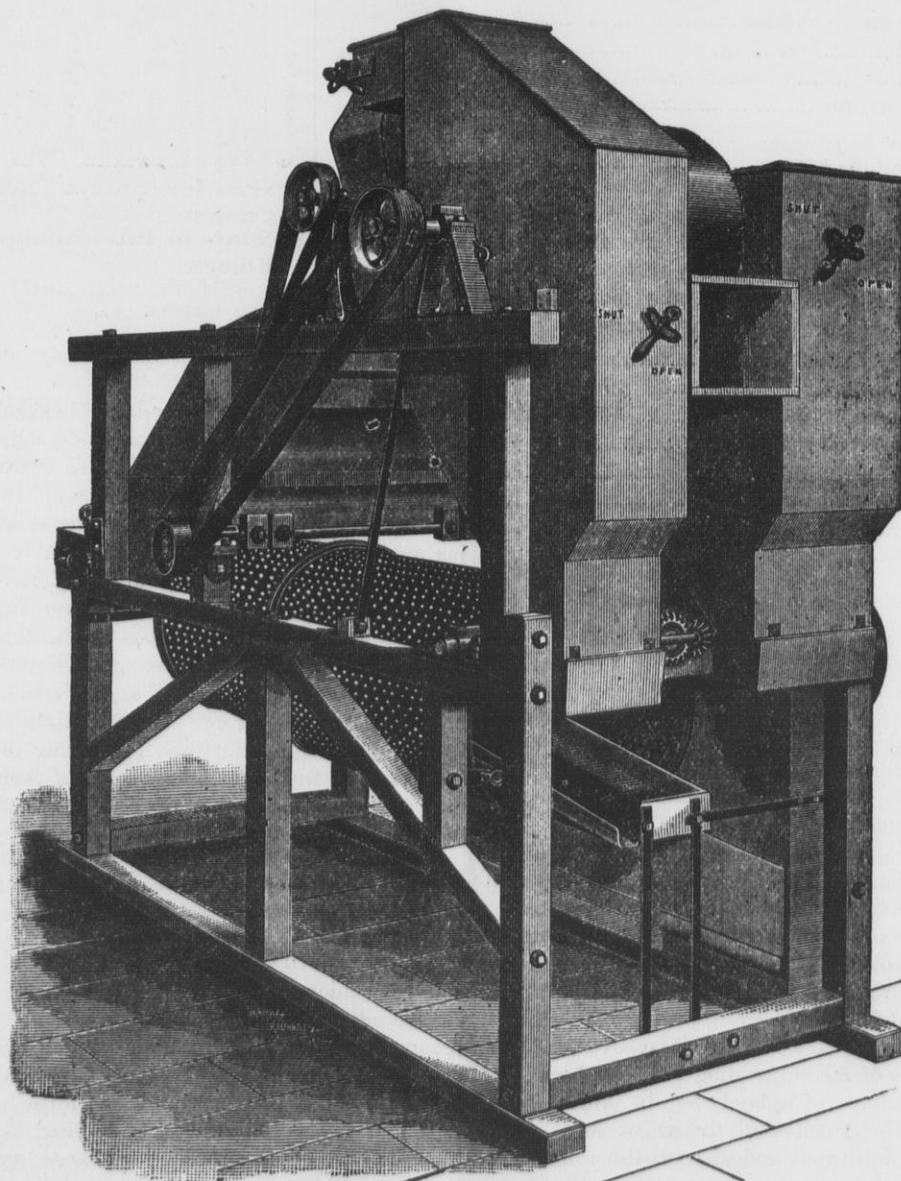


Fig. 2. LATEST IMPROVED COCKLE SEPARATOR AND OAT SEPARATOR COMBINED—ONE CYLINDER, DOUBLE SUCTION.

the miller will take the trouble to examine with a glass, he will find that the fault is altogether in his method of grinding, and not in the purifier.

And again, where millstones are run at too high speed, or where there is too much land surface, or not draft enough, with either of these defects the middlings will be fine, soft and have a "red-dog" appearance. The germ will be cut up and mixed with the product so that it will be impossible for any purifier to wholly remove it.

To produce good middlings, millstones should run slow; furrows should be broad, flat, and with a smooth feather edge; land

of the same size, it is possible to have them all of the same quality.

These remarks are not designed for those who "know all about it," but rather for those who may be contemplating the purchase of a purifier, and in order to assist them in obtaining benefit from their use, without the vexation and annoyance which has sometimes attended others by reason of inattention to those essential requirements.

The demand for purifiers is not by any means yet filled, but that is no reason why every purchaser hereafter should, by experience, learn the necessity for carefully following the foregoing requisites to satisfactory

results; for, experience is a dear teacher, and if we can forego the expensive luxuries of employing her, it is well to do so.

Not only will the miller be benefited by conforming to these necessary requirements but the manufacturer will also be saved much trouble and perplexity, and oftentimes needless expense, because, if he has five hundred machines sold, which are giving satisfaction, it is fair to presume that the one he sells you should do the same, but if it does not, he first thinks the fault may be in the machine, and off he sends a man, one, two, yes, sometimes five hundred miles to remedy the difficulty, (because, if he does not, you may throw his machine out and thereby greatly injure his reputation and business) only to find that the fault is not in the machine, but in the miller. Well, how do you suppose the manufacturer feels under the circumstances? It can be better imagined than described.

You want the best machine you can obtain, and the manufacturer wants to supply you with the best he can produce, and it is but justice to him, as for your own pecuniary interest, that you should religiously follow all instructions he gives you to obtain the best results from the use of his machine. The entire object of the miller is the attainment of results, and the entire object of the manufacturer is to provide machinery which shall facilitate or economize their attainment.

LEGAL.

An Important Judicial Decision in the United States Supreme Court in Relation to Patent Infringements.

A BIT OF COMFORT FOR MILLERS WHO ARE DEFENDANTS IN THE DENCHFIELD CASES.

A decision of importance to all railroad companies who use what is known as the "Tanner Car-brake" was rendered by the Supreme Court of the United States at Washington, March 13, 1882, in the case of Chas. L. Root, executor of Thos. Sayles, appellant, vs. The Lake Shore and Michigan Southern Railway Company, on appeal from the Circuit Court of the United States for the Northern District of Illinois.

This was a suit in equity, brought by Sayles against the railway company for alleged infringement of a patent upon an improvement in car-brakes. The patent upon which the complainant founds his claims was originally granted to Henry Tanner, the inventor of the improvement, on the 6th of July, 1852. On the 5th of July, 1866, it was renewed and further extended for a period of seven years. Of this patent the complainant is the assignee, and he brings this suit against the company for the unauthorized use by it of the car-brake in question from Aug. 6, 1869, to the expiration of the patent in 1873. He prays for an account of profits and for corresponding damages. The points of the defense set up by the railway company are, first, that after the expiration of a patent a court of equity has no jurisdiction to entertain a bill merely for an account, and the recovery of the profits which have accrued to the infringer during the existence of such patent, the remedy in that case being at law for damages; and, second, that even if in certain cases such a jurisdiction exists, the present case does not fall within it.

The complainant, on the other hand, maintains that in cases involving the enforcement of the rights of patentees, resort may be had as a matter of right to a court of equity, for the mere purpose of establishing an infringement and asserting and recovering the profits of the infringer, upon the independent equitable ground that the latter is for that purpose a trustee of his gains for the use of the true owner of the patent, and is liable to an account as such.

JUSTICE MATTHEWS,

in delivering the opinion of this court, reviews very carefully and at great length the course of legislation and of judicial decision with regard to these questions, and comes to the following conclusions:

1. That a bill in equity for a naked account of profits and damages against an infringer of a patent cannot be sustained; that such relief ordinarily is incidental to some other equity, the right to enforce which secures to the patentee his standing in court; that the most general ground for equitable interposition is to insure to the patentee the enjoyment of his specific right by injunction against a continuance of the infringement, but that grounds of equitable relief may arise other than by injunction, as where the title of the complainant is equitable merely, or equitable interposition is necessary on account of impediments which prevent a resort to remedies purely legal, and such an equity may arise out of and inhere in

the nature of the account itself, springing from special and peculiar circumstances which disable the patentee from a recovery at law altogether, or render his remedy in a legal tribunal difficult, inadequate and incomplete, and as such cases cannot be defined more exactly, each must rest upon its own particular circumstances as furnishing a clear and satisfactory ground of excepting from the general rule.

2. That it does not appear from the allegations of the bill in the present case that there are any circumstances which would render an action at law for the recovery of damages an inadequate remedy for the wrongs complained of, and as no ground for equitable relief is presented, it is the opinion of this Court that the Circuit Court did not err in dismissing the bill. The decree is therefore affirmed.

This case decides broadly that no patent suit can hereafter be maintained in equity after the patent has expired, which conclusion is one of very great interest and importance to every patent lawyer, and equally so to every patentee interested in patent litigation in this country. This importance arises from the difference heretofore prevailing, in the measure of recovery in a patent case, between a suit at law and a suit in equity. In an action at law, the measure of damages is the license fee. In an action in equity the patentee recovers theoretical profits and savings. This suit was brought under the Tanner brake patent, owned by the late Thomas Sayles. It was alleged originally that every other kind of brake now in use by the railroad companies was an infringement of this patent; but in a case decided in the Supreme Court in 1878, against the Chicago & Northwestern Railroad Company, it was held that the Stevens brake, which is the one most largely used by the railroad companies in this country, was no infringement of the Tanner patent. Extending the measure of recovery, adopted by the Circuit Court in that case against all the members of the Western National Association, the decree amounted to, say \$60,000,000; whereas, if the rule of the license fee, which obtains in a suit at law, had been applied, the extreme effect of the recovery would have been, say only \$150,000. This is a fair comparison of the rules of recovery on the one hand in an action at law, and on the other hand in an action in equity. It has been the custom for a great many years to commence all patent suits in equity, and without any reference to the fact of the expiration of a patent, excepting that the suit should be brought within six years after the time of such expiration in order to escape the statute of limitations. The present opinion by the United States Supreme Court is that a patentee desirous of recovering profits and savings must sue in equity before the expiration of his patent. The conclusion arrived at by Mr. Payson, the counsel of the Western Railroad Association, that the only doorway open into equity to a patentee is the right to an injunction, is fully sustained in this opinion delivered by the Supreme Court by Judge Matthews. Thirty-four of the cases now pending against railroad companies in which the Tanner patent is involved, and which have been defended by the Western Railroad Association, are disposed of by this opinion; the statute of limitations having run against this patent, and the plaintiffs being unable for that reason to recommence in law.

This opinion will dispose of hundreds of suits now pending before United States Circuit Courts, among which in the opinion of the attorney of the Miller's National Association are the well known Denchfield cases now pending against most of the prominent millers in Minnesota, Wisconsin and Missouri. The Denchfield patent expired in April, 1879, and all these cases for infringement have been commenced in equity since that time. It may well be imagined that interested millers feel quite jubilant over this decision from the highest judicial authority in the land.

Rice Cultivation in Japan.

REPORT BY CONSUL-GENERAL VAN BUREN, OF KANAGAWA.

There are two general divisions of the rice plant (*Oriza Sativa*), "upland" and "lowland." The great bulk of the rice products is lowland rice, but the upland variety is grown in all Asiatic countries. In some of the richest provinces of China the tax or tribute collected in kind and sent to Peking for the Imperial use, consists, in great part, of upland rice. The lowland variety, in all cases, requires a low, level soil, susceptible of being flooded several times during the season. The labor required for its production is immense. The plot of ground must be embanked, so as to hold the water, and the soil, after being flooded

and exposed to the sun, bakes, and is worked with great difficulty.

On the other hand, the upland rice is grown on high dry ground, and in ordinary climates requiring no irrigation. The dry soil is easily and cheaply prepared for the seed, and needs no expensive system of irrigating ditches and embankments. The plot of ground can be so large as to admit the employment of the plow, and the loose, dry soil is fitted for its use. It is safe to say that the labor in Japan of producing an acre of upland rice is less than one-half that required for the lowland, and it may not be more than one-third. It is grown in all the ken, or districts, of Japan, and flourishes in any soil adapted to wheat or barley. The soil is plowed with the small Chinese plow, drawn by one animal, usually a cow or bull, or it is dug up with a mattock. The seed is sown in April or May, in drills about eighteen or twenty inches apart. In the drills, before the seed is sown, a compost of decomposed straw, closet manure, and ashes is strewn, upon which the seed is dropped, one to one and a quarter bushels per acre. The soil is dug up between the drills three or four times, to keep it loose and to destroy weeds. Two or three times, during the growth of the plant, small quantities of liquid fertilizers or poured on to the ground by its root. The ordinary height of the stalk, when matured, is about that of wheat or barley, but, when the soil is very fertile, or an extra quantity of fertilizers has been used, it will sometimes reach a height of four, and even five feet. It is ready for harvest in September or October, and is cut here with a sickle or knife, and thrashed the same as wheat or barley.

The process of hulling is the same as that used for lowland rice.

Any acre of land, which will produce a good crop of wheat or barley, will produce thirty bushels of upland rice.

I have seen many acres yielding, each, 40 bushels or more. The weight of a bushel of this hulled rice is from 60 to 61½ pounds.

The analysis of this rice, as given by Pavy, Edward Smith and Parkees, is;

Nitrogenous matter.....	7.55
Starch.....	88.65
Dextrine.....	1.00
Fatty matter.....	0.80
Cellulose.....	1.10
Mineral matter.....	0.90
	100.00

By way of comparison I give an analysis, from the same authorities, of flour, obtained from 100 pounds of wheat, the highest quantity obtainable being eighty pounds:

Water.....	11.20
Fatty matter.....	0.96
Nitrogenous matter.....	11.68
Dextrine and sugar.....	5.76
Starch.....	47.76
Cellulose.....	1.36
Salts.....	1.28
	80.00

It will be seen by the above that, while the bushel of wheat yields a somewhat larger amount of nitrogenous matter dextrine and sugar, it contains less than fifty-three per cent. of the starch that a bushel of hulled upland rice does. This plant seems to flourish as well in the northern districts of this main island as it does in the middle and southern portions.

The mean annual temperature of the northern districts of this main island averages as it does in the middle and southern portions.

The mean annual temperature of the northern districts is 48.33° Fahrenheit: the extreme maximum, 88°; extreme minimum, 2°; rainfall, 51 inches.

I have been led to give the above facts with a view of recommending the introduction of the culture of upland rice in America. It could be grown on all the wheat soils of the great northwest, and also on the rolling uplands of the south. It can be sown broadcast, cut by an ordinary harvester, and threshed by any threshing machine. It is probable that our field tillage would not give such high yields as the thorough gardening of the Japanese, but our unmanured prairie soils are more fertile than those of Japan, even with all their fertilizers, and I believe that it would be safe to anticipate a yield of twenty bushels per acre. Even at the same yield, upland rice will furnish more than one and one-half times the nutriment for human food than an acre of wheat will, and its cash value will be three times that of wheat. The rice straw is fully as good for forage as that of wheat or oats.

I can see no reason, from the soil and climate, why this most valuable food-plant

should not be produced with us, and I believe its introduction would be of great benefit to our agricultural interest.

I forward herewith three samples of the upland rice, in the straw, furnished me at Gifu, in the center of Nippon, measuring, as will be seen, from four to six feet; also, a sample of the hulled rice, in order that it may be compared with the rice produced in our Southern States; and a bushel of the unhulled seed, with which experiments may be made of growing it in our country. (These samples have been sent to the Department of Agriculture.)

Agriculture of Australasia.

Hitherto the pastoral and mining industries have furnished the staple exports of Australasia, but of late years agricultural products appear to be coming rapidly to the front. In New Zealand the exports of agricultural produce increased from \$1,279,549 in 1875 to \$3,716,230 in 1879. In Victoria the area under tillage has more than doubled during the past ten years. This colony in 1879 exported 321,809 centals of wheat and in 1880 1,472,123 centals. In South Australia the export of breadstuffs, which deservedly rank among the finest in the world, approximates in value to \$10,000,000 annually. The following table will show the produce of the various crops for the several colonies for 1880-'81.

Produce of Crops for the several Colonies of Australasia.

Name of Colony.	Wheat Bushels.	Oats Bushels.	Barley Bushels.	Maize Bushels.	Other cereals.
Victoria.....	9,719,049	2,358,459	1,063,751	49,299	415,900
New South Wales.....	5,708,737	356,121	160,692	4,488,457	22,290
Queensland.....	228,243	2,081	31,433	1,409,697
South Australia.....	8,606,510	50,070	151,886	58,963
Western Australia.....	413,644	25,080	114,552	448	11,543
Total.....	22,671,183	2,791,811	1,522,224	5,942,811	508,696
Tasmania.....	750,040	439,446	160,156	106,886
New Zealand.....	8,147,705	6,891,251	1,221,241
Grand total.....	31,868,928	10,122,568	82,912,621	5,942,811	615,092

[Written for the UNITED STATES MILLER.]

Mechanical Points of Interest to Millers.

VARYING DRAFTS.

The question of draft runs very closely into furrow outline.

In all quarter dresses having parallel secondary furrows, (whether the leaders are straight, circular, or spiral,) the draft of the short furrows is greater than that of the leaders; and if it be a disadvantage to have greater crossing angle at the skirt than at the eye, the furrows which have the most draft will have the greatest crossing angle. If the short furrows are given the same draft as the leaders, they will have the same crossing angle, at a given distance from the skirt, as the leaders have. There may be two or three different lengths of diverging furrows, all having the same draft at the skirt, though some of them may not reach more than half way towards the eye.

Dresses of this type will not be strictly "quarter dress," although the leaders apparently divide them into so-called "quarters" or fields.

DUTIES OF FURROWS.

Here opinions differ. If furrows did nothing but admit air to the buhrs, it would be cheaper to drill holes through the latter, and then there would never be any furrow dressing required! They certainly perform at least four offices:—granulation, cooling, distributing the chop between the faces, and carrying out; but their action is very different from what is generally understood concerning them.

In proof that furrows are not essential, stones are run, though rarely, without any furrows at all; and the granulation, distribution, and carrying out have not been stopped, though the chop was unduly warm; and in regard to the carrying out by "shears-like action," tests have been made with the furrows reversed, and not greatly affecting the capacity of the buhrs.

NUMBER OF FURROWS.

Evidently a given area in furrows may be got by having few wide furrows, or more narrow ones of proportionate width; by a few long furrows, or more short ones of proportionate length.

Here the questions of stone diameter, material operated on, and product desired, come in, complicated with details concerning the method of "ventilating" the stone, concerning the bosom, hardness, and porosity of the stones, etc. Modern tendency seems to be to an increase in the number.

DRESS.

The "quarter dress" proper is a barbarism as generally applied; and when we consider the course of the grain or other material, in its outward progress from eye to skirt, we must incline to such dresses as will give all the furrows on each stone, as far as possible, the same draft:—this, entirely independent of the question as to whether or not the angle of crossing of bed and runner furrows shall be the same for all points along the length of the furrows. The "quarter dress" may be abolished and still leave free choice between straight, bent or curved furrows; between furrows all of a length and those of varying length; between those having the same crossing angle all the way out, and those having the crossing angle vary at different distances from the eye.

("Crossing angle" means the angle formed by any furrow in one stone with its mate in the opposite stone. With curved furrows the angle is measured between the tangents at the point of crossing.)

The writer's objections to the quarter dress are based on analogy. Evidently the fewer the quarters the greater the disproportion between the draft of the leaders and that of the secondaries, in stones of equal diameters.

THE QUARTER DRESS.

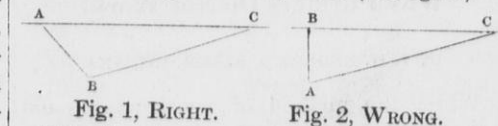
We advise our readers to draw the various millstone dresses in circles about 6 inches in diameter, one on cardboard and the other on transparent cloth or paper, and sticking a pin through the centers of both, note the crossing of the furrows. If this does not convince them that the ordinary quarter dress with parallel furrows is imperfect especially with few quarters on the stones, it will at least set them thinking.

The path of the material is different in under runners to what it is in upper runners, and different in vertical mills from either. In the first case the material falls on a "live" surface, in the second, on a dead one; in the third, on neither one, strictly speaking.

In the upper runner the path, if the furrows do not change it, is stated by KICK to be a spiral; in the under runner, the involute of a circle.

FURROW SECTION.

I consider that the cutting work done by the furrow is rather limited, and that the best section is that of a right-angled triangle, having the right angle B in the bottom, the obtuse angle A at the front, and the acute angle C at the feather edge or back, thus: (see fig. 1.)



This gives freer action than when the obtuse angle A is at the bottom and the front edge AB is vertical, as in fig. 2; and the first method is easier made with a pick or an emery wheel.

SMOOTHNESS OF LAND AND FURROWS.

The smooth and the rough furrow advocates do battle on this head, without ever coming to much of a conclusion, or rather change of opinions. It seems, however, as though the smooth furrows cut the bran up less than rough ones, in wheat reduction; and many millers, while religiously adhering to "cracking" on the face, rub the furrows smooth with a corundum block.

Cracking the faces is now done finer and finer each year; the "diamond dresses" having paved the way for this, and the emery wheel dresses following them up towards absolutely smooth land and furrows.

Middlings Purifiers in Custom Mills.

BY J. H. REDFIELD, SALEM, INDIANA.

The question is often asked, "Will a purifier pay in a custom mill?" We claim that even under the old style of milling a purifier will increase the miller's profit sufficient to repay its cost in a few months. Every miller knows that however close he grinds he will of a necessity produce some middlings.

Suppose, now, that under the old style of grinding the average product of middlings is only five pounds per bushel of wheat ground, and he grinds eight bushels per hour per run of stones, which would equal a product of fifty pounds per hour for each run of stones or five hundred pounds for ten hours grinding for each run of stones.

Suppose he has but one run of wheat stones, and a custom to keep it running ten

hours per day, at the close of the day's grindings the miller or his customers have five hundred pounds of an article that is almost worthless, only for feed. Should he grind it without purifying, it would make a very low grade of flour; and to run it into the eye of the stones and grind with the wheat, would be ruinous to the entire product. Under ordinary circumstances these middlings contain the very cream of the flour.

Now suppose he has a purifier and he runs this five pounds per bushel in the eye of the stones and regrinds with the wheat and reduces it to flour (we are now speaking of a case where the miller has no middlings mill—it is always better to grind the middlings on a separate stone) he will have an increase of at least four pounds per bushel, and make a better grade of flour; or, suppose he stocks it and regrinds it separately, he will have of his five hundred pounds of almost worthless middlings, over two barrels of high grade flour.

And, again, in using a purifier, it is not necessary to grind so low to make a yield. Grind high with a purifier; if you do make more middlings, so much the better; purify and regrind by running into the eye of the wheat stones, or which is better into a middling stone, and you will make better flour and more of it, and at the same time you can grind more grain with a given amount of power.

The Great European Spy.

The Paris *Echo* of Feb. 28th had the following interesting narrative:—"A political personage, whose importance and influence were far greater than his fame, died a few days ago in Paris. M. Blindworth was known amongst his profession as the "Dean of the European Corps of Spies." It was once said of him—"This man came into the world to cajole and deceive Emperors and Kings." His political value in the narrow circles of the supreme official rulers of the world was estimated at so high a price, that he was able, during his most successful period, to command a princely income. Although his surname has a German look, it appears that our own country has some right to claim a share in him. His father was an English mechanic, who emigrated to Göttingen when England and Hanover were ruled by the same sovereign. The son made full advantage of his residence in that learned city. He studied philology and political science, and earned a brilliant reputation at his examination for the doctor's degree. From the moment of leaving the University he adopted the career of a political adventurer. He went first to Berlin, where he became a member of a secret society. The murder of Kotzebue, however, seems to have scared him, and he took pains to ingratiate himself with the leaders of the reactionary party. Prince Wittgenstein, Count Oriola, and other persons of high influence, who gave tone to the polite society of the Prussian capital, found use for his talents. He was employed in a series of political intrigues. He found a way of deceiving the keen-witted Varnhagen von Ense, and was received behind the scenes by the Liberal leaders as an enthusiastic fellow-worker, whilst he was betraying all their counsels to their foes. His work was carried on under numberless disguises throughout Northern Germany. He was in rapid succession a journalist, a wealthy private scholar and scientist, and a theatrical director. He became head of the 'Secret Cabinet' of the Sovereign of Brunswick, the notorious 'Diamond Duke.' From his Court Blindworth kept up a correspondence with official persons all over Europe. The Ambassadors and Ministers of all Courts knew and feared him, as the sailors feared the 'Flying Dutchman.' Guizot made great use of him. Metternich pressed him to go to Vienna. There was a conflict for the possession of this human treasure amongst the wire-pullers of Legitimacy and Reaction. Blindworth ultimately gave his services where there seemed to be prospect of the biggest pay, and settled in France. He was Louis Philippe's secret agent to the Court of Spain, and had a leading finger in the conspiracies of kings and diplomatists, which were suddenly shattered by the revolutionary volcano of 1848. That event naturally drove him from Paris, and he returned to his native land. He settled on the Rhine, near Prince Metternich, who had been driven from Vienna, and devoted himself to the culture of his renowned vineyards on the Johannisberg. The 'Dean of Spies' spent his time in political study of a concrete character. He drew up lists of 'suspects,' which he knew would be useful when the whirligig of time brought about a

reactionary counter-revolution. An acquaintance who knew him at this period said that he used to rub his hands with glee as he read the 'Stupidities of Frankfurt'—or the German Parliament—and anticipate the period when the triumphant Radicals would reap the whirlwind. He kept irons in both fires. His clever daughter Agnes wrote up Austria in one journal, while he himself wrote up Prussia in another, as no sure forecast could be taken by the most astute spy which of the two great military German Powers would crush the revolution, and secure for itself predominance over Germany. Between the defeat of the revolution and the outbreak of the Russophobic craze, which turned the attention of the European nations from internal reform at home to fighting in the far East. Blindworth was one of the most courted persons in Europe. Koppel-Ellfeld, who was personally acquainted with the 'little sultan,' says that the Manteuffel Cabinet loaded him with business, that King Frederick William IV. employed him with brilliant success in the internal affairs of the Zollverein crisis, that the Austrian Government could not dispense with his services, that Lord Palmerston was incessantly inviting him to London, that he and Gortschakoff were in continual conference, and that Napoleon III. used to send for him in order to get the benefit of his advice and his encyclopedic knowledge of the seamy side of international politics. A good deal of the omniscient profundity which it was once the fashion to attribute to the French Cæsar may be paid back by future historians to its rightful proprietor—the son of the English mechanic. Throughout this period of his life, in which he had nearly every sovereign and diplomatist in Europe for a customer, Blindworth lived at Brussels, in order to keep up a show of neutrality. This great intriguer, who had such a share in all the political changes of Europe between 1830 and 1866, had no son, like Oxenstierna, to whom he could confide his general opinion of the Governments of our century. It is said that Samarow has utilized some of Blindworth's communications. During his later years he sank into wealthy obscurity. It is not even known when he moved from his charming house in the Quartier Leopold at Brussels and settled in Paris. Nor does anyone seem to know what has become of his gifted daughter and his two grandchildren. His death, a fortnight ago, recalled the title by which he was known amongst his employers—the Dean."

Flour Adulteration in Germany.

REPORT BY CONSUL SMITH, OF MANNHEIM.

I have the honor to report that the subject of adulteration of food and other materials having become a very important matter of interest throughout the world, I herewith transmit the result of my investigations regarding such adulterations in Germany, and the laws of the Empire concerning the same.

Flour made from wheat, rye, and barley, contains chemically combined nutriment, albumen, starch, and salts. Flour may be damaged without adulteration by faulty manufacture, or if the grain is not thoroughly cleaned before grinding. If not perfectly manufactured, or if overheated after manufacture, it forms itself into small balls and acquires a disagreeable odor. It also absorbs moisture from imperfect barrels and a bad taste from oils contained in the wood from which the barrels are made. It may gain dust and a bad taste from *Secale cornutum* seeds, etc., remaining after improper separating the grain from the husk. Bread made from such flour is not healthful or palatable. In order to make it palatable and salable, alum, copperas, and similar substances are used, giving the bread a grayish tint. The usual mode of adulteration is to use oxide of zinc. Chemists have found 3 to 3.5 per cent. of oxide of zinc in bread, yet zinc and copper may be discovered to a certain degree in bread baked with old wood that has been covered with these metals, the wood readily impregnating itself with these mineral elements.

Flour is also adulterated with spar (baritza), plaster of Venice, chalk, pulverized stone, etc., thus increasing the weight. Exportations have been made from Netherlands of so-called imitation flour made of crushed spar and plaster of Venice. These exportations were made to such an extent that the Prussian minister of commerce found it necessary to publish a warning against the production. It was observed that the mixture of plaster of Venice amounted to 30 per cent., while the mixture of spar showed but 16 to 20 per cent. Imitation flour is used to increase

the weight of genuine flour by mixture. Vegetable substances—peas, beans, Indian corn, dried potatoes, and oats—are mixed with wheat, manufactured, and sold as wheat flour. These substances are not considered dangerous to health and are not prohibited. But the mixture of flour with spar, plaster of Venice, alum, copperas, oxide of zinc, and other mineral substances is considered dangerous, and is prohibited. Any kind of adulteration of flour diminishes its nutritional value. Mixtures are not always made at the place of manufacture, but more often by the retailer in flour, and by the baker, who thus increases the size and weight of the loaf.

A Fly-Wheel Cat.

A white cat which was about Winchester's shop was missed recently. In the forging department of the drop shop is an upright engine where the blowing is done for the forges. The other morning the man started his engine, and looking about the wheel he noticed something on the fly-wheel. The wheel was making a great number of revolutions per minute—going so fast that the spokes were invisible. He did not make out what it was, but paid no particular attention to it, as he thought it was the sun shining on the wheel. Glancing that way occasionally, he noticed the same thing several times. He started the engine at 7 o'clock, and at about 9:30, noticing the object again on the wheel, he thought he would stop the engine and see what it was. He stopped it and got over where it was, and found it was a white cat clinging to the wheel. There the cat had been hanging on for two and a half hours. He took the cat down, and it had become cross-eyed. He put the cat in a box and cared for it, and in about two or three days it began to get around and its eyes commenced to have their natural look. In about a week it came to the room of the foreman, J. D. Eager, a branch of the forge department. Mr. Eager fed it and commenced to train it. The animal reciprocates the kindness shown, remaining about the forge all the time and evincing quite an interest in the business, and is quite a pet among the workmen. The above is a fact.—*New Haven (Conn.) Journal and Courier, February 6.*

Foreign Items.

THE flouring mill belonging to Messrs J. T. & S. Fearweather, at Skeldersgate, York, England, burned recently together with some grain warehouses adjoining. Loss \$50,000. The property was well insured.

MESSRS. SUTCLIFFE & SONS Mill at Rochdale, England, was recently burned. The fire was caused by an explosion in the flour dressing department in the sixth or top story which had strong side walls. A portion of the roof was blown off. The damage is estimated at about \$175,000.

THE Buxburn Mills near Aberdeen, Scotland, have been destroyed by fire. Loss about \$30,000.

MESSRS. GANZ & Co. of Budapest, Hungary, have won their suit against L. Nemeika & Co., of Vienna, for infringement of their roller mill patents after a tedious litigation.

IT IS SAID that over 4000 mills on the Continent of Europe have substituted rollers for millstones during the last four years.

THE death of James Alexander, Esq., proprietor of the Belfast Flour Mills, at Belfast, Ireland, is announced.

BILLS for the increase of import duties on breadstuffs have been brought before the Austrian Parliament. Austro-Hungarian millers are strenuously opposed to it. They say that they have suffered much from the present duties in diminished exports of flour to Germany and also in their increased import thence.

FROM January 1st to February 3d, 5,209 tons of potatoes were shipped from Glasgow to the United States.

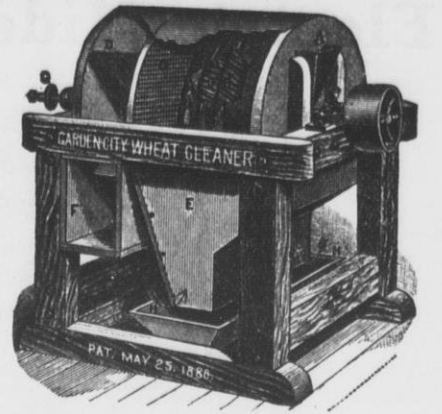
A GERMAN named Dittmar has invented a cheap process for converting petroleum oil into a solid substance for transportation and which can again be liquefied. A company has been organized in St. Petersburg, Russia, to operate the patent in connection with the Russian oil trade. Several patents were taken out for a similar purpose in this country some years ago but were all found to be impracticable in operation.

A NEW LINE of steamships has been put on between Trieste to New York. These steamers will touch at Portugese, Spanish and Mediterranean ports to receive and deliver freight. It is anticipated that this line will greatly increase American trade with Austria.

"BEST IN THE WORLD."

GARDEN CITY

WHEAT BRUSH!



Gathmann's patent "inclined bristles" prevents all clogging when the brushes are run close together. This is the

ONLY DOUBLE BRUSH

Which can be set up close so that it will

Thoroughly Brush Wheat.

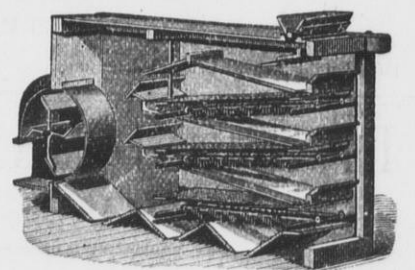
Guaranteed to **IMPROVE COLOR** of the FLOUR.

It don't break or scratch the grain. Removes all the dust. Very light running. Send for circular and prices.

Prices Reduced!

Improved Garden City

Middlings Purifier!



With Travelling Cloth Cleaners

Our improved Purifier has every device requisite to make it perfect, and every one in use is giving the greatest satisfaction to the users. The Cloth Cleaners are guaranteed to clean the cloth better than is done on any other purifier. Send for our new circular.

Over 4000 Garden City Purifiers in use, nearly 500 of which are the Improved Machine.

The **Best** and now the **Cheapest**. Write for circulars and price list.

We are agents for the

BODMER

Bolting Cloth!

Which has long been acknowledged as the best made, and which has lately been further improved, making it now *beyond competition*. We make it up in the best style at short notice. Send for prices and samples.

Garden City Mill Furnishing Company,

CHICAGO, ILL.

Mention this paper when you write us.

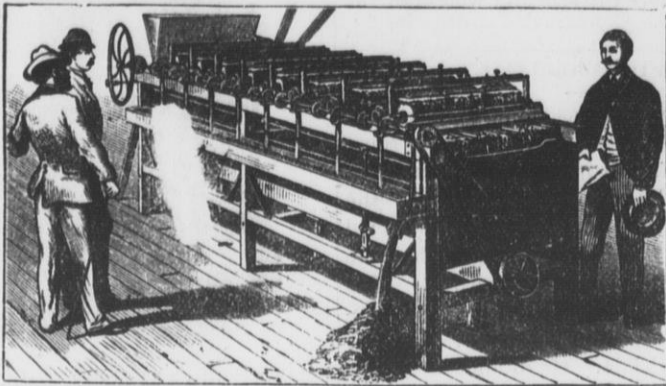
ELECTRIC PURIFIER COMPANY,

—OF—
New Haven, Conn.

Factory, New Haven, New York Office, 17 Moore Street.

This Company was Organized at New Haven on the first of March, 1881, with a Capital of \$300,000.

Electric Middlings Purifiers.



HAVING PURCHASED THE SMITH-OSBORNE PATENTS GRANTED BY THE

United States, Great Britain, France, Belgium, Austria and Canada.

The first Machine manufactured was put up soon after the United States patent was granted, in February, 1880, in the ATLANTIC MILLS, BROOKLYN, and has been in almost constant practical use since, demonstrating beyond a question that it possesses the following advantages:

- It Purifies Middlings Absolutely without Waste.
- It Purifies Middlings with Greatly Reduced Power.
- It Purifies Middlings with Greatly Reduced Space.
- It Purifies Middlings with Greatly Increased Rapidity.
- It Purifies Middlings from Spring and Winter Wheat Equally Well.
- It Purifies Middlings with the Best Results.
- It Dispenses with the Use of Air Blasts.
- It Dispenses with the Use of all Dust Houses.
- It Dispenses with the Use of all Dust Collectors.
- It Dispenses with the Dangers of Explosion and Fire.
- IT PURIFIES DUST HOUSE MATERIAL OF ALL KINDS.
- IT PURIFIES THE FINEST MIDDINGS OF ALL KINDS.
- It is Remarkably Adapted to Custom Mills.
- It is Excellently Adapted to Manufacture Farina.

WHERE THE ELECTRIC PURIFIERS MAY BE SEEN IN OPERATION:

Atlantic Mills, Brooklyn, N. Y.; Archibald Schurmeier & Smith, St. Paul, Minn.; F. L. Johnston & Co., St. Louis, Mo.; Washburn, Crosby & Co., Minneapolis, Minn.; Norton & Co., Chicago, Ill.; Sanderson & Co., Milwaukee, Wis.; M. C. How & Co., Cleveland, Ohio; James K. Hurin, Cincinnati, Ohio; Mosely & Motley, Rochester, N. Y.; Chas. Tiedman, O'Fallon, Ill.; Lyman & Co., Norfolk, Va.; Texas Star Flour Mills, Galveston, Texas; Zenith Milling Co., Kansas City, Mo.; C. Hoffman & Son, Enterprise, Kansas; Richter & Co., Williamstown, W. Va.; Kinney & Hobart, Burton, Kansas; Parkville Milling Co., Parkville, Mo.; Norton & Co., Lockport, Ill.; Ballard, Isom & Co., Albany, Oregon; Niedammer & Walton, Buena Vista, Ind.; Kimberly & Clark Co., Appleton, Wis.; Cyrus Hoffer, Lewisburg, Pa.; Roberts & Briggs, Seneca Falls, N. Y.; Phillips & Thomas, Kennedy, N. Y.; Hillsdale City Mills, Hillsdale, Mich.; Susong, Logan & Co., Bridgeport, Tenn.

SOMETHING NEW.

A Combination Electric Purifier—A Complete System of Three Purifiers in One.

Samples of work will be sent upon application, by mail, and all inquiries answered from the New York Office. Parties contemplating building new mills, or reconstructing old ones, should see the superior working of the ELECTRIC SYSTEM before making contracts for Purifiers elsewhere.

No. 17 Moore St., NEW YORK. **JOHN RICE**, General Manager.
GUNN, CROSS & CO., Minneapolis, Minn., Manufacturers and Agents for the Northwest.
GEO. G. SMITH, San Francisco, Cal., Manufacturer and Agent for the Pacific Slope.
JAMES E. LOOMIS, St. Louis, Mo., General Western Agent.

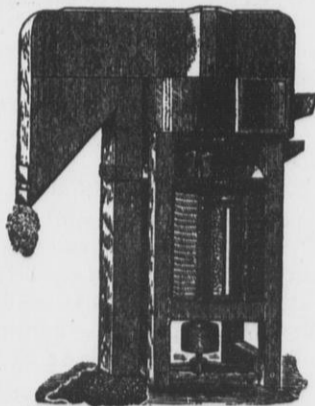
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RICHMOND MANUFACTURING CO., LOCKPORT, N. Y.,

—Manufacturers of—

RICHMOND'S CELEBRATED
Smut Machines,
Brush Machines,
Grain Separators,
and Bran Dusters.

Nearly Two Hundred of these Machines are now in operation in the city of Minneapolis, Minn., alone, and more than sixty in the city of Milwaukee, Wis. They are also extensively used in many other sections, both on Winter and Spring Wheat.



Adjustable Brush Smut Machine.

SEND FOR DESCRIPTIVE CATALOGUE.

[Mention this paper when you write.]

HARRIS-CORLISS ENGINE.

—BUILT BY—

WM. A. HARRIS, Providence, R. I.

Built under their original patents until their expiration. Improvements since added: "STOP MOTION ON REGULATOR," prevents engine from running away; "SELF-PACKING VALVE STEMS" (two patents), dispenses with four stuffing boxes; "RECESSED VALVE SEATS" prevent the wearing of shoulders on seats, and remedying a troublesome defect in other Corliss Engines, "BABBITT & HARRIS' PISTON PACKING" (two patents). "DRIP COLLECTING DEVICES" (one patent). Also in "General Construction" and "Superior Workmanship."

The BEST and MOST WORKMANLIKE form of the Corliss Engine now in the market, substantially built, of the best materials, and in both Condensing and Non-Condensing forms. The Condensing Engine will save from 25 to 35 per cent. of fuel, or add a like amount to the power and consume no more fuel. Small parts are made in quantities and interchangeable, and kept in stock, for the convenience of repairs and to be placed on new work ordered at short notice. NO OTHER engine builder has authority to state that he can furnish this engine. THE ONLY WORKS where this engine can be obtained are at PROVIDENCE, R. I., no outside parties being licensed.

WM. A. HARRIS, Proprietor.

[Mention this paper when you write us.]

A PURIFIER

- That fills all the demands of modern milling.
- That is subject to the most complete control possible.
- That gives double the capacity of any other in the same floor space.
- That has two Screens, each with its own Feed Bar, and each tails off.
- That has the best (patented) ever used on a Purifier.
- That has the most thorough control of the blast.
- That has the most convenient method of "cut-off."
- That has absolutely the best cloth cleaner (patented) in use.
- That has the perfection of cloth tighteners used while running.
- That is made either single or double, (double principle patented).
- That carries 25 to 50 square feet of boiling surface, against 13 to 45 in others.
- That costs no more, nor as much as others with half the capacity.
- That has its bearing boxes detached from the wooden frame.
- That renders them fire-proof. These are recent and important attachments that do its work "not absolutely without waste" BUT WELL.
- That has no screw conveyor or gear wheels to absorb power, but that has many new and important devices, convenient and simple.
- That does not infringe any patent, (can convince any one of this).
- That is not an experiment, but has been tried and tested by hundreds.
- That is in use from Long Island to San Francisco, from Dakota to Texas.
- That not one of which has ever been returned by any miller.

These are some of the things we have to say about the Case Purifier, and if one jot or tit of them is found to be untrue, we will take the machine back and pay all expenses, including freight both ways. Can fill orders promptly. Address

[Mention this paper when you write]

CASE MFG. CO., Columbus, Ohio.



James Leffel's Improved WATER WHEEL.

NEW PRICE LIST FOR 1881.

The "OLD RELIABLE" with Improvements, making it the Most Perfect Turbine now in Use, comprising the Largest and the Smallest Wheels, under both the Highest and Lowest Heads used in this country. Our new Pocket Wheel Book for 1881 and 1882 sent free to those using water power. Address

JAMES LEFFEL & Co., Springfield, Ohio, and 109 Liberty Street N. Y. City.

[Mention this paper when you write us.]

BOTTLED BEER.

VOECHTING, SHAPE & CO.,

SOLE BOTTLERS OF

JOSEPH SCHLITZ BREWING COMPANY'S

CELEBRATED MILWAUKEE LAGER BEER,

Cor. Second and Galena Streets,

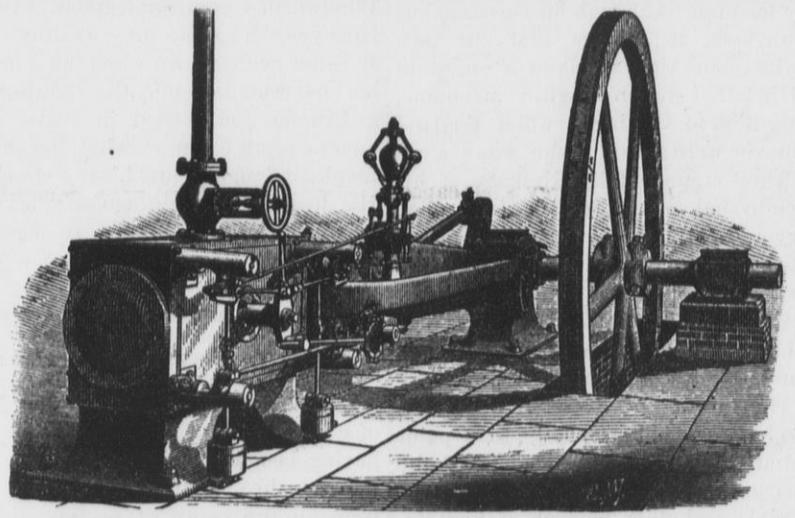
MILWAUKEE, WISCONSIN.

BOTTLERS' SUPPLIES CONSTANTLY ON HAND.

[Parties corresponding will please state where they saw this advertisement.]

ATLAS-CORLISS ENGINE.

Will Replace Ordinary Engines Guaranteeing to Save One-Third Fuel.



WRITE FOR ENGINE PAMPHLET.

ATLAS ENGINE WORKS, INDIANAPOLIS INDIANA, U. S. A.

BUILDERS OF ALL CLASSES OF

Engines and Boilers,

We Build The Best Farm Engines and Small Engines for warehouses and elevators. [Mention this paper when you write us.]

"THE GREAT ROCK ISLAND ROUTE"

Calls your attention to the following REASONS WHY, if about to make a Journey to the GREAT WEST, you should travel over it:

As nearly absolute safety as is possible to be attained, are connections in UNION DEPOTS, at all important points. No change of cars between CHICAGO, KANSAS CITY, LEAVENWORTH, ATCHISON or COUNCIL BLUFFS. Quick journeys because carried on Fast Express Trains. Day cars that are not only artistically decorated, but furnished with seats that admit of ease and comfort. Sleeping cars that permit quiet rest in home-like beds. Dining cars that are used only for eating purposes, and in which the best of meals are served for the reasonable sum of seventy-five cents each. A journey that furnishes the finest views of the fertile farms and pretty cities of Illinois, Iowa and Missouri, and is afterwards remembered as one of the pleasant incidents of life. You arrive at destination rested, not weary; clean, not dirty; calm, not angry. In brief, you get the maximum of comfort at a minimum of cost.



That the unremitting care of the Chicago, Rock Island & Pacific Railway for the comfort of its patrons is appreciated, is attested by its constantly increasing business, and the fact that it is the favorite route with delegates and visitors to the great assemblages, political, religious, educational and benevolent, that assemble from time to time in the great cities of the United States, as well as tourists who seek the pleasant lines of travel while en route to behold the wonderful scenes of Colorado, the Yellowstone and Yosemite. To accommodate those who desire to visit Colorado for health, pleasure or business, in the most auspicious time of the year, the Summer season and months of September and October, the Company every year puts on sale, May 1st, at all coupon ticket offices in the United States and Canada, round trip tickets to

DENVER, COLORADO SPRINGS AND PUEBLO,

At reduced rates, good returning, until October 31st. Also to San Francisco, for parties of ten or more, good for ninety days, at great reduction from regular fares.

RESUME HERE, this is the most direct route for all points WEST and SOUTHWEST. For further information, time-tables, maps or folders, call upon or address

R. R. CABLE, Vice-Pres't and Gen'l Man'gr, Chicago.

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PATENTS IN USE.

We continue to act as Solicitors for Patents, Caveats, Trade Marks, Copyrights, etc., for the United States, Canada, Cuba, England, France, Germany, etc. We have had thirty-five years' experience. Patents obtained through us are noticed in the SCIENTIFIC AMERICAN. This large and splendid illustrated weekly paper, \$3.50 a year, shows the Progress of Science, is very interesting, and has an enormous circulation. Address MUNN & CO., Patent Solicitors, Publishers of SCIENTIFIC AMERICAN, 37 Park Row, New York. Hand book about Patents sent free.



It has tight shutting and easily operated Gate; gives more power for the water used, and will last longer than any other Turbine. Large shop with improved tools for making this wheel and machinery. Illustrated Pamphlet and Catalogue with prices sent free by

BURNHAM BROS.

[Please mention this paper when you write us.]

"Work" and "Energy."

Prof. Preece, in a recent lecture, thus clears up the definitions of "work" and "energy," which terms are often loosely used, and in such a manner as to confuse students:

"Suppose a gardener, with a ton of gravel in front of him, were told to move that gravel to a height of three feet. He would go to work with his spade; he would move shovel-ful after shovel-ful from the ground-line up to the three-foot height, and after he had moved the whole of it you might readily imagine that he would be a little fatigued. Now, whenever a person does anything which causes a little fatigue, he does what we call work. The gardener, in lifting the gravel, would perform an amount of work which is capable of being measured. I will give you another illustration: Supposing some of you boys were put beside a pile of cricket-balls, and for a wager or prize you were called upon to throw the balls as fast and as far as you could. A good thrower would perhaps throw the first ball 80 yards, he would throw the second ball 75 yards, the third 70 yards, the fourth 65 yards, and so each ball that he threw would go a less and less distance, until he had no strength left, and he could throw no more balls. Now, that boy would have done work; something would have passed out of him into the balls; he has, as it were, passed something that belonged to him into the cricket-balls, and as a result he feels fatigue through the loss of this something. Take another illustration: Supposing two crews agree to row a race. They start full of life and full of energy; they pull with all their hearts and might, and arrive at the goal, in common language, thoroughly pumped out. Something has gone out of them into the boat. That which has gone out of the crew, and out of the boy who threw the cricket-balls, is what we call energy, and what they have done is to do work upon the boat. Another example is in the case of football: A boy kicks a foot-ball and makes a splendid goal. To do that he has sent something out of his body into the ball which hurtles through the air past the goal, and the game is won. In all these illustrations something is done which results in fatigue, work is performed and energy is lost; in fact, work done means energy applied, and energy applied means work done. As mental energy is our capacity for learning lessons, for going through examinations, and that kind of thing, so the energy of the kind I speak of is the capacity for doing absolute physical work. The generality of this energy is immense. It is a difficult thing to grasp the fact that there is something in existence that we cannot feel, that we cannot touch, and that we cannot see, but which gives us all the force and all the power we possess."

Scale in Boilers.

Most all water contains vegetable, earthy and solid matter in solution; those which occasion the greatest trouble are probably sulphate and carbonate of lime, oxide of iron, magnesia, alumina and silica, and are found in greater or less proportion in water of different localities. They are capable of being precipitated by heating water to a high temperature, as in the case of the steam boiler, when the precipitated salts settle, covering the tubes, sides and bottom of the boiler with a thin coating for each quantity of water heated, which, if not properly treated, will soon form into a hardened scale very difficult to remove. The best preventive of scale is probably a good filter heater, in which the feed-water can be raised to a temperature sufficiently high to deposit the matter held in solution, in the filter of the heater, before entering the boiler. A practice which facilitates the making or hardening of scale in boilers, is that of blowing out the water under a high pressure. The only time to open the blow-cock when under steam, is in the morning before starting the engine; a small percentage of sediment may then be blown out, but it should only be continued for a few moments at the farthest.

When the boiler is to be emptied, it should, if circumstances will allow, stand until the brick-work, water, etc., become quite cool, then the blow-cock can be opened, and while the water is running out, or immediately after it is out, take off the man-hole plate, and with a hose wash the sheets and tubes well while the sediment is still soft. With this treatment very little scale will adhere to the iron, but all that does should be dislodged as soon as possible, and on every occasion, by scaling bars, chisels and hammers. Any sediment which the washing fails to remove should be

scraped out before refilling the boiler. In cases where blowing out is compulsory, it should be done with as low a pressure as practicable. Water should be run out whenever it shows signs of being dirty—about once in two weeks is sufficient, as there is no use of emptying the boiler of water which has made its deposit and is comparatively good, to replace it with that which contains matter in solution to form new scale.

The great objection to scale is, that, being a non-conductor of caloric, it prevents a large proportion of the heat of the furnace from entering the water, the heat escaping up the chimney, causing a waste of fuel and decreasing the evaporating power of the boiler. With a heavy deposit of scale there is great danger of the iron which is in contact with the fire becoming burned, as the scale interposes a barrier to the radiation of the heat, and separates the water from the iron.—*Extract from the Prize Essay written for the N. Y. Mechanical Engineer by Mr. H. L. Stellwagen.*

American Newspapers in 1882.

THE AMERICAN NEWSPAPER DIRECTORY, which will be issued next month by Geo. P. Rowell & Co., of New York, will contain the names of 10,611 periodicals in the United States and Territories, which is a gain of 344 in the year just passed. The number of daily papers has increased in a somewhat larger proportion, and is now represented by a total of 996 against 921 in 1881. The largest increase has been in New York—10 dailies, 29 of all sorts. Illinois and Missouri show a percentage of gain which is even greater, while Colorado leads all others in the percentage of increase, both of daily and weekly issues. California, Nebraska, Nevada, Oregon, South Carolina, Tennessee, Vermont, and West Virginia have fallen behind 1881 in the total number of periodicals issued. In Georgia, Maine and Massachusetts the suspensions have exactly counterbalanced the new ventures. In every state not mentioned above, and in the territories, there has been an increase.

Fix by Law.

The "unterrified grangers" demand that the millers' rate of toll should be "fixed by law." This they have demanded in convention assembled. The millers should now assemble in convention and demand that the price of farmer's wheat should be "fixed by law." And then the old maids should assemble and demand that all the old bachelors and widowers should marry them in a time "fixed by law." This "fixed by law" business is played out so far as it applies to fixing the prices of produce and merchandize, which can only be fixed by the relation of supply to demand; and if these honest and well-meaning grangers will take a second thought on the subject, they will see the point.

Items of Interest.

The *Prairie Farmer* gives the following recipes for making Graham bread:

No. 1.—Three pints of Graham flour, or two pints of Graham and one pint of wheat flour, one pint warm water, one cup yeast, one-half cup of molasses, a little salt, one-half teaspoonful saleratus.

No. 2.—One pint sweet milk, two pints Graham flour, one-half cup molasses, to which add one teaspoonful soda, and one of salt. Mix thin enough to pour.

No. 3.—Three-quarters of a pint of Graham flour, three-quarters of a pint of white flour, a handful of Indian meal, a teaspoonful salt, three heaping teaspoonfuls of baking powder. Mix all thoroughly together while dry. Then stir in half a small teacupful molasses; add sufficient cold water, or sweet milk, and water to make a stiff dough. Bake immediately.

WARNING TO WHEAT EATERS.—"How is it," asked a reporter of a Stockton, California paper of a prominent wheat buyer, "that you wheat men always spit out the grain you sample?" "That is easy enough to explain" said the man of cereal proclivities. "Do you know that many a man has ruined his constitution, and in lots of instances consumption has been brought on by acquiring the habit of eating wheat? The reason is this, the husk of the wheat somehow or other finds its way into or affects the lungs. In Mark Lane it is the custom to fine any man found eating wheat one shilling." This will be received as news by the general public.

A remarkable discovery is said to have been made accidentally in Dakota. It is a new fuel, an oil saturated rock as inflammable as the best

cannel coal. The discovery was made in Mix County where some men were blasting a ledge when a piece of the rock fell into a fire near by and was quickly in a blaze. A pile of three bushels of the rock was set on fire and burned freely. This petroleum rock is to be tested on a Milwaukee railroad as fuel for locomotives. A piece of the rock about the size of a hickory nut was tried in a retort recently by a Yankton scientist, and found to contain three drops of petroleum. The inflammable property of the shale comes from this oil. It is said that the same material abounds along the Missouri River and in some parts of Iowa.

CONVICT MECHANICS—Superintendent Pillsbury reported to the New York Senate that at Sing Sing prison, Perry & Co. employ 906 men at 56 cents per day, at manufacturing stoves. Of this number 200 are general laborers, clerks, packers, engineers, and firemen, 385 moulders, 196 stove mounters, and the remainder nickel platers, tinsmiths, carpenters, blacksmiths, polishers, varnishers and tool-makers. The Bay State Shoe and Leather Company employ 307 men at shoemaking at 50 cents per day; Mahoney & Stern employ 138 men at laundry work at 60 cents per day. At Auburn, the Auburn collar company employ 65 men at making horse-collars at 50 cents per day; Dunn, Barber & Co., 101 men at shoemaking at 60 cents per day; Foxall, Jones & Co., 181 men at hollow-ware making, at 50 cents per day; Hayden & Smith, 118 men, in the manufacture of harness and plate, at 50 cents per day; Sheldon & Co., 225 men at 50 cents and 59 men at 60 cents per day, in the manufacture of axles. At Clinton, William Carroll & Co. employ 380 men at hat making at 40 cents per day.

The daily average number of hours' work at the three prisons for the past year did not exceed eight. General competition has not been invited in letting the labor of convicts. As the contracts have expired they have been renewed at an advanced price, 60 cents per day being the amount now obtained. When Capt. Pillsbury assumed charge of the prisons the price paid under contracts then existing was 40 cents per day. Capt. Pillsbury says if convict labor is to be abolished at all it should be in all states of the Union. For New York to stand alone in such action would be manifestly disadvantageous.

Crop Notes.

The Michigan State Crop Report for March has just been published. It includes returns from 1,041 crop correspondents, representing 750 townships. Six hundred and forty-nine of these returns are from 426 townships in the southern four tiers of counties. The estimates, almost without exception, show the condition of wheat, the condition of cattle and sheep and the prospect for apples and peaches better than one year ago. In only three counties—Alpena, Delta, and Gladwin—do the wheat prospects seem to be less promising. The total area in wheat in these counties in May, 1881, was only 821 acres. The condition of wheat in the southern four tiers of counties is estimated at from 12 per cent. better in St. Clair, to 141 per cent. better in St. Joseph County, where the crop in 1881 was almost a total failure. The average for the 28 counties in the southern four tiers is 43 per cent., and for the entire State 33 per cent., better than on March 1, 1881. In addition to the returns made by correspondents, reports have been received of the quantity of wheat marketed during the months of January and February at 431 elevators and flouring-mills, or about two-thirds of the whole number in the State. The whole number of bushels, as shown by the reports, is 2,885,235, of which 669,487 bushels were marketed in the first or southern tier of counties, 915,333 bushels in the second tier, 422,767 bushels in the third tier, 607,505 in the fourth tier, and 270,143 bushels in the remaining counties of the state. At 56 elevators and mills, or 13 per cent. of the whole number from which reports have been received, there was no wheat marketed during the months named.

The latest reports from Kansas indicate an unusually fine condition of the wheat crop throughout the Arkansas Valley. It has seldom been more promising at this time of the year. There have been no spells of alternate freezing and thawing, which usually do the most harm to the crop. The late cold snap has been of great benefit to the fruit prospect by retarding the bursting buds, so that they were not injured by the storm which followed. The late snow has gradually disappeared, and it gave the wheat a wonderful start. The winter has favored an early seeding, and much plowing has been done.

The agricultural situation in South Carolina is thus reviewed by the *Charleston News and Courier*: "An unusually large quantity of small grain has been sowed in every part of the state, and the weather has been such as to promise a yield that will fill the barns and furnish abundant support for man and beast. The oat crop is in fine condition in the Piedmont district, as well as in the middle country, and on the seaboard, and in six or eight weeks, with a continuance of good weather, the farmer will be in easier circumstances. This will be a great relief, as the purchases of Western corn have been a heavy drain upon the agriculturist. There will be too, a disposition to work strenuously to obtain good results in cotton, rice and corn. The intelligence given in the country newspapers concerning the small grain crop is fully confirmed by the advices received by the Charleston factors, who say that there is complete agreement in the statement about the area in cultivation and the condition of the crop."

THE MURRAY IRON WORKS of Burlington, Iowa report business first rate. The demand for the "Howard" automatic cut-off engine is unprecedented and this style of engine gives great satisfaction.

News Items.

MILLING is reported to be very dull in Minneapolis.

THE Minneapolis operative millers have organized a mutual protection and benefit society.

REPORTS of damage to milling property in all parts of the country by high water have come in thick and fast.

THE Eagle Milling Co. of Quincy, Ill., have ordered 40 sets of Stevens rolls of the John T. Noye Manufacturing Co.

NEW YORK state canal commissioners state that the New York canals will probably be open for business April 15th.

JAMES A. MILLER, formerly head miller in the Excelsior Mill at Minneapolis, is now on the road travelling for Edward P. Allis & Co.

W. SIMMERS of New Prague, Minn., has ordered 12 pair of Stevens rolls from the John T. Noye Manufacturing Co. of Buffalo, N. Y.

E. HOAG & SONS of Manchester, O., have ordered a Cosgrove roller-mill of the John T. Noye Manufacturing Co. of Buffalo, N. Y.

RICHARDSON & EVANS, of Indianapolis, have ordered eight pair of Stevens rolls from the John T. Noye Manufacturing Co. of Buffalo, N. Y.

DIED—March 21, 1882, Martin B. Medberry, aged 78. He was for many years one of the proprietors of the Empire mills in Milwaukee.

MESSRS. JOHN FIECHTER, SON & Co. have purchased manufacturing property in Minneapolis and may now be said to be permanently located. They manufacture the Fir centrifugal reels and roller mills.

THE Cockle Separator Manufacturing Co. of Milwaukee, Wis., have during the past month shipped a double-suction combined machine to South Russia, and also one to James Bruce, Timon, New Zealand. The demand for the machine is constantly on the increase. The company report numerous inquiries and orders in answer to their advertisements in the UNITED STATES MILLER.

MR. ANTON KUFKE, in his circular dated Liverpool, March 15, 1882, says:

The weather has now become quite spring-like and vegetation is making rapid strides, not only in these islands but all through northern Europe. The growing wheat-plant continues to be in splendid and very forward condition, and the prospects so far are most favorable. Farmers' deliveries of wheat are again on a decreased scale and the average price remains the same as last week, viz., 44s. 9d. against 42. 3d. at the corresponding week last year, and is virtually the same as in 1880, when it was 44s. 8d. per quarter.

The depressions under which the grain trade has been suffering for many years past, found its culminating point last Thursday, when some forced sales took place; but since then a steadier feeling has developed and no further decline in the values of flour has taken place. The business transacted in the interval has, however, been only small as regards foreign flour, as our local millers are getting the greatest share of what business there is passing.

Wheat sells more freely at last Friday's decline of 1d. per cental and some parcels are taken hold of by speculators for a rise. Oatmeal, dull and unchanged. Bran, rather lower to sell.

[Continued from page 85.]

not desired, one simply removes one of the gears of the roll shaft and the rolls run with equal velocity. The same can be done with smooth iron rolls producing a *flattening* effect, with no rubbing or flouring action and the result arrived at will be as good or bad as from metal rolls.

The chief object in grinding is to keep the product organically sound or of good baking quality. The fitness for baking does not depend so much on the percentage of gluten but it is necessary that during the process of grinding no condition should exist which may develop sporadic organisms. The percentage of gluten only determines the *method of baking* and the treatment of the dough. Flour containing only a small percentage of gluten is capable of giving good results when baked but it must be treated differently by the baker from a flour rich in gluten. A flour rich in gluten may become unfit for baking during the grinding process, where it has met with such conditions as cause those organic changes which should only take place during the process of baking,—when in short the formation of dough and fermentation take place during the process of grinding. Such developments take place in high temperatures accompanied by dampness—warmth and moisture being highly conducive to organic changes. Millers have therefore made their best efforts to grind cool and dry. This can easily be done by using porcelain rolls if attended to properly, much easier than with metal rolls for the former material is sharper and grittier than the latter and requires no extreme pressure in making flour and therefore tends to avoid heat by friction. The Russian writers referred to asserted that the product resulting from using chilled iron rollers was always cool as the friction between middlings and the smooth iron is only about half as great as between middlings and porcelain. They evidently have not considered their assertion for a miller would be regarded unenviably, should he assert that dull stones ground cooler than sharp ones because the friction of dull stones on middlings is less than of sharp ones. It is better to keep such astounding views very secret.

When the grinding surfaces are in operation, unless they come in contact with each other, there is no friction, which is only the result of uselessly expended power. The operation of porcelain rollers is in this respect to be judged exactly the same as millstones. The product is reduced between sharp surfaces. Heat is developed in grinding only when the "grip" fails, or when the surfaces of the stones or rollers run together. Porcelain rollers have, however, the advantage of stones, in that the "grip," the grinding quality, remains constant, while with stones it is worn away, and must be restored by frequent sharpening. Neither can hot grinding take place with porcelain rollers through want of sharpness, through dullness of the grinding surfaces. They can, however, run empty, and become heated by friction upon each other, whereby the particles composing the mass are set in oscillation, precisely as is the case with millstones. This is to be guarded against principally as a useless expenditure of power. As a safeguard against carelessness of the miller in attendance, Mr. Wegmann has recently added to his Victoria mill a device by which the rollers are automatically thrown apart whenever the feed fails and the rollers are in danger of running together. This device is very practical (I have had it in use for several weeks on a Victoria mill). It saves the rollers at the same time from unnecessary wear. An alarm signal can also be combined with this device.

[TRANSLATOR'S REMARKS.—A frequent reason for the "heating" of porcelain rolls. I have found is in the insufficient care taken in keeping the rolls parallel. A pair of smooth rolls ought to be adjusted once a week. The finer the middlings are, that are to be ground on rolls, the greater is the necessity of keeping the roll bodies parallel to each other—*i. e.* keeping them "level"—for when they diverge in the least some fine dust middlings will pass unground and the miller will at first increase the pressure, to remedy the trouble of too great returns; the result will be, too close grinding along some distance of the grinding line causing some "caking" and even the roll-surfaces themselves will come in contact with each other causing "heating." The roller surfaces will commence to wear hollow if they are left in motion while in this condition for any length of time, and will quickly be in an unfit condition for grinding dust middlings even after they are leveled up. Porcelain rolls having more

grit than iron, will wear out quicker and heat more than iron in case they are allowed to rub against each other. A careful miller will keep his machinery in order, paying as much attention to one as to the other but a careless miller will pronounce the porcelain rolls undurable and much inclined to wear away quickly while he will call the iron rolls indestructible. He can use iron rolls carelessly and they will not remind him so quickly of his lack of attention, as a porcelain roll will do. The porcelain rolls built in this country by Edw. P. Allis & Co. of Milwaukee are provided with mechanism by which a pair of rolls can be accurately leveled in five minutes.]

The cause of hot grinding is, however, only partially removed by this arrangement. Rollers, as well as millstones, are liable to run empty at the sides or in places, producing friction, which gives rise to constantly increasing heat. This is the result of imperfect regulation of the feed. This is the more liable to take place the more rapid the revolution of the rollers, the smoother their surfaces, and the stronger the pressure under which the rollers must be worked to produce the requisite adhesion. But if the erroneous idea is entertained that rollers may be run as fast as they can be driven—why even porcelain rollers cannot perform impossibilities. The feed failing to keep up with the too rapid motion of the rollers is not seized and drawn in, and the rollers consequently rub together and become heated. This fact cannot be too carefully considered. Porcelain rollers do not need to run rapidly. The Wegmann Victoria mill should make not more than 130, the small rollers not more than 160, revolutions per minute. The productive capacity is not thereby diminished, but on the contrary is actually increased. I have never had my porcelain rollers run warm. The advantage of rollers, that the product does not remain so long between the grinding surfaces as with millstones, and is therefore less exposed to possible injury from heating, is generally conceded, and is only mentioned for the sake of completeness.

It is not to be understood from these statements that fine flour cannot be produced without porcelain rollers, but only that this can be accomplished by the use of porcelain rollers alone, without further auxiliary means, and with the least expenditure of power. The Wegmann porcelain rollers with differential speed require no detachments or dismembrations. Even the idea that dressing machines are necessary is erroneous. With these porcelain rollers a completely developed light feathery product is obtained which can be perfectly bolted on the ordinary reel. The arrangement of dressing machines is indeed not suitable for much bolting. However, it amounts practically to a question of the construction of such machines which I will not pass over without notice.

Among all the roller machines constructed and purchased for special purposes in milling, the Wegmann machines, and especially the so-called Victoria mill, take a foremost place, because they are capable of the most universal application. With them all kinds of middlings, whether fine or coarse, hard or soft, may be ground, or if desired, a simple break may be made. If it were possible for the grain to be completely decorticated, which will probably ultimately be achieved, and if the decorticated wheat kernels could be treated as large middlings, the Wegmann Victoria mill would be able without the assistance of any other machinery, to make a perfect flour by the reduction of such decorticated grain. A complete milling equipment would then consist simply of a decorticated machine and a Victoria roller-mill. With the cuticle of the grain removed it is self-evident that the entire process of reduction to middlings by means of corrugated rollers is superfluous, as the main object of sharp corrugations on the smooth surface is to prevent the reduction of the bran and its mixture with the flour. But even without reference to this anticipation of decorticated wheat, (which, moreover, I can only technically assent to) this universal applicability of porcelain rollers makes them especially desirable, as one willingly curtails the "complete system" which is necessary when only cast-iron rollers are used, to make a fine flour. Porcelain rollers require no "complete system," and therefore can be used to advantage in any mill. They comprehend in themselves every existing milling system or even more, every porcelain roller mill represents in itself a complete system capable of making any required reduction. This is a consideration to which, in the interest of the majority of mill owners too much attention can not be given. Not

all millers are able to provide themselves with a "complete system" of rollers. To do this requires a large business and a larger purse. We cannot all have large mills; of these there are already too many. The small mills are also entitled to existence and wish also to be in a condition to compete with others. Not every one is able and willing to entirely rebuild his mill. The porcelain rollers exactly answer to the requirements of such. They reduce the middlings to flour equally well whether these are made by millstones, corrugated rollers or other means. The better and cleaner the middlings the better the flour made from them, but in any case it is better than if made with millstones. The improvement lies in this, the possibility that every miller by the use of porcelain roller mills can perfect his system and improve his product. It is even no art for the smallest miller to make "Kaiser-Auszug" with the help of porcelain roller mills.

I hope by this exposition to have justly presented the views on milling with rollers, and especially, the use of Wegmann's porcelain rollers according to different sides.

There still remain two words for me to say: The first concerns the strength of the porcelain rollers, which has very recently been called in question; the other the expressions of distrust in allusion to "claims" which are constantly appearing.

The strength of the porcelain rollers and their fastening is sufficiently attested by the operation of more than 20,000 rollers. The fastening of the cylinder to the shaft is effected in the manufactory by special pressure apparatus with such accuracy that they cannot fail to hold except in case the screw employed for this purpose is loosened by a prying miller to gratify an unnecessary curiosity, and is not to be attributed to any defect in the apparatus employed in the manufactory.

It has been asserted that for no invention have more claims been made than for porcelain rolls, and the inference can be drawn therefrom that no milling invention has been of so great service to the milling art. This is simply *truth!*

NEWS.

Everybody Reads This.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

BURNED—Bodenheimer & Wright's flour mill, at Fillmore, Ind.

BURNED—C. Kronschnabel's mill at Benton, Minn. Insured.

CORN-MEAL is sold at Brenham, Texas, for three cents per pound.

SMILEY & LISSON, of Lakeville, Minn., have sold their mill to John Stauffer.

F. C. TRABINE, of Beaver, Greene Co., Ohio, is building a 200-barrel roller mill.

A. G. MOROBRAY, of the Winona Mill Co., of Winona, Minn., is sick with varioloid.

SHULER & Co. of Minneapolis recently sold 29 sets of Stevens' roller-mills in one day.

MOSES SHANTZ & SON, of Berlin, Ontario, have just retired from the milling business.

EIGHTY-FIVE turbine water-wheels run the mills and factories on the Neenah and Menasha water-power.

CROCKER, FISK & Co., of Minneapolis, have concluded not to rebuild their mill which was burned Dec. 4, 1881.

STOKES, BROS.' mill at Janesville, Minn., which has just started up, now has a capacity of 125 barrels per day.

KIPPER & WALLACE, of Sedalia, Mo., have dissolved partnership. John C. Kipper will continue the business.

BEMIS, BROS. & Co., the St. Louis bag manufacturers, will build a large salesroom in Minneapolis this year.

THE Mount Pulaski Milling Co. at Mount Pulaski, Ill., will start up their new gradual-reduction mill very soon.

W. P. EVANS' newly remodeled roller mill at Malvern, Pa., is running full time and turning out excellent work.

EDWARD P. ALLIS & Co. are putting in four sets of Gray's corrugated rolls in D. L. Wing & Co.'s mill at Litchfield, Ill.

ORSON TONCRAY of Brighton, Mich., has bought out his brother's interest in the flour-mill there and runs it alone.

THE new half of the great Pillsbury A mill has been fitted up with its machinery and will soon be in running order.

EDWARD P. ALLIS & Co., of Milwaukee have lately shipped four of their double 9x24

roller-machines to Wing & Co., of Litchfield, Ill., and three of same size to the Park mill, St. Louis.

THE Los Gatos Milling Co. of Los Gatos, Cal., shipped, March 2d, 1,212 barrels of flour to Liverpool via San Francisco.

WEIZEL BROS. & SCOTT of Anoka, Minn., have dissolved partnership. Weizel Bros. continue the milling business.

EX-GOV. WASHBURN, the Minneapolis mill owner, is at Hot Springs, Ark., and his health is said to be rapidly improving.

ROBERTS & PERKINS will double the capacity of their mill at Fargo, D. T., this season, making a 350 barrel-roller mill of it.

FROST & CO., of Oriskany Falls, N. Y., are putting in Gray's roller-mills, and will soon have a neat 100-barrel mill in operation.

EASTERN millers report business generally from fair to good. They are making more money, as a class, than Western millers.

THE New York & New England Railroad Co. have just completed an elevator in Boston having a storage capacity of 520,000 bushels.

Kansas City elevators handled nearly 5,000,000 bushels of wheat during the year 1881, and about 4,000,000 bushels of other grains.

MESSRS. FARLEY, CHRISTY & Co., are now building one of the largest oat meal mills in the United States. It will be completed in July.

MARTINDALE & SCHULTZ of Burlington, Kans., have lately bought a Becker Brush from the Eureka Manufacturing Co. of Rock Falls, Ill.

THE Kenton Paper Co. of Kenton, Ohio, have ordered two large Reynolds' Corliss engines from Edward P. Allis & Co., Milwaukee.

MARCH 14, a boiler in Joseph Brucker's mill at Dorchester, Wis., exploded, demolishing the mill and seriously injuring two employes.

E. P. ALLIS & Co. are now making plans for the erection of a 1,500 barrel mill with Gray's roller system for Hon. George Bain of St. Louis, Mo.

BURNED.—The Vance flouring mills situated in Venice, Ill., owned by Kehlor Bros., of St. Louis, burned March 11. Loss \$30,000. Insured for \$16,500.

PITTSBURGH, Pa., has a new roller flour mill in operation. It is owned by B. F. Veach and is located at 335 Liberty Street. It is doing a fine business.

THE well-known milling and mill furnishing firm of Stephen Hughes & Co. of Hamilton, O. have become incorporated as the "Stephen Hughes Manufacturing Co."

J. B. A. KERN, proprietor of the Eagle Mills, Milwaukee, purchased during the month, 40,000 bushels of wheat in St. Louis to be made into flour in his mills.

THE six New England States consume some twenty million bushels of wheat, while the wheat product of these states scarcely reaches one-and-a-quarter million bushels.

G. E. ALLINGER, of Port Jefferson, Ohio, has improved his cleaning machinery and is happy in the use of a Becker brush from the Eureka Manufacturing Co. of Rock Falls, Ill.

THE Janesville, (Wis.) cotton-mills have recently been entirely destroyed by fire. Loss, \$30,000. Insurance, \$17,000. Janesville manufacturing institutions have suffered severely by fire during the past year.

THE water in many of the rivers in Maine has recently been higher than at any time since 1874. It seems as if there was going to be another deluge judging by the reports from almost all parts of the country.

THE wheat area in Illinois is reported by the State Board of Agriculture as 285,000 acres less than last year, or about 9½ per cent. The condition of the crop is unusually favorable in all of the divisions of the State.

EDWARD P. ALLIS & Co. are rebuilding Kaufmann's mill at Bethalto, Ill., making it a 600-barrel roller-mill on the Gray system. Gray's roller-mills are also being put into Kaufmann's "Park Mill" in St. Louis.

A well known planter and miller in Mississippi says that money is close and times hard, but that the citizens are striving to economize and look hopefully to the near future when the crops for 1882 shall be harvested.

MR. JOHN HURD, of Marshall, Mich., has lately started his new roller-mill, and reports the most satisfactory results on the soft winter wheat, with choicest flours and a yield of four bushels to the barrel. He uses Gray's patent noiseless rolls. Edward P. Allis & Co., of Milwaukee, designed and built the mill.

JOHN EMMERT & Co. of Greensburgh, Ind., are changing their mill to the roller system. They have adopted the Allis system and will use Gray's patent noiseless roller machines exclusively. Edward P. Allis & Co., Milwaukee, Wis., have the contract.

C. H. BROWN & Sons of Dakota, Iowa, and J. Webber Adams, of Freeport, Ill., have lately bought the Galt combined brush and smutter, and write us that they are well pleased and that their flour has been much improved by its use. This machine is made by the Eureka Manufacturing Co. of Rock Falls, Ill.

THE "Simmons Mill," at Kenosha, Wis., has been entirely remodeled to the roller system by E. P. Allis & Co., of Milwaukee. Gray's Roller Mills are used. The mill now has a capacity of 175 barrels per day. It is driven by steam power. It is operated by Messrs. Simmons & Dickson.

A. K. WILLIAMS, of Minneapolis, Minn., has patented an invention for transporting grain through pipe-lines by atmospheric pressure. Mr. Williams will have to raise considerable wind to transport the wheat crop of the Northwest to the seaboard if he ever puts his pipe-lines in operation.

MESSRS. SHATTO & DEPNIS, of Minneapolis, Minn., have accepted the general agency for the Northwest for the celebrated Atlas Corliss and Slide Valve Engine, built by the Atlas Engine Works, Indianapolis, Ind. They are doing a booming business and keep a full supply of engines on hand for immediate delivery.

MESSRS. MANNING, MAXWELL & MOORE, No. 111 Liberty Street, New York, dealers in railway and machinists tools and supplies, will soon issue a new catalogue of all the line of specialties they deal in and would be pleased to receive from manufacturers duplicate lists of their goods. They will send for electro-types later.

THOMAS GALLAHER of the Pillsbury A mill recently fell a distance of 27 feet into the wheel-pit, striking his head against solid masonry at the bottom. He does not appear to be injured much. The lantern which he held in his hand while falling was not broken. Some of these millers are composed of substantial material.

THE Milwaukee Cement Works have begun working three months earlier this year than last. They have doubled the kiln capacity and are grinding for the coming season, so that when in full blast 1200 barrels per day can be made. One order alone, for the construction of the railroad bridge at Minneapolis is for 35,000 barrels.

COMMISSIONER HENDERSON, of the Atlanta Ga., says that during the present year there will be generally a greater variety of food crops raised. The planters have discovered that they have made a serious mistake in making cotton almost their entire crop. It is estimated that 54 per cent of their force products for man and beast were brought from other states.

C. W. BONNIWELL'S mill at Waverly, Minn., was burned recently. His loss amounted to about \$10,000, on which he had an insurance of \$4,000. He will rebuild at once, in the latest style, a mill of about 100 barrels capacity per day. He is desirous of hearing from mill-furnishers as soon as possible before he gets his plans made out.

THE "Victor Roller Mills," at Ottawa, Ill., owned by Messrs. Cotton, Dawall & Hamilton, have recently been finished and have started up. It is driven by water power and has a capacity of 250 barrels per day. It is fitted up with the Stevens Roller Mills and the plans and designs and machinery were made by the Jno. T. Noye Manufacturing Co., of Buffalo, N. Y.

THE Atlas Engine Works, of Indianapolis, Ind., are crowded with orders, and have shipped engines recently at the rate of one hundred per month. Shipment was made one day last week of two large engines, one going to Portland, Me., for a locomotive works, and the one to Ouray County, Col., for the Brooklyn & San Miguel Mining and Reduction Co.

EDWARD P. ALLIS & Co. have lately started the large pumping engine they have built for the city of Milwaukee. The engine is a Reynolds' Corliss compound condensing, and will give a duty of 100 million foot pounds. Its capacity is twelve million gallons per day, 150 feet high. It was run up to a sixteen million capacity with perfect ease. It will be at once placed on regular duty.

WILLIAM MCLEAN, Esq. of the Richmond Manufacturing Co. of Lockport, N. Y., has

been lying dangerously ill with inflammation of the lungs at the Nicollet House, in Minneapolis. At latest accounts, however, he was much improved and was thought to be in a fair way to recover. His brother has been summoned to his bedside, and if care and attention will save him, his many friends will soon see him about again.

SOUTHERN ILLINOIS suffered last year from drouth and now they are suffering greatly from floods. A correspondent from McLeansboro, Ill., says that usually a considerable quantity of grain is shipped from that place, but since harvest time last year, not a single car has been shipped, but that 79 carloads has been received for the consumption of the citizens of that place.

DURING the year 1881, Kansas produced 19,164,896 bushels of winter wheat and 1,314,793 bushels of spring wheat. The corn crop amounted to 80,760,542 bushels; oats, 9,900,768; rye, 986,588 bushels; barley, 110,125 bushels and buckwheat, 58,621 bushels. These figures are furnished by Mr. David Kelso, of Parsons, Kan., who is Land Commissioner of the Missouri Pacific Railway.

JOSEPH BUCHER of Columbus, Neb.; C. C. Risk of Mount Pleasant, Iowa; Geo. Shimp-ton, Columbus City, Neb.; L. B. Weisenburg, Georgetown, Ky.; Knowles & Son, Seneca, Kans., and Lewis Kamp, of Mount Carmel, Ill., after looking around for the best brush-machine, have bought the Becker brush made by the Eureka Manufacturing Co. of Rock Falls, Ill., and are more than pleased with the way it cleans wheat.

BURNED, March 23, 1882, Haven & Co's flouring mill and Werner & Cole's elevator at Leavenworth, Kan. Loss including 20,000 bushels of wheat and 12,000 barrels of flour estimated at \$60,000. Insurance \$50,000. The mill will probably be rebuilt at once on the latest improved gradual reduction plan by Messrs. Werner, Cole & Havens. Mr. Havens and two employees were injured during the fire quite seriously.

CHISHOLM BROTHERS have just started a new mill on the Jonathan Mills system for the Grundy County Milling Co., at Grundy Centre, Ia., and another for Witherspoon & Barr, at Princeton, Ind.; besides a third for Sooy, Brinckman & Roberts, Great Bend, Kan. The last was a fourth for Bridges & Johnson, Crete, Neb. All of these parties state that they are perfectly satisfied with the working of the system.

A LARGE STEEL SAILING SHIP.—On the 8th was launched from Messrs. Harland and Wolff's building yard, Belfast, a ship which is said to be the largest sailing vessel ever constructed of steel. She is named the *Garfield*, after the late President of the United States. The *Garfield*, which is of 2,220 tons register, is 292 ft. in length, 24ft. 9in. in depth and 41 ft. breadth. She has been built for Messrs. Ismay, Imrie & Co., of the White Star Line, and is intended for the Australian and Californian trades.

THE Chicago Packers Hoop Company, about being organized, contemplate the placing of new machinery for splitting and dressing half round bark hoops for packers and millers at Chicago, Rockford, Sterling, Rock Falls, Quincy, Alton or East St. Louis and at Belleville, Cairo, Centralia and other points in Southern Illinois convenient to millers and coopers and accessible to hoop timber districts. The machinery controlled by the company is of recent invention and is one of the most remarkable labor saving inventions known. It promises to revolutionize an industry equally important to the farmer the packer and the miller throughout the state.

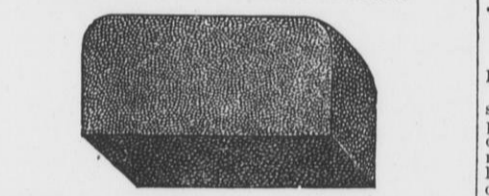
GIBSON & Co.'s mill B., in Indianapolis, Ind., which has been running constantly since 1876 as a buhr mill, has recently been changed to a complete 500 barrel roller mill, and at the same time all the machinery, bolting and purifying apparatus has been refitted and rearranged. The following is a short description of the mill: The wheat is operated upon successively by a Richmond separator, a combined Richmond brush and beater and a Becker brush, after which it is graded into three grades as to size, which facilitates the operations of the first break machines in their work of exactly dividing or splitting the wheat. The reduction machinery, which consists of twenty-eight double Gray roller machines, is placed on the grinding floor in three parallel lines, and is all driven from the same line shaft in the basement. Fifteen of these machines operate on the wheat in six successive breaks. Nine, which are of smooth iron and porcelain, reduce the middlings in four breaks, while the remaining four are for sizings, tailings, soft stocks and "red dog."

The bolting and purifying is done on six scalp-ers, 28 reels and 10 purifiers, arranged according to a system of bolting and purifying devised by Mr. Louis H. Gibson, who is also the inventor of a grinding machine, consisting of a combination of sieves and aspirators which separate all of the soft and branny matter from the middlings, before going to the purifiers. These machines operate so successfully that further purification for all middlings coarser than those going through a No. 14 cloth is unnecessary, and little work is left for the purifiers on the fine middlings. The tailings are purified by Gray aspirators, and the fine and sizings middlings by La Croix machines. We do not care to indulge in the gush ordinarily used in describing new mills, but will simply say that the product of flour in quality and quantity is entirely satisfactory to the owners. Of the low grade there is about 6 per cent. which is known as "St. Louis Extra." As to the bran, it is finished. The mill was planned and arranged, and the machinery selected by Mr. Louis H. Gibson, the superintendent, and the millwright work executed under his direction by Mr. T. M. Wilson.

IOWA MILL FOR SALE.
The Elgin flour mills—3-run of stone—2 Leffel water wheels—8½ feet head and plenty water. 2 purifiers and good bolting capacity. The power is ample for an 8-run mill. Address for further particulars
P. DOWSE, Jr.,
Elgin, Iowa.

FLOUR MILL FOR SALE.
A new, 2-run grist mill, with dwelling house and barn and 15 acres of land, situated on the Zumbro river, in a fine grain growing country. It is seven miles from a railroad station. Good stone dam and plenty of water the year around. For further particulars, address
CHARLES MUELLER,
Berne, Dodge Co., Minn.

John H. Miller,
MANUFACTURER OF



MILL BURR RUBBER,
SECTIONAL FURROW GAUGES AND STAFF.
PETERSBURG, PA.

The Best, Cheapest, and Most Durable Rubber in the Market USED DRY. Will outwear any Rubber made in the world, and retain its cutting qualities until entirely worn out.
FACE RUBBER, 12x6x3 inches; weight 12 lbs.; price, \$3.00. FURROW RUBBER, 12x6x1¼, 1½, 1¾ and 2 inches, as required, \$2.50; or both for \$5.00, by express. Furrow Gauges and Staff \$1.25 per set, by mail. Send for circulars, testimonials &c. Address all orders as above.
N. B.—This Rubber will not wear a pair of Burrs out of existence in 15 minutes. But if used in connection with the Pick and Red Staff will leave the face and Furrows in the best possible condition for making good work. For cleansing the face of Glazing it has no equal. Try it and be convinced. Money refunded if not satisfactory.
Mention U. S. Miller when you write to me.

ROPER'S
PRACTICAL
Hand-Books for Engineers.

Hand-Book of Land and Marine Engines.	Price \$3 50
Hand-Book of the Locomotive.	" 2 50
Catechism of High-Pressure Steam Engines.	" 2 00
Use and Abuse of the Steam-Boller.	" 2 00
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These books embrace all branches of Steam-Engineering—Stationary, Locomotive, Fire, and Marine. Any engineer who wishes to be well informed in all the duties of his calling, should provide himself with a full set. They are the only books of the kind ever published in this country, and they are so plain that any engineer or fireman that can read can easily understand them.
UNITED STATES MILLER,
Milwaukee, Wis.

FLOUR MILL FOR SALE.
Situated on the Chesapeake & Ohio Canal, 2½ miles above Georgetown, D. C., with a perpetual water supply. Has three run of stone, and is capable of making 75 barrels of flour per day. A good home market for the flour. The building is of stone, with a large frame shed attached. Address
THOS. P. MOGAN, 1718 Rhode Island Ave.,
Washington, D. C.

FOR SALE.
A good two run, water power Grist Mill, 36x50, stone foundation. Good dwelling house and barn with 25 acres of land, situated in fine grain growing country, 1-1½ miles from railroad station and 9 miles from Manitowoc, Wis. For further particulars address,
ANTON E. REIF,
Branch, Manitowoc Co., Wis.

Milling Made Profitable.
We build mills on any system known. We guarantee a saving of 25 per cent on the cost of construction and room occupied by
BOLTING CHESTS.
We handle 45 bushels per hour on one reel successfully.
C. B. LATER & CO.,
Blanchester, Ohio.

SITUATION WANTED.
A MILLER of many years experience in mills using stones and rollers, desires a situation. Can furnish first-class references. Address,
W. NEWBURGH,
Care UNITED STATES MILLER,
Milwaukee, Wis.
Feb., 24

IMPORTANT NOTICE TO MILLER
The RICHMOND MILL WORKS, and RICHMOND MILL FURNISHING WORKS are wholly removed to Indianapolis, Ind., with all the former patterns, tools, and machinery, and those of the firm who formerly built up and established the reputation of this house; therefore, to save delay or miscarriage, all letters intended for this concern should be addressed with care to
NORDYKE & MARMON CO.,
INDIANAPOLIS.

BIRGE & SMITH,
Practical Millwrights.

PLANS, SPECIFICATIONS & ESTIMATES
MADE FOR ALL KINDS OF
MILLWORK, MACHINERY, ETC.

Flour, Sawmill, Tanners' and Brewers' Machinery, and General Mill Furnishers,
Corner of East Water and Knapp Sts.,
MILWAUKEE, - - - WISCONSIN.

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CHOICE BEVELED EDGE
FLOUR BRANDS
For two dollars and upwards. Also RUBBER STAMPS, BURNING BRANDS, SEALS, STEEL NAME STAMPS, LETTERS AND FIGURES, Etc. Orders promptly attended to.
CHAS. H. CLARKE,
Box 114,
82 Wisconsin St., Milwaukee.

STEEL CAR
Made entirely of STEEL. ONE MAN with it can easily move a loaded car. Will not slip on ice or grease.
Manufactured by
E. P. DWIGHT,
Dealer in Railroad Supplies, 407
Library St., Philadelphia, Pa.

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THE CALDWELL
Water Mill For Sale!
The best water mill property in north-east Missouri located at Monticello, the county seat of Lewis Co., Mo. The mill house is 30x40 feet, 3 1-2 stories high, made of stone brick and frame, with two run of Buhrs, Leffel, improved wheel, 20 feet dam, stone foundation and machinery almost new, and now doing a good custom business. If desired, will also sell 250 acres of good farming land with three dwelling houses. The land could be divided into two good farms. Terms easy. Address,
J. P. CALDWELL,
Monticello, Mo.

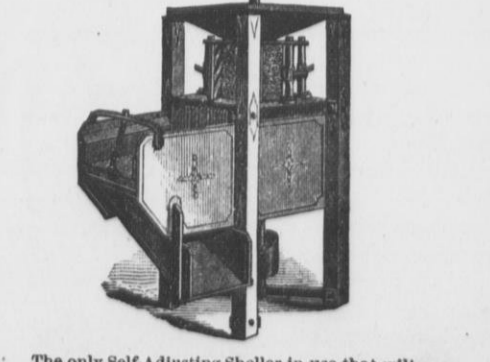
JOHN C. HIGGINS,
Manufacturer and Dresser of

Mill Picks,
No. 169 W. Kinzie Street,
CHICAGO, - ILLINOIS.

Picks will be sent on 30 or 60 days' trial to any responsible miller in the United States or Canada, and if not superior in every respect to any other pick made in this or any other country, there will be no charge, and I will pay all express charges to and from Chicago. All my picks are made of a special steel, which is manufactured expressly for me at Sheffield, England. My customers can thus be assured of a good article, and share with me the profits of direct importation. References furnished from every State and Territory in the United States and Canada. Send for Circular and Price List.
[Mention this paper when you write us.]



MARSHALL'S
NEW CORN SHELLER.



The only Self-Adjusting Sheller in use that will
SHELL MIXED CORN
FAST AND WELL,
And that will clean it THOROUGHLY.
Easy of access to all parts liable to clog. Thoroughly made. Sold as cheap as the cheapest.
Send for circulars to
G. MARSHALL & SON, Mfrs.
Kilbourn City, Wis.
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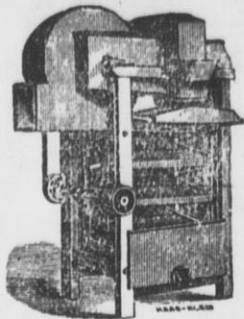
HOWES, BABCOCK & EWELL,

Established 1856.

Silver Creek, Chautauqua County, N. Y.

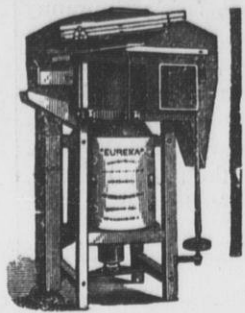
Established 1856.

MANUFACTURERS OF THE WORLD-RENOWNED EUREKA GRAIN CLEANING MACHINERY AND SPECIALTIES HEREWITH ILLUSTRATED.



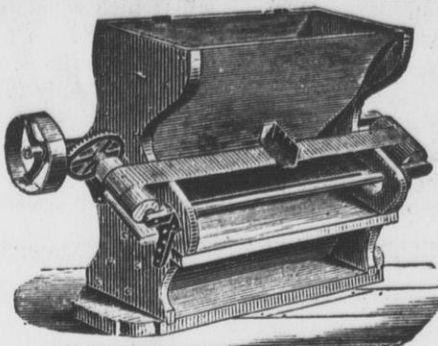
The Eureka Separator

occupies but little space, does its work in an effectual manner. Is also built for use in Elevators and Warehouses, with a capacity of from 100 to 1,000 bushels per hour.



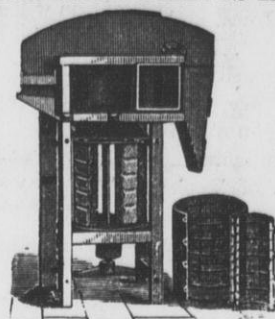
The Eureka Smut and Separating Machine.

A combined Smut and Separating Machine, having thorough ventilation. Over 14,000 of these Machines are now in use.



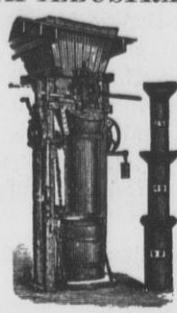
Eureka Magnetic Automatic Separator.

Removes all metallic particles from a flowing stream of grain, requiring no attention from the miller. 5 sizes.



Eureka Brush Finishing Machine

Recognized as the leading one of this class of machines. Universally recommended for finishing the process of cleaning.



Silver Creek Flour Packer.

Will pack whole and half barrels, and half, quarter, eighth and sixteenth barrel sacks. Provided with labor-saving patent creveling steel coil spring regulating the packing to perfection.

GENUINE DUFOUR AND ANCHOR BRAND BOLTING CLOTHS. FULL STOCK ALWAYS ON HAND, MADE UP BY THE AID OF OUR OWN PATENTED ATTACHMENTS, IN A SUPERIOR MANNER.

Office and Warehouse in England, 16 MARK LANE, LONDON. E. C.

Gen. Agency for Australian Colonies & New Zealand, THOS. TYSON, MELBOURNE, VICTORIA.

Abernethey's New Book.

PRACTICAL HINTS

Mill Building.

The Latest, Best and Only Exclusively Flour Mill Work in Print.

Every Miller, Millwright and Millwright's Apprentice should have a copy.

THE UNITED STATES MILLER for one year and a copy of this book will be sent for \$1.00. Address,

UNITED STATES MILLER, Milwaukee, Wis.

EUREKA MANUFACTURING CO.,

Manufacturers and Sole Proprietors of the

BECKER BRUSH,

Galt's Combined Smut and Brush Machine.

The Only Practical Cone-Shaped Machines in the Market, and for that Reason the Best.

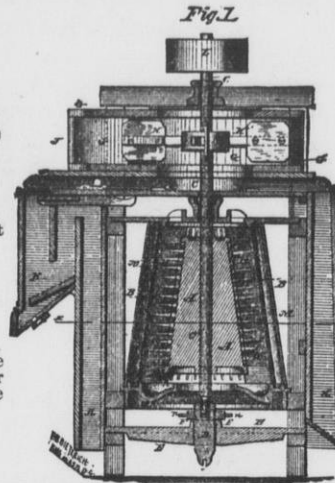
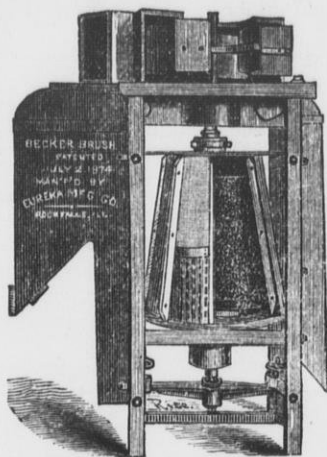
ADJUSTABLE WHILE IN MOTION.

Nearly 1,000 of these Machines in Use.

In the United States and foreign countries, and so far as we know all that use them are pleased. Millers, millwrights, and milling experts claim the Cone Shape Solid Cylinder Brush is the true principle to properly clean grain. All machines sent on trial, the users to be the judges of the work. For price and terms apply to

EUREKA MAN'G CO., ROCK FALLS, ILL., U. S. A.

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Galt's Combined Brush and Sifter.

Millers, Attention!

You can successfully purify the chop from either Stone or Rolls with the

Wheat Meal Purifier.

Satisfaction Guaranteed or No Sale.

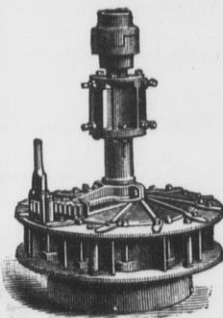
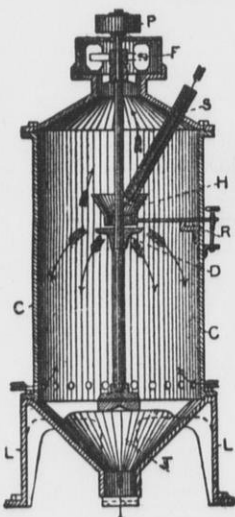
THIRTY DAYS' TRIAL.

Send for circular and full particulars to

Wheat Meal Purifier Co.,

Academy of Music, MINNEAPOLIS, MINN.

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POOLE & HUNT'S Leffel Turbine Water Wheel

Made of best materials and in best style of workmanship.

Machine Molded Mill Gearing

From 1 to 20 feet diameter, of any desired face or pitch molded by our own SPECIAL MACHINERY. Shafting, Pulleys, and Hangers, of the latest and most improved designs.

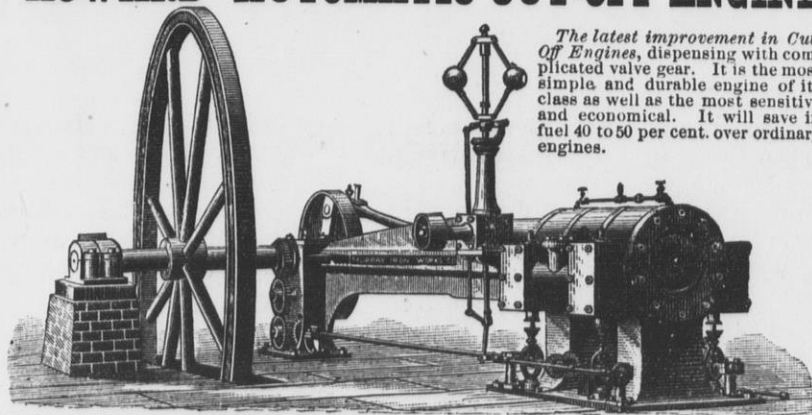
Mixers and General Outfit for Fertilizer Works.

Shipping Facilities the Best in all Directions

POOLE & HUNT, Baltimore, Md.

N. B.—Special attention given to Heavy Gearing for Pulp and Paper Mills.

"HOWARD" AUTOMATIC CUT-OFF ENGINE.



The latest improvement in Cut-Off Engines, dispensing with complicated valve gear. It is the most simple and durable engine of its class as well as the most sensitive and economical. It will save in fuel 40 to 50 per cent. over ordinary engines.

Built only by the MURRAY IRON WORKS CO., BURLINGTON, IOWA.

BUILDERS OF ALL KINDS OF ENGINES AND MACHINERY.

CAWKER'S AMERICAN FLOUR MILL DIRECTORY FOR 1882:

Is Now Ready for Delivery, February 1st, 1882.

It has been compiled with the utmost care, and contains 22,844 Addresses

Of Flour Mill Owners in the UNITED STATES and CANADA.

It give the Capacity and Motive Power of Mills wherever obtained.

MILL FURNISHERS, FLOUR BROKERS,

And Every one Desiring to Reach the Trade, WILL FIND THIS WORK SIMPLY INVALUABLE.

PRICE, TEN DOLLARS PER COPY.

Address THE UNITED STATES MILLER, Milwaukee, Wis.

Will be sent to any part of the world by Mail, REGISTERED, on Receipt of Price.

Stout, Mills & Temple, DAYTON, OHIO.

MANUFACTURERS OF THE

American Turbine Water Wheel,

Best Quality French BURR MILLSTONES.

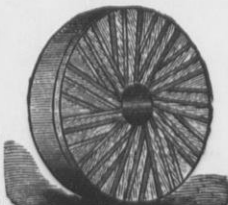
Sole Agents in Dayton for the sale of

DU FOUR & CO'S CELEBRATED BOLTING CLOTHS,

Flour and Paper Mill Machinery, Best Chilled or Porcelain Rolls for Crushing Wheat and Middlings and

GENERAL MILL FURNISHINGS.

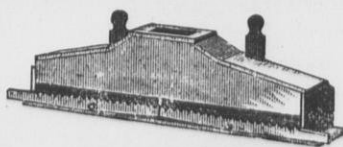
The AMERICAN TURBINE, as recently improved, is unequalled in the power utilized from a given quantity of water, and is decidedly the BEST WATER Wheel ever known. It has also been otherwise greatly improved.



Large Illustrated Catalogue Sent Free on Application.

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The Perfect Feed Box.



Insures a perfectly even distribution of the middlings over the entire width of the cloth. Every miller will appreciate this. Fits all purifiers. Address,

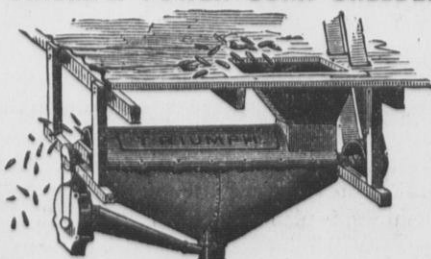
CASE MANUFACTURING CO.,

COLUMBUS, OHIO.

W. E. CATLIN & CO., 68 LAKE ST., CHICAGO, ILL., AGENTS.

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TRIUMPH POWER CORN SHELLER.



Shells and Cleans 2,000 Bushels Ears per Day.

The Cheapest, Best, and most Simple Power Corn Sheller in use. Send for Circular and Price List.

Manufacturers of Steam Engines, Mill Builders and Mill Furnishers.

HULBERT & PAIGE, Painesville, Ohio.

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MEDAL & PREMIUM AWARDED TO

ALCOTT'S TURBINE WATER WHEELS

Most Perfect Turbine in Use.

ALCOTT'S IMPROVED TURBINE WATER WHEEL.

MANUFACTURED BY T. C. ALCOTT & SON, MOUNT HOLLY, N. J.

MANUFACTURERS OF Circular Saw Mills, Shafting, Pulleys, Hangers & General Mill Machinery. Stating Particulars of Stream, &c. Address: T. C. ALCOTT & SON, Mount Holly, N. J.

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FOR SALE.

A good water power and mill with two run of stone a Stone Bank, Waukesha County, Wis. Mill is doing a good business, which with a moderate amount of improvements, could be largely increased. One half or the whole will be sold to the right party. For full particulars, address, U. S. MILLER, Milwaukee, Wis.

The Wheel is STRONG, DURABLE AND EFFECTIVE. Unsurpassed in power at "part gate." Warranted to give full satisfaction.

WEGMANN'S PATENT PORCELAIN ROLLS

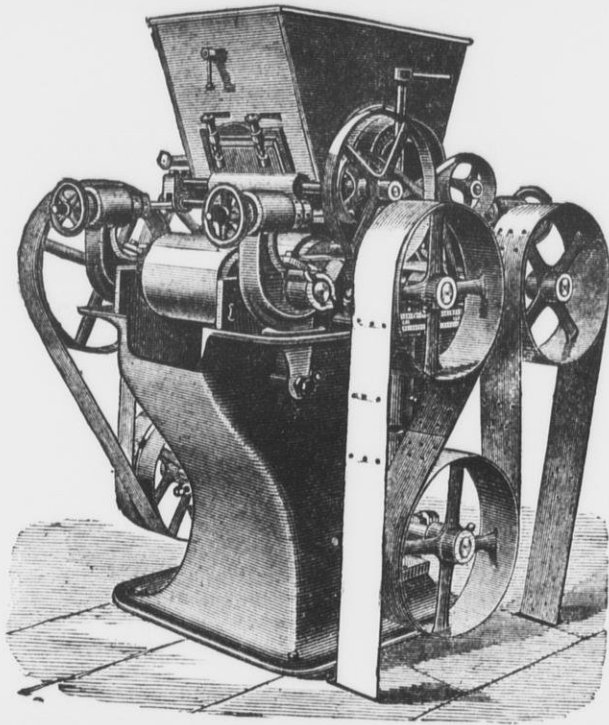
THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!



THE BEST ROLL

FOR

MIDLINGS

IN THE

WORLD!

"AWARDED SPECIAL PREMIUMS."

OVER 6,000 OF THESE ROLLS IN USE

IN THIS COUNTRY AND EUROPE

The Superiority of Porcelain over Chilled Iron for Reducing Middlings for Tailings is as under:

CHILLED IRON ROLLS, whether polished at first or scratched with fine grooves, soon become, through wear, smooth and glassy, and will only squeeze instead of grinding.

PORCELAIN presents a continual inherent sharpness, which no art can give to any other material in equal fineness and regularity, which enables it to act upon the smallest particles of flour and to separate them.

CHILLED IRON discolors the flour, by reason of the carbon that exudes from it, and also by its liability to rust.

PORCELAIN does NOT discolor the flour and is entirely indifferent to any and all chemical influences.

CHILLED IRON ROLLS are smooth and "cake" the meal; more especially is this the case on soft material.

PORCELAIN ROLLS possess a certain porosity, and no matter how finely ground, or how long they have been used, still re-

tain this granular and porous texture, and will reduce the middlings without "caking"

CHILLED IRON can be cut with steel.

PORCELAIN can ONLY be cut by the best black diamonds.

CHILLED IRON ROLLS require great power to reduce middlings to the proper fineness on account of their smooth surface.

PORCELAIN ROLLS will do the same amount of work, on account of the slight pressure required, and the gritty nature of the Porcelain, with one-half the power. The flour produced by Porcelain Rolls is sharper, whiter, stronger and more even than that produced by Iron Rolls.

No remarks need be made as to the superiority of Porcelain Rollers over Millstones, as it is a recognized fact by all. Porcelain Rollers are the only Rollers that will entirely supercede Millstones and Metal Rollers.

THESE MACHINES RECEIVED the FIRST PREMIUM!

At the late Millers' International Exhibition, Cincinnati.

Gold Medals at Nuremberg, 1876; Paris International Exhibition, 1878;

Little International Concours, 1879; First Gold Medal of the State, Berlin International Exhibition of the German Millers' Association, July, 1879; and Gold Medal Le Mans, 1880.

Full Instructions regarding the system of using Rolls in place of Stones given to parties purchasing. Address

EDW. P. ALLIS & CO., Sole Mfr's.

MILWAUKEE, WISCONSIN, U. S. A.

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COCKLE SEPARATOR MANUFACTURING CO., MILWAUKEE,

GENERAL MILL FURNISHERS

AND MANUFACTURERS OF

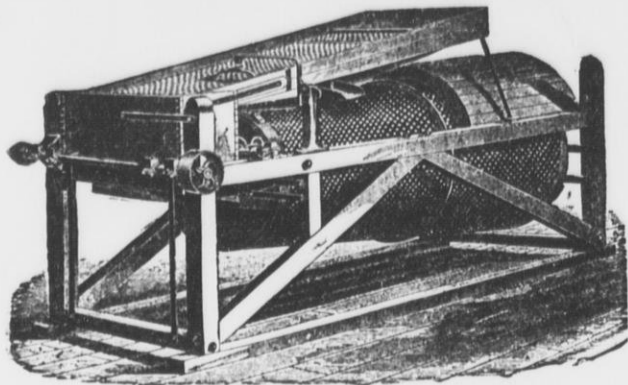
IMPROVED COCKLE SEPARATORS

(Kurth's Patent.) Also built in combination with

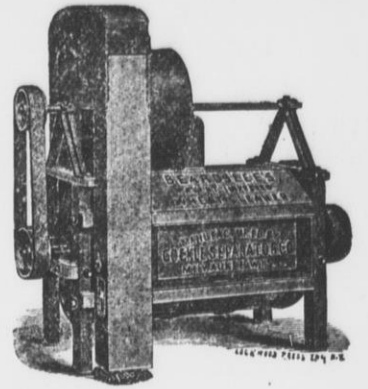
Richardson's Dustless Wheat Separators!

Also Sole Manufacturer of BEARDSLEE'S PAT. GRAIN CLEANER

We will contract to furnish entire Wheat Cleaning Machinery for mills, and guarantee the best results.



PLAIN COCKLE MACHINE.



BEARDSLEE'S WHEAT CLEANER.

Perforated Zinc at Bottom Figures.

Send for Illustrated Catalogue.

We GUARANTEE GREAT CAPACITY combined with GOOD QUALITY OF WORK. Any common Sieve will separate the cockle from wheat but to separate it WITHOUT WASTE is the GREATEST FEATURE of our Machine. A WASTEFUL machine is a DAILY LOSS OF MONEY in a mill. There is NO MACHINE IN THE MARKET which can stand comparison with ours.

Carbondale, Ill., 2, 1881.
Cockle Separator Mfg. Co., Milwaukee.
Gentlemen:—Replying to your late favor, would say that we can cheerfully recommend your Cockle Separator as doing all that you claim for it. We have tested ours thoroughly by this time and know whereof we speak. We would not think of doing without it, having tried it once, and can conscientiously vouch for its good work.
Yours respectfully,
BROWN & WINFREY.

Perryville, Idd., Nov. 24, 1881.
Cockle Separator Mfg. Co., Milwaukee.
Sirs:—The combined machine I bought of you has been running about three weeks. It certainly does all you claim for it, and is the most perfect Separator that I have any knowledge of.
Yours respectfully,
B. O. CARPENTER.

Hixton, Jackson Co., Wis., Dec. 30, '81
Cockle Separator Mfg. Co., Milwaukee.
Gents:—In answer to your inquiry of the 28th inst., I would say that the combined machine I bought of you last summer, works to my entire satisfaction. Respectfully yours,
W. T. PRICE,
per D. G. THOMAS.

P. S.—I have been milling now for twenty-seven years, but never have I seen anything that will equal yours in cleaning wheat.
As an Oat Separator it is No. 1, and for Cockle it cannot be beat. I can take screenings and separate the cockle from it without wasting any of the small wheat. In my opinion every mill in the United States ought to have one, and if I were to build a mill I would have no other. I remain
Yours, etc. D. G. THOMAS.

Minneapolis, Minn. Aug. 22, 1881.
Cockle Separator Mfg. Co.:

We have been using two of Beardslee's wheat cleaners, a scourer and finisher, for nearly two years, and are passing one hundred and fifty bushels per hour through them, one third more than rated capacity, and are not using any other cleaners, and consider our wheat as well cleaned as any in Minneapolis.
Yours truly,
CAHILL, FLETCHER & CO.

La Crosse, Wis., July 30, 1881.

Cockle Separator Mfg. Co., Milwaukee.

Gentlemen:—The Beardslee Grain Cleaner sent me about the middle of June has been in operation since that

time with very satisfactory results. I cannot see that it breaks the wheat or requires an unusual amount of power to run it.
Yours truly,
WILLIAM LISTMAN.

Milwaukee, Wis., Aug. 23, 1881.
Cockle Separator Mfg. Co.

Gentlemen:—The Beardslee's Grain Cleaners which we have purchased from you for our New Era and Milwaukee Mills give us the best of satisfaction. Experienced millers having seen the work done by the machine agree with us, that it cannot be beat. You are at liberty to use our names as a reference, and any party calling on us we will be pleased to show the machine in operation.
Yours truly,
NEW ERA MILLING CO.

Pott's Patent Automatic Feeder!

The best device for regulating the FEED ON ROLLER MILLS, PURIFIERS, and other machines requiring a regular feed, spread out the full width. Very cheap and simple. Sent on trial upon application. Write for circulars with illustrations. Perforated Zinc of all sizes at low rates. Send for Illustrated Catalogue.

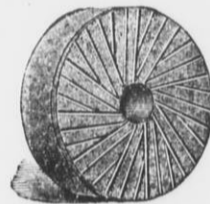
STEEL CASTINGS

FROM 1-4 to 10,000 LBS. WEIGHT.

True to pattern, sound and solid, of unequalled strength, toughness and durability.
An invaluable substitute for forgings or cast iron requiring threefold strength.
Gearing of all kinds, Shoes, Dies, Hammer-Heads, Cross-Heads for Locomotives, etc.
15,000 Crank Shafts and 10,000 Gear Wheels of this steel now running prove its superiority over all other steel castings.
CRANK SHAFTS, CROSS-HEADS and GEARING, specialties.
Circulars and price list free. Address

CHESTER STEEL CASTINGS CO.,
407 LIBERTY ST., PHILADELPHIA, U. S. A.

Works, CHESTER, PA.
[Mention this paper when you write us.]



Mill Furnishing,
Foundrymen & Machinists.
Established 1861.
MANUFACTURE
MILL STONES.
Flouring Mill Contractors.
Send for Pamphlet.
Nurdyke & Marmon Co
Indianapolis, Ind.

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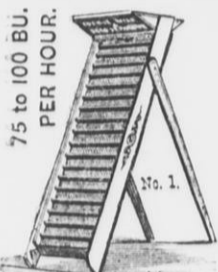
Northwestern Mill Bucket Manufactory

310, 312, and 314 FLORIDA STREET.

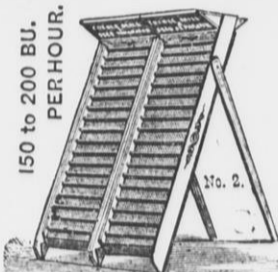


Is furnishing Mills and Elevators in all parts of the country with their superior BUCKETS.
They are UNEQUALED for their SHAPE, STRENGTH and CHEAPNESS.
Leather, Rubber, Canvas Belting and Bolts at lowest market rates. We have no traveling agents. Sample Buckets sent on application. Large orders will receive liberal discounts. Send for sample order.
Address all inquiries and orders to
L. J. MUELLER, 197 Reed St., Milwaukee, Wis.
[Mention this paper when you write us.]

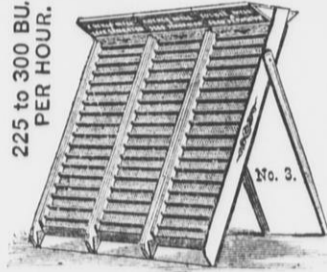
KING COCKLE MILL AND SEED SEPARATOR!



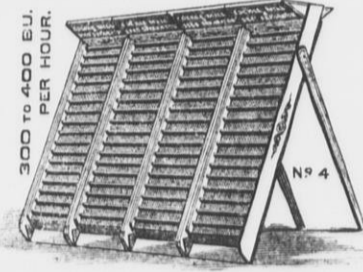
75 to 100 BU. PER HOUR.



150 to 200 BU. PER HOUR.



225 to 300 BU. PER HOUR.



300 to 400 BU. PER HOUR.

Pat. November 9, 1880. Gives 25 Grades of work by Change of Elevation. No change of Screen. Requires no power. When used in Connection with Kurth Cockle Mill your cleaning capacity is more than Doubled. When used alone you have more Merit for the money than in any device yet invented. Write for circulars to La Du & King, Manufacturers, Rochester, Minnesota.

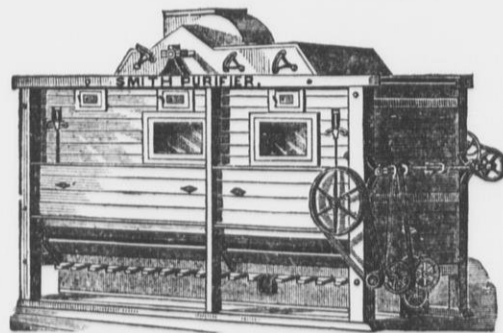
Low in Price!

Quantity and Quality of Work Considered.

LICENSED

Under ALL Patents owned by the Consolidated Middlings Purifier Co.

SIMPLE, EASILY ADJUSTED.



Adapted to all Systems

Of Milling and Every Grade and Condition of Middlings.

FOURTEEN SIZES,

SINGLE, DOUBLE AND SPECIAL MACHINES.

DURABLE, LIGHT RUNNING.

TWO THOUSAND SMITH PURIFIERS WERE SOLD IN 1881.

More than FOUR THOUSAND now Running in the United States.

The Smith Purifier

Is in Use in Every Milling Country in the World.
Has GRADED, CONTROLLABLE AIR CURRENTS.
Has a POSITIVE AND EFFICIENT means of cleaning the Silk of the Sieve.

It is Impossible to do Good and Economical Work without these Features.

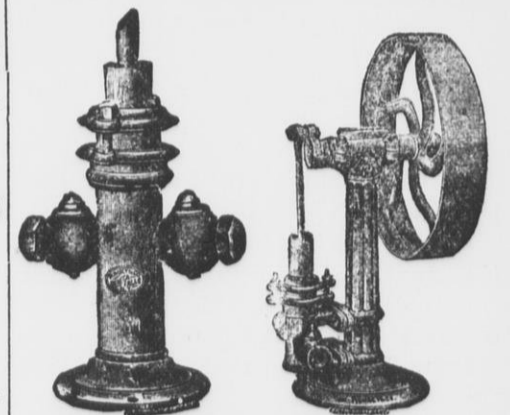
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