

The United States MILLER

Volume 8.—No. 2.

MILWAUKEE, DECEMBER, 1879.

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

The Millers' Exposition.

We present on this page an illustration of the Industrial Exposition Buildings at Cincinnati, O., in which the Millers' Industrial Exposition will be held during the first two weeks of June, 1880. The buildings cost not far from half a million of dollars and are in every way suited to the purpose of the Exposition, which is calculated to be the most complete of the kind ever held in this or any other country. It is probable that every machine or process of any use to the miller, grain holder or baker will be fully represented. Liberal prizes and premiums will be awarded, a list of which will be published in due time.

Celluloid—What it is, and How it is Made.

BY W. H. WAHL, PH. D.

The multifarious uses which this remarkable substance is made to serve, and which appear to be constantly increasing, as well as the fact that but little is generally known concerning its composition or the methods of producing it, render it probable that a few words concerning it may prove of interest to many of our readers.

Celluloid briefly defined is a species of solidified colloid, produced by dissolving gun-cotton (pyroxylin) in camphor with the aid of heat and pressure.

The nature of this product and the methods of procedure employed in its manufacture, will be found described in what follows. First let us devote a few lines to an account of the materials employed; and here as of prime importance, we must begin with gun-cotton.

When cellulose, or wood fibre (under which terms are included common cotton, paper or paper-pulp, the refuse of cotton mills and vegetable fibre of every description), is immersed for a few minutes in a bath composed of a mixture of strong nitric and sulphuric acids, then removed and washed and dried, it will be found to have acquired new and remarkable qualities. In external appearance there is nothing to indicate that any change has taken place, but when the test is made it will be found to have become highly inflammable, and (if the action of the bath has been sufficiently prolonged and intense) even highly explosive.

Wood fiber, or, to give it its proper chemical name, cellulose, thus treated, is said to have been nitrated, and the resultant product is termed nitro-cellulose, pyroxylin, or, properly, gun cotton. The latter term is given to it because, when properly prepared, it can be used as a substitute for gun-powder, having explosive qualities considerably greater than the latter. A number of substances besides cellulose, when treated in the manner above described, acquire similar inflammable or explosive properties, among which may be named, sugar, starch and glycerine; the nitro-compound of the last named substance being nothing else than that most terrible and energetic of known explosives agents—nitro-glycerine.

Besides acquiring inflammable and explosive properties, our cotton (supposing, for the sake of illustration, that we have used this common form of cellulose) after treatment as above described, has taken on another quality, namely, that of ready solubility in certain materials which are utterly without action on common cotton. For example, it will be found to gelatinize and quickly disappear in a mixture of alcohol and ether, forming a thick, transparent liquid. This is the same material used by photographers, who, in taking a picture, first

spread a thin film of this solution, called colloid, on a glass plate. The ether and alcohol being volatile quickly evaporate, leaving behind a thin, smooth and tenacious membrane or film of gun cotton, which serves as the medium of holding the sensitive silver compound used in taking the photographic image. It is upon this property of ready solubility of gun-cotton that the manufacture of "celluloid" depends, as we shall presently see; and the secret of its production depends upon the fact that camphor, like ether and alcohol, will readily dissolve gun-cotton. Prof. Seely, so far as the writer is informed, was the first to observe that gun-cotton would dissolve in an alcoholic solution of camphor, and the brothers Hyatt, after many experimental trials, succeeded in perfecting and patenting a procedure, whereby camphor, with finely pulped gun-cotton, is made to exert its solvent effect upon its substance, with the aid of heat (fusion) and the pressure in a closed chamber (to prevent the volatilization of the camphor). The following is an abstract of their method:

Gun-cotton is ground in water to a fine pulp

is reached, and the product which results is the homogenous solidified colloid, known as celluloid. After the mass is taken from the press, it hardens and acquires the extraordinary toughness and elasticity which are the distinguishing characteristics of the product; and one of the most noteworthy circumstances connected with it is the fact that a large portion of the camphor which it contains appears to be permanently held or combined with it, if we may use this convenient (though not strictly correct) term, so that its property of volatilization when exposed to the air is practically arrested.

There are several varieties or modifications of the above named procedure which would require too much of our space to detail. The process commonly employed in the production of celluloid is substantially that which we have given; and the endless variety of colors that the products of celluloid possess, are simply obtained by proper admixtures of pigments in the operation of its manufacture; mottled and other peculiar effects require special manipulation, which our technical readers will not find

articles fashioned out of it, at a fraction of the cost of similarly ornamented goods of ivory and some of the other materials imitated.

Hard-rubber, it is said, is able on account of its cheapness to hold its own against celluloid very well; but tortoise shell, malachite, amber, pink-coral, and other costly and elegant materials are so successfully imitated that an expert must look sharp to detect the original from the copy. In imitation of tortoise shell, it is made in such articles as combs, card-cases, cigar-cases, match-boxes, napkin-rings, etc. The pink-coral, so popular for jewelry, is admirably imitated, and the imitation sold at prices considerably below those of the genuine article; and the same may be said of articles imitating malachite and amber. Mouth-pieces for pipes, cigar holders and musical instruments, cleverly substituting the last named, are quite common.

Celluloid is also used as a substitute for porcelain in making dolls' heads that will stand any amount of hard usage. It is used in place of tortoise shell and hard-rubber for the frames

of eye glasses, spectacles and opera glasses, for shoe tips in place of metal, for martingale-rings, emery wheels and knife sharpeners. The latest thing in celluloid, and certainly the most novel, is its use, in combination with linen, cotton or paper, for shirt bosoms, cuffs and collars. These goods are possessed of a luster which very cleverly imitates that of freshly laundered linen; they are remarkably strong, elastic and durable, and are completely impervious to moisture, and of course to perspiration. When soiled they require only to be wiped off with a moistened sponge or cloth, to have their freshness restored, and can be made to do service for a long time.

What new uses for this extraordinary product the future may develop, the Lord only knows, but it is safe to say,

from what has already been achieved with it, that its production is deserving of a rank beside that of vulcanized rubber, as one of the most remarkable inventions of the age.—*Journal of Industry.*

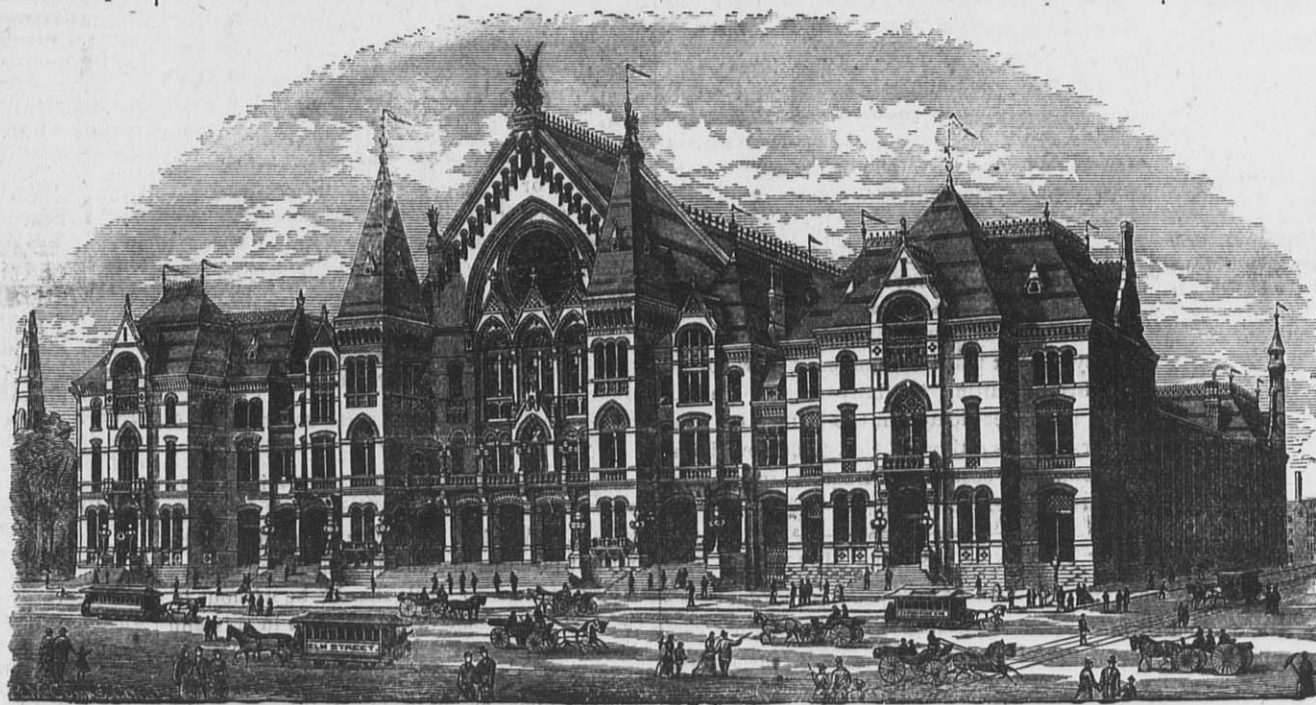
AUGUSTA, GA., promises to become the Lowell of the South. Another large mill to manufacture several varieties of cotton cloth, is projected there, and large subscriptions to the stock of the company have already been made.

THE Pullman Car Company are building sleeping coaches for narrow-gauge roads in Colorado. The body of these are 18 inches narrower than those built for the standard gauge, and the aisles and seats in proportion.

A FINANCIAL Reform League has been formed in Canada for the purpose of urging Parliament to an independent money and currency, which will not interfere with any existing contract, but will be legal tender for all public and private debts.

A SINGLE factory in Redditch, England, turns out between 6,000,000 and 7,000,000 of needles each week, or about 350,000,000 a year, which is equal to one-third of the population of the globe. With all the factories in the world going, who breaks these billions of needles?

It is said that in order to meet the increased demands of the cattle trade, which is anticipated in the near future, upward of seventy steamers are now on the stocks in the ship-yards of England and Scotland, being built expressly for this interest.



THE CINCINNATI INDUSTRIAL EXPOSITION BUILDING.

Where the Millers' International Exhibition of Milling Products and Machinery is to be held, June 1st, 1880.

in a machine similar to that used in grinding paper pulp, which is then subjected to powerful pressure in a perforated vessel, to extract the bulk of the moisture, but still leaving it slightly moist for the next operation. This consists in thoroughly incorporating finely comminuted gum-camphor with the moist gun-cotton pulp in the condition last named. The proportions employed are said to be one part by weight of camphor, to two parts by weight of the pulp.

With the camphor and pulp, the patentees further state, they also incorporate any pigments, coloring matter, or other materials that may be adapted to the requirements of the articles into which the product is to be manufactured.

The mixture of pulp, camphor and pigments, having been made, the next step is to subject the mass to powerful pressure in order to expel from it the remaining traces of moisture, and incidentally to effect also the more intimate contact of the camphor with the pulp. The dried and compressed mass is next placed in a mold open at the top, into which fits a solid plunger. The vessel is next placed in a hydraulic (or other) press, and heavy pressure, applied to the plunger, is brought to bear upon the mixture. While thus under pressure the mixture is heated by means of a steam jacket surrounding the chamber, or by other means, to a temperature of about 300° Fahr.; at this temperature the camphor fuses and its volatilization being impossible, the melted gum dissolves the gun-cotton pulp, or, to use the words of the patentees, "converts it." The patentees further state that the process of transformation is rapidly effected when the right temperature

is difficult to understand. It should be remarked also, that the celluloid made as above detailed, can be rendered plastic again, and remolded into any desired shape without further additions.

As to the applications of celluloid, they are legion, and we can only name the more prominent of them.

As a substitute for ivory it is perhaps best known, and has been so successful as to have been for many uses to which this substance was formerly put so extensively substituted for it, as to have made serious inroads upon the business of the ivory importers and workers. So perfect is the resemblance of celluloid to ivory that a close inspection is required to distinguish the counterfeit from the genuine. The absence of "grain" is perhaps the readiest peculiarity by which goods of celluloid may be detected, but for all practical purposes, it is not only as good but in some respects even better than ivory for all the uses of that substance. It (celluloid) possesses not only all the strength and elasticity of ivory, but it does not warp or discolor with age.

On these accounts, it is now largely used in place of ivory, in making piano and organ keys, billiard balls (said to be equal in elasticity to those of ivory), combs, backs of brushes and hand mirrors, plates for ivorytypes, frames for looking glasses and portraits, handles for knives and forks, whips, canes and umbrellas, and other objects too numerous to name for which ivory is used; and not the least of its advantages as a substitute for this substance is the fact that it can be molded, a property which renders it possible to reproduce the most delicate and elaborate decoration on the

UNITED STATES MILLER.

E. HARRISON CAWKER, EDITOR.

PUBLISHED MONTHLY.

OFFICE, 62 GRAND OPERA HOUSE, MILWAUKEE, WIS.

SUBSCRIPTION PRICE.—PER YEAR, IN ADVANCE.

To American subscribers, postage prepaid... \$1 00
 To Canadian subscribers, postage prepaid... 1 00
 To British subscribers, postage prepaid... 6s sterling.
 To French subscribers, postage prepaid... 7f. 50 cent.
 To Austrian subscribers, postage prepaid... 3 Florins.
 To German subscribers, postage prepaid... 5 Marks.

All Drafts and Post-Office Money Orders must be made payable to E. Harrison Cawker.
 Bills for advertising will be sent monthly unless otherwise agreed upon.

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

MILWAUKEE, DECEMBER, 1879.

THE UNITED STATES MILLER has now commenced its eighth volume, and has become universally acknowledged to be one of the most valuable milling journals in America, both for the purpose of transmitting knowledge on milling and mechanical subjects and as an advertising medium for introducing and selling all kinds of modern milling machinery. It is our aim to meet the wants of our patrons, whether manufacturers or consumers. Our editorial course will be entirely independent, and we shall do our best to give our readers the benefit of the latest important news on subjects pertaining to the objects of this paper. Our circulation and advertising patronage cover all sections of the country. We do not deal in machinery ourselves, and consequently have no "axes to grind." We cordially invite all those who have already patronized us to continue their patronage, and those who have not to try our columns. We append herewith our

ADVERTISING RATES FOR 1879.

	1 mo.	3 mos.	6 mos.	1 year.
One inch card	\$ 2 00	4 00	5 50	\$10 00
Two " "	4 00	8 00	11 00	20 00
Four " "	6 00	12 00	16 50	30 00
One-half col. (8 inches)	10 00	20 00	30 00	60 00
One-fourth page	20 00	40 00	60 00	120 00
One-half page	40 00	80 00	120 00	200 00
One page	100 00	150 00	200 00	400 00

Size of page, 12x18. Length of column, 16 inches.
 Width of column, 2 1/2 inches; 4 columns to each page.
 Business editorial matter per line, 30 cents. If over 50 lines, 25 cents.

Illustrations charged for in proportion to space occupied.

Advertising for Millers wishing situations, or millers wanting to engage employes, 50 cents.

MILL FOR SALE advertisements, \$2 each insertion.

We have published a List of Names and Post-Office Addresses of the Flour-Mill Owners of the United States and Canada, which is of great value to those who desire to communicate by circular with American mill-owners. The price is \$5 per copy, post paid. Cash must accompany the order.

We have also published a Saw and Planing Mill Directory of the United States and Canada. Price, \$5.

Subscription price to the UNITED STATES MILLER, \$1 per year.

M'Lean's Millers' Text Book, which every miller should have. Price by mail, 60 cents, post paid.

Ropp's Easy Calculator, which every business man should have in his pocket or on his desk. Price by mail, post paid, \$1.

Our Job Printing Department is one of the finest in the State, and particular attention is paid to all kinds of commercial work, which we can do on the most reasonable terms. Parties desiring to publish catalogues, circulars, etc., should send for estimates.

Address all communications to the
 UNITED STATES MILLER,
 Milwaukee, Wis., U. S. A.

THE Cockle Separator Mfg. Co. has opened a trade with Russia, and has established an agency at Odessa.

MESSRS. COLLINS & GATHMANN, of Chicago, report business lively. Look out for their new advertisement in January.

WE expect some interesting foreign communications, concerning milling subjects, for our January number.

MESSRS. ANGUS SMITH & CO., will build a new elevator in Milwaukee next spring with a capacity of 800,000 bushels.

THE Geo. T. Smith Middlings Purifier Co., Jackson, Mich., are reported to be selling machines at the rate of 100 per month.

MESSRS. HOWARD, BARCOCK & CO., of Silver Creek, N. Y., are meeting with a heavy demand for their Flour Packers. They suit every time.

A GOLD medal has been awarded to the Cockle Separator Mfg. Co., at the 7th Cincinnati Industrial Exposition, for the excellence of their machine.

SUBSCRIBERS changing their location and writing to us to send the MILLER to their new address, will confer a favor by stating what their former address was.

OUR readers in the Northwest in want of bolting cloth, will do well to refer to the advertisement of Messrs. Russell & Willford, of Minneapolis, Minn.

THE Chairmen of the various committees for making the necessary arrangements for the Millers' Exposition, have been duly appointed, and are already systematizing their

work. We predict the most complete and successful exposition of milling machinery ever held in any country.

THE Reliance Works, of Milwaukee, are now running day and night, and employ over 700 men. They are more than crowded with orders for all sorts of milling machinery.

Do not fail to commence your subscription for the UNITED STATES MILLER for 1880 with the January number. We shall endeavor to present our readers with a better paper than ever during the coming year.

We will send a copy of the MILLERS' TEXT BOOK, by J. M'LEAN, of Glasgow, Scotland, and the UNITED STATES MILLER, for one year, to any address in the United States or Canada, for \$1.25. Price of Text Book alone, 60 cents. Send cash or stamps.

IN a letter received from Geo. B. Macklin, of Frankfort, Ky., he says: "The milling interest is very prosperous here, and the mills are making a very high grade of new process flour."

A LEARNED French writer for the English journals, expresses the belief that mill-stones will never be superceded by roller mills, but grants that rollers are really very valuable when used in connection with mill-stones.

MESSRS. Barnes & Hodson, of Janesville, Wis., have about completed their 8-run mill. It has a capacity of over 200 barrels per day and is driven by water power. Messrs. John T. Noye & Sons, of Buffalo, N. Y., furnished the machinery.

WM. LEHMANN, the Milwaukee inventor, has been in Minneapolis, Minn., during the past month, introducing his Patent Method for Truing the Faces of Mill-stones, and his Adjustable Bosom Staff, and, we are informed, has met with good success.

THOS. WALLACE, of Joliet, Ill., has recently secured patents for a new process and machinery for making middlings from grain and for cleaning bran. We shall probably learn the particulars concerning this new invention by the time we issue another paper.

MESSRS R. G. DUN & Co.'s, Commercial Agency, report that the number of new business firms starting in daily in the United States is unprecedented in the history of this country. It is estimated that 1,900 new firms daily start in business. Business prospects are certainly encouraging.

THE UNITED STATES MILLER has the largest circulation of any milling journal published in America, and was the first milling journal started in America entirely independent of connection of interest with some machine or mill-furnishing establishment.

IN view of the fact that roller mills are being so extensively introduced into the United States, we commence the publication in this issue of an article on Roller Mills translated from Prof. Kick's German work in milling, for the Corn Trade Journal of London, Eng. The illustrations are made from the original by our own engraver. We commend its careful study by our readers.

THE Commissioners of the Millers' Exposition to be held in Cincinnati next June have adopted a premium list comprising the following classes: Motive power, steam boiler and engine fittings, milling machinery and millers' supplies, grain, products of the mill, bread, crackers, etc., baking powder and yeast, bagging, scales, barrel labels, miscellaneous. It is proposed to offer prizes of \$1,000 for the best barrel of flour made from spring and winter wheat.

STEAM TOWING ON THE ERIE CANAL.—The first through tow on the Erie Canal from Buffalo to Rochester, by the steam cable towing system, arrived at the latter city, November 18. The tow consisted of five canal boats, carrying 1,200 tons of grain. The distance 96 miles, was covered in 39 hours, a saving of 23 hours as compared with horse power. It is expected that the cable system will be completed the entire distance from Buffalo to Troy, 345 miles, shortly after the reopening of navigation in the spring. The existing canal boats will be used without alteration, and the boats will yield a larger revenue owing to the saving of time on each trip. The traffic of the canal this year has been unusually great, and it is

expected that the new system will largely increase its capacity.

Merry Christmas.

Before another number of this journal is issued, Christmas, 1879, will be amongst the things of the past. We therefore take this opportunity to wish all of our patrons and readers generally A Merry Christmas.

Reports from all sections of the country indicate that money is plentiful and prospects better than before for many, many years, and it is our hope that with such pleasing prospects all may enjoy the coming holidays.

FOR the convenience of those wishing to subscribe to the UNITED STATES MILLER for 1880, we print a blank in this edition which can be readily cut out and filled out. With it inclose One Dollar in cash or postage stamps in a well sealed envelope and send at our risk. We will send a receipt by postal card by return mail. If postage stamps are sent, let them be of the denominations of one cent, two cents or three cents.

Yeast.

About as important a factor of good bread as anything, is good yeast. Millers, especially those doing a custom trade, frequently have flour returned to them by customers, with the complaint that it will not rise; that it will not make good bread, and upon trial it is found that the entire trouble is in not using good yeast. A Waukesha county miller recently said to us, when speaking on this subject, that not long since he had a sack of flour returned to him by a farmer, who stated that his wife had tried it twice, and failed to make good bread. The miller took the flour, and, while the farmer was out, emptied it into a sack bearing the name of another mill, and when the farmer returned gave it to him with instructions to buy some good fresh yeast. The next time the farmer came he wanted to get some of that "same kind of flour he got last time, as it was the best he ever saw." Clearly in this case the trouble was either in the imagination or in the quality of the yeast.

The yeast question will be thoroughly discussed at the Millers' Exposition for 1880, in Cincinnati, next June, where samples of all kinds of baking powders and yeast will be on exhibition and practically tested.

IMPORTANT NOTICE.

TO THE PARTY RECEIVING THIS PAPER WHO IS NOT ALREADY A PAID SUBSCRIBER.

We hereby extend to you a cordial invitation to become a subscriber to the UNITED STATES MILLER. We shall endeavor to make it of the greatest possible use and benefit to the milling fraternity, and no mill should be without it. The best talent that we can obtain in this and other countries will contribute to its columns, which will also be enriched by carefully translated articles on subjects of interest to the craft. Subscription price, \$1. Enclose money or stamps in an envelope, seal carefully, and send at our risk. By return mail you will receive a receipt therefor. Address

THE UNITED STATES MILLER,
 Milwaukee, Wis.

Middlings Purifiers.

A LETTER FROM ANDREW HUNTER—HE THROWS DOWN THE GAUNTLET, AND IS WAITING FOR SOMEONE TO TAKE IT UP.

To the Editor of the United States Miller:

The meeting of the Millers National Convention and the Exhibition of Mill Machinery to be held in Cincinnati, Ohio, June 1st, 1880, will afford a good opportunity for a thorough trial of the practical working of middlings purifiers.

The following proposition I submit for the acceptance of competitors, open to the whole world, namely: That each owner of a Middlings Purifier will deposit on or before the first day of April, 1880, \$1,000.00 (one thousand dollars) in the First National Bank of Cincinnati, subject to the decision of the judges in the trial of Middlings Purifiers to be made in the exhibition building. The judges shall be selected only from the leading millers of the United States. The test shall be made on five different kinds of middlings, from the softest to the coarsest. First, to run through each purifier one ton of fine middlings, that have passed through a No. 12 cloth and dusted over a No. 15. Second, to run through each purifier one ton of ordinary winter wheat middlings that have been dusted over a No. 15 cloth. Third, to run through each purifier one ton of Spring wheat middlings that have been dusted over a No. 15 cloth. Fourth, to

run through each purifier one ton of fine soft tailings from rolls, that have been dusted over a No. 15 cloth. Fifth, to run through each purifier one ton of ship stuff mixed with one hundred and fifty pounds of coarse, medium and fine middlings, that have been dusted over a No. 15 cloth. Each of the above tests to be weighed correctly before entering the machine and each part of the separation weighed afterwards. The test is not made to find out who can produce the whitest middlings without regard to quantity, but who can make the best separation on the most difficult material, weighing the purified middlings, the tailings and the fluff in the dust room. Each competitor shall furnish double the amount of material he shall purify for the purpose of allowing others the privilege of making a test on a part of their middlings selected for purification. Whoever shall be awarded the first premium shall receive the whole amount deposited by the different competitors.

A good practical test made fairly, will enable millers to decide whose purifier does the best and most economical work. I am prepared to put up \$1,000.00 at any time. Hoping others will come forward and make a public declaration of their acceptance. I am

Respectfully yours,

ANDREW HUNTER, Chicago, Ill.

Rice.

We compile the following from the Annual Review of Messrs Dan Talmage's Sons & Co., dated at New Orleans, November the 1st, 1879. In regard to the Rice culture in Louisiana, they say:

THE CROP OF 1878—79.

Quantity.—The total yield was 164,000 bbls. of which 150,000 bbls. were marketed, the remainder being used for seed and home consumption.

Quality.—Planters having been more careful in seeding and cultivation, and account of fair harvest weather, the average grade was fully up to previous seasons.

Prices.—Louisiana being the base of supply for the United States, during the first three months of the crop year, all the surplus was disposed of as early as November. Speculation in "Rough" (unmilled rice) then forced prices unduly higher and market ruled quiet and steady until Spring demand set in, and prices advanced $\frac{1}{2}$ c. per pound. Altogether the season was a profitable one to the rice interests of this State.

THE CROP OF 1879—80.

The remunerative prices obtained for the previous crop induced a much extended cultivation, and about 50,000 acres were planted, from which a yield of 250,000 to 300,000 bbls. was reasonably expected. In May, the water in the Mississippi River fell so low that it was impossible to flood the fields, and the customary "June rise" falling, together with a long period of drouth, all combined to seriously injure the growth of the rice. Artificial means of raising the water were resorted to, and pumps were kept running night and day with indifferent success by those who could command them. September 1st a heavy gale supplemented the disasters of the year, and instead of the large yield expected, the most reliable estimates show only about 75,000 bbls. as the total crop for the season. The quality was somewhat injured by the want of water, yet the parcels offering are of fair character. Preparations are being made for a large planting next season.

DECIMAL NOTATION.—Ten is, theoretically, ill suited for the radix of a system of notation, because it permits of only one bisection. The half of it is five, an odd number. It also is incapable of any other division. On account of these defects the system is ill adapted to the operations of the shop and market. Although our calculations are universally made in the decimal system, none of our tables of weights and measures are decimal in any one of their subdivisions. In all departments of trade the current prices have been derived from a process of successive halvings. The shopman reckons by halves, quarters, eighths, sixteenths, and thirty-seconds, and not by fifths or tenths. The yardstick is divided in its practical use into halves, quarters, eights, &c., by successive bisections. Even the sixteenth of a unit is more commonly used in trade than the tenth. In the stock exchange, shares change in price by eights of a dollar, and not by tenths. Even with our decimal system of money, we require coins for half and quarter of a dollar, for practical use in trading. Almost the entire price list of our stores advance and recedes by these fraction of a unit formed by successive bisections. The attempt by the French to compel the use of the decimal system shows the difficulty of such an undertaking. Popular necessities compel the introduction of binal divisions. The prices of their money and stock markets are still frequently quoted in quarters and eights. The attempt to divide time decimally was a failure. After trying to give to their decimal metrology a universal application, they have been compelled to modify it in many of their weights and measures. From the inherent defect of a ten scale, all attempts to introduce an international decimal system of weights and measures have met with strong opposition.—Popular Science Monthly.

Roller Mills.

EXPLANATION OF THEIR MANNER OF WORKING AND COMPARISON BETWEEN THEM AND MILLSTONES.

[Translated by special permission from Professor Kick's Die Mehlfabrikation].

If two cylindrical rollers (*a* and *b*, fig. 103) of hard material working together, have a sufficiently large diameter (about 7 3/4 inches) they seize and crush the wheat or other materials as soon as the distance which they are apart is less than the size of the particles fed to them.

If both rollers have equal speed (for instance about 200) the action is most purely crushing, although it cannot be said that there is no friction, the drawing in of the feed between the rolls being itself a consequence of friction, which takes place between the rollers and the material fed to them. However, in this case the least gliding or friction would take place.

If only one roller is driven direct, the second roller being carried round simply by the pressure which is transmitted to it through the feed, this second roller would run somewhat slower than the other, it would be gliding on the feed.

If the two rolls are driven with different speeds, if consequently they possess unequal velocity at the circumference, the speed with which the feed passes through the rollers will be determined principally by the quick running roller, but the material will be gliding along the slower moving one, and thereby be slightly retarded in its motion.

It is evident that the gliding will increase in proportion with the difference between the speeds of the rollers. Take the extreme case that one roller is stationary and one only running, the revolving roller will then only squeeze the feed past the stationary one. The feed will in this case only be subjected to friction during the short distance *mn*, fig. 104—i. e., from where it is first seized until it is reduced. If instead of the stationary roller, a plate (*P*, fig. 105) is substituted, the effect will be somewhat different, as the particle would be seized a little further from the narrowest place, the distance through which the gliding takes place being, therefore, rather longer. The diameter of the rollers would of course have to be the same in both cases, if smaller in the last the distance might remain the same as in the first case.

The thing is, however, very different the roller is environed by a segment (fig. 106). In this case the distance, *mn*, through which the feed will be subjected to friction along the saddle or segment is long, and the results in the reduction would be considerably impaired, particularly with hard wheats.

If both rollers run with equal speed, the choice of the roller mill material would be of very little consequence. With the customary size of diameter the drawing in would take place with either chilled iron, porcelain, stone, glass, etc.

Altogether it is not the roller mill material so much, but its power of resistance and the condition of its surface which is of importance in its selection.

The speed with which the feed runs through the rolls has no great influence on the results obtained, as has been shown by experiments made by Messrs. Ganz & Co., of Buda-Pesth, Hungary. If, therefore, both rollers are driven, the speed can be increased to such an extent as the bearings which are subjected to high pressure will admit without heating. The same remark applies if one roll only is driven, the other being carried round by friction only.

Both with rolls running at equal, as well as those running with differential speed, the feed will be drawn in all the easier the greater the diameter of the rolls—i. e. the smaller the angle contained by the tangents at the point of contact, and the greater the coefficient of friction between feed and roller. If one roller is replaced by a disc *S* (fig. 107) the angle *a* contained by tangents to the point *mn* would be smaller than if two rollers *w* were used; the feed would consequently be drawn in more vehemently, but in exchange for this advantage the arrangement has the defect that the speed will become less as the effective point gets nearer the axis *AA*. It cannot be seen what advantage is to be gained through the use of two cones *k₁*, *k₂* (German patent No. 246), unless it is that here also the angle at the places where the feed is grasped gets very small, the latter, therefore, being easily drawn in, and the disintegration becoming very intense.

The condition of the roller surface has greater influence on the work than the speed of the rolls. The roller is made either smooth or grooved, and in the latter case the grooves can be either parallel to the roller shaft or put in, in the shape of very steep screws. The latter method has the advantage of making

the machine run more quietly and evenly. The size (depth and width) of the grooves is determined by the work the rolls have to do, as coarsely grooved rolls cannot be used if the feed passing on to the rolls is already fine.

Smooth rolls can be made both to crack wheat and grind semolina (coarse) and middlings (fine); but the breaks made by smooth rollers consist of pretty correctly broken fragments of wheat only with hard kinds of grain, while with soft wheats, particularly if the rolls run at equal speeds, the breaks will be in the shape of little discs. If the rollers are, however, grooved, the wheat is more correctly broken in the cracking process, and good breaks are more easily obtained. Of course the arrangement must be that shown in fig. 109a, while with the grooves placed as shown in fig. 111, no correct breaking (shearing) can

When regarding fig. 109 it will be easily seen that if roller *b* was the one running the fastest of the two, the action would be crushing and rubbing, not shearing, consequently, of two grooved rolls, that roll (*a*) will have to run fastest, the teeth of which (at the point where the feed is drawn in) point downwards, i. e., stand in the direction in which the feed passes.

It is correct as regards construction to let the roll *a* run even three times as fast as roller *b*.

If it is desired to reduce finer material than last made, for instance, in passing from the first wheat break to grinding the second or third, or with reducing semolina, grooved rollers of the same kind as used for the previous grinding should be employed, but the grooves must be finer. If the same rolls are used as have done the foregoing process, it

by friction on the second, as the rubbing action of the rolls in the two latter systems is extremely small, and purified fine middlings also contain but little bran.

Mention must be made here of a circumstance which influences the power required by the rolls, and by paying attention to the same, power may be saved. It is this: For reducing middlings and semolina into flour a higher pressure will have to be put on the rolls if they run with equal speed, and consequently simply crush, than if the middlings are also subject to friction, as is the case with rolls having differential speed. The power required by rolls of differential speed is determined to some extent by the roller material, while with equal speeds it is a matter of no importance of what material the rolls are made. In the first case the power required will decrease as the friction between the middlings and the rolls increases.

This assertion is easily proved. Suppose the roller *A*, on fig. 112, running at a somewhat higher speed than roller *B*, the particle of semolina shown will then be drawn in by the roller *A* with a force, *c. p.*, made up of the pressure (*p*) put on the roller, and the coefficient of friction (*c*) possessed by the roller mill material. That side of the semolina particle which touches the roller *B*, will also be drawn in with the pressure *p*, but it will not be drawn in so fast as the other side, because roller *B* runs slower than roller *A*, consequently it will be retarded with the power *c* equivalent to the co-efficient of friction of the roller material, but retarding one side means tending to break the semolina particle, and it stands to reason that the coarser or rougher the grain of the roller surface—i. e., the greater the co-efficient of friction—the firmer will be the grip which each roll has of its side of the semolina particle and the easier it will be broken, while in proportion as it decreases, more pressure will be required to make the rolls grip the semolina particle with the same power, or the pressure may be decreased as the co-efficient of the friction of the roller material increases.

From this it would follow that it would be correct to employ a roller material of which the co-efficient of friction is great.

(To be continued).

Recent Patents.

The following patents of interest to the milling trade were issued from the U. S. Patent Office, Oct. 28, 1879:

Grain Separator.—Chas. H. Brookbank, Connersville, Ind.

Grinder.—Lorenzo D. Cogswell, Rockford, Ill.

Wind Mill.—Ratti Lorenzo, Loyalton, Cal.
Grain-meter.—Alpheus Lowmiller, Kilgore, Ohio.

Oatmeal Machine.—Alexander Scoullar, Ottumwa, Ia.

Process of and Apparatus for Making Middlings from Grain.—Thomas Wallace, Joliet, Ill.

Bran Cleaner.—Thos. Wallace, Joliet, Ill.
Patents issued Nov. 4th, 1879.

Elevator Bucket.—Wm. G. Avery, Detroit, Mich.

Bag Fastener.—Charles R. Elliott, Golden, Ohio.

Wind Mill.—J. D. Morrison & J. C. Tietjens, Lyons, Iowa.

Grinding Mill.—John Stevens, Neenah, Wis.

Patents issued Nov. 11th, 1879:

Grain Meter.—Wm. & T. P. Carr, Yellow Springs, Ohio.

Grain Separator.—Geo. E. Passage, Nunda Station, N. Y.

Grain Separator.—Wm. H. Silsby, Chico, Cal.

Mill-stone Dressing Machine.—S. E. Griscom, Pottsville, Pa.

Wind Mill.—John M. Whitney, Mt. Pulaski, Ill.

Patents issued Nov. 18th, 1879.

Mill-stone Driver.—Wm. H. Dickey, assignor to A. & G. S. Bennett, Jackson, Mich.

Mill-stone Dress.—Wm. C. Hale, Austin's Springs, Tenn.

Mill-feeding Apparatus.—Jas. H. Redfield, Salem, Ind.

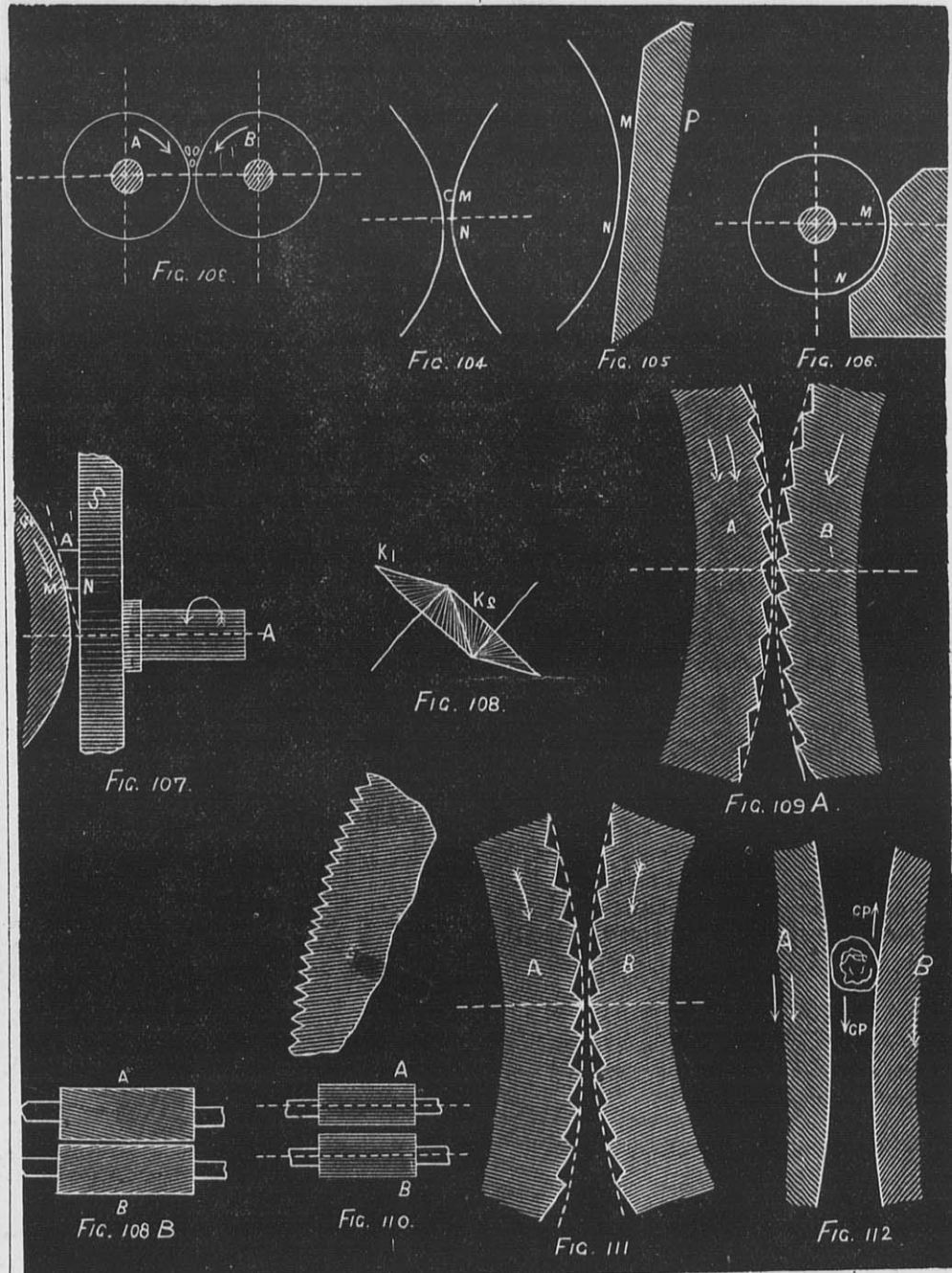
Oatmeal Machine.—Sylvester Sanford, Preb, Wis., assignor to N. B. Brown & W. S. Taylor, Cedar Rapids, Ia.

Middlings Scourer and Purifier.—George Summerton, San Francisco, Cal.

Mill-stone Supporting and Driving Device.—O. J. Bollinger, York, Pa.

Bag Fastener.—Isaac W. Giles, South Abington, Mass.

Cleaning Bolting Cloth.—Wm. H. Moses, Shawsville, Pa.



take place. The method of grooving—as used for instance by Ganz & Co., who are renowned for the quality of their chilled iron—is shown by fig. 109a, while fig. 110 illustrates the shape of the grooves which Escher, Wyss & Co. used along time ago on the Sulzberger Wheat Breaking Rolls with steel rolls.

In the first case it is impossible for the grooves of one roll to project into those of the other, the grooves being arranged screw-shape, as shown in fig. 109b, the threads in the roller *a* being right-handed; and left-handed in the roller *b*; while with the second, or Escher-Wyss system, the same end was attained by the position of the one adjustable roll. It should be here mentioned that in their breaking rollers of newest construction this firm has also grooved the cutting roll and the flat steel jaw against which it works, on the system of fig. 109.

If fig. 109a is examined closely, it will be easily understood that with the roller *a* running at a higher speed than roller *b*, a shearing or cutting action must result. The particles of wheat lying on the ledges of roller *b* and protruding over them will be cut by the quicker running roller *a*. This cutting and breaking will be done well, even when the sharpness of the ledges on newly grooved rolls has worn blunt; it will take place so long as the roller *a* revolves at so much higher speed than roller *b*, that there is constantly a groove of the roller *a* passing by one of those on the roller *b*, i. e., as soon as the roller *a* has double the speed of roller *b*. If *a* was made to run but slightly faster than *b*, there would then be no shearing action, and the grooves would act similar to those of the old breaking rollers, fig. 110. As a consequence of this and the above-mentioned reason, ROLLER *a* (fig. 109a) SHOULD RUN AT LEAST TWICE AS FAST AS ROLLER *b*.

may be possible to grind breaks of middlings if but slightly differing in size from the last, by altering the distance which the rolls are apart, but the depth of the grooves must always be less than the size of the particles fed into the rolls. Rolls of 8 1/2 in. diameter would have from 200 to 900 grooves.

The sharpness of newly grooved rolls wears away after short use, i. e., the rough, sharp ledges on them, existing after they are planed is soon lost. If such rolls have been in use but a few days the grooves feel smooth. In this state the rolls can be used constantly and will work correctly without re-sharpening for a couple of years. Grooved porcelain rolls are also used, but this material does not allow grooves of the form described, but they are made by cutting round grooves by means of a diamond, and these do not give such sharp cutting ledges.

Smooth Rolls.—If the particles fed to the rolls are already of great fineness, as, for instance, purified fine middlings, smooth rolls are employed, these can be made to revolve with a different speed, for instance, 19 revolutions of the one roll to 23 of the other, or the one roll may be dragged round by friction on the other, or they can both be run at the same speed. In any of these three cases the result will be good if the middlings fed to them are well purified and consequently as free as possible from bran. In proportion as the speed of the two rolls approaches equality the liability will decrease of reducing the bran particles which adhere to even the cleanest middlings, and consequently it will be easier in this case to remove them subsequently by purifying. However, the difference is extremely small between the action of rollers with equal speed and those having slightly differential speed, or with those where one of them is carried round

UNITED STATES MILLER.

PUBLISHED MONTHLY.

OFFICE, 62 GRAND OPERA HOUSE, MILWAUKEE, WIS.
Subscription Price.....\$1 per year in advance
Foreign Subscription.....\$1.50 per year in advance

MILWAUKEE, DECEMBER, 1879.

MILLERS' ASSOCIATION DIRECTORY.

NATIONAL ASSOCIATION.

President—George Bain, St. Louis, Mo.
Secretary and Treas.—S. H. Seamans, Milwaukee, Wis.
VICE PRESIDENTS—L. Fletcher, Minneapolis, Minn.;
Robert Tyson, Baltimore, Md.
ACTING EXECUTIVE COMMITTEE—Geo. H. Christian,
Minneapolis, Minn.; S. H. Seamans, Milwaukee, Wis.;
Alex. H. Smith, St. Louis, Mo.; Philip Haxall, Rich-
mond, Va.; J. A. Hines, Rochester, N. Y.

STATE ASSOCIATIONS.

MINNESOTA—President, W. P. Brown, Red Wing; Sec-
retary, F. B. Mills, Minneapolis; Treasurer, J. A.
Christian, Minneapolis.IOWA—President, J. J. Snouffer, Cedar Rapids; Vice-
President, H. Hammond; Secretary and Treasurer, J.
R. Serrin; Executive Committee, J. R. Serrin, H. Ham-
mond, G. F. Weist, E. J. Woodbury.NEBRASKA—President, Elam Clark, Omaha; Secretary,
C. D. Smith, Lincoln; Treasurer, E. J. Curson, Lincoln.KANSAS—President, Robert Atkinson, Ottawa; Sec-
retary and Treasurer, Frank H. Pope, Ottawa.MISSOURI—President, E. Goddard, St. Louis; First
Vice-President, John Crangle, St. Louis; Second Vice-
President, J. O. Roberts, Clarksville; Secretary, D. B.
Kirk, St. Louis; Treasurer, Geo. J. Plant, St. Louis.KENTUCKY—President, Wm. N. Potts, Richmond;
Vice-Presidents, Jno. E. Miles, Frankfort; Wm. Shaw,
Paris; C. J. Grover, Mt. Sterling; L. H. Nottmager,
Lexington; Secretary, E. D. Hix, Payne's Depot;
Treasurer, A. Weisenberger, Payne's Depot.ILLINOIS—President, D. B. Sparis, Alton; Secretary
and Treasurer, C. H. Seybt, Highland.WISCONSIN—President, E. Sanderson, Milwaukee;
Secretary and Treasurer, S. H. Seamans, Milwaukee.MICHIGAN—President, J. D. Hays, Detroit; Secretary
and Treasurer, W. Hibbard, Grand Rapids.INDIANA—President, Nicholas Ellis, Evansville; Sec-
retary, H. H. Emery, Indianapolis; Treasurer, D. A.
Richardson, Indianapolis.OHIO—President, F. Schumacher, Akron; Secretary
and Treasurer, Robert Colton, Bellefontaine.MARYLAND—President, Robert Tyson, Baltimore; Sec-
retaries, J. Olney Norris and W. B. McAttee, Baltimore;
Treasurer, W. H. Woodyear, Baltimore.NEW YORK—President, Geo. Motley, Rochester; Sec-
retary and Treasurer, J. A. Hines, Rochester.TEXAS—President, John Kerr; Secretary, M. Gray,
Dallas; Treasurer, P. S. Sheppard, Houston.PENNSYLVANIA—President, Chas. D. Minor, Wilkes-
barre; Secretary and Treasurer, A. Z. Schock, Selins-
grove.THE MILWAUKEE PRACTICAL MILLERS' ASSOCIATION
—President, Chas. Mueller; Vice-President, Levi
Hicks; Recording Secretary, H. W. Sherwood; Finan-
cial Secretary, Louis Holtz; Treasurer, E. DeLaus;
Usher, Edward Hiemke.THE NATIONAL ASSOCIATION OF BRITISH AND IRISH
MILLERS—President, Mr. Alderman Hadley, City Flour
Mills, London, England; Secretary, J. H. Chatterton,
69 Mark Lane, London, E. C., England.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. We are
working our best for the milling interestof this country, and we think it no more
than fair that our milling friends should
help the cause along by liberal subscrip-
tions. Send us One Dollar in money or
stamps, and we will send THE MILLER to
you for one year.WE call the attention of those wishing to
purchase a good milling property to the ad-
vertisement in another column of J. M. Leach,
of Clermont, Iowa.ST. WINFRED'S WELL, in England, evolves
120 tons of water per minute, furnishing abun-
dant water-power to drive 11 mills, within a
distance of a little over a mile.THE disasters to grain vessels on our lakes
have been numerous during the past month.
Many crafts have foundered or gone ashore,
and many lives have been lost.WM. DUNHAM, Esq., editor of *The Miller*,
London, England, recently presented Hon.
Geo. Bain, President of the Millers National As-
sociation with a gorgeously bound copy of his
paper.THE Cockle Separator Manufacturing Co.,
of Milwaukee, Wis., recently sold one of their
cockle separators to a firm in Odessa, Russia,
through an advertisement in the UNITED
STATES MILLER.A CHEAP and simple piece of machinery has
just been invented, and is in operation at
Westchester, S. C., which spins seed cotton
into thread. It is claimed that this invention
will add 100 per cent. to the profit of the
planter.ALL the flouring mills in Milwaukee are in
operation and are turning out a large quantity
of as good flour as can be made, daily. Sev-
eral new milling enterprises are being talked
up, and the prospects are favorable for more
mills and more business.ALL American visitors to London will find
the UNITED STATES MILLER on file at the
American Exchange of Henry J. Gillig & Co.,
449, Strand, W. C. These reading rooms are
the favorite place of resort for American visit-
ors, and they afford many conveniences whichare very desirable to strangers in a foreign
land.PATENT SUIT.—Messrs. Griscom & Co., of
Pottsville, Pa., have commenced suit against
John James & Co., of La Crosse, Wis., alleg-
ing infringements of their patents on diamond
mill-stone dressers. The case will be called
in December.MR. J. R. SERRIN, member of the Executive
Committee of the Millers National Association,
recently issued a circular to Iowa Millers re-
questing their hearty co-operation in helping
to make the Miller Exposition at Cincinnati, in
1880 a grand success. Iowa will certainly be
heard from.A CABLEGRAM was received in New York
Nov. 13th from a member of Queen Victoria's
household, ordering twenty-five barrels of red
winter wheat flour recently manufactured
under the new patent, in the West, and said
to be the finest quality in the world. The
order was executed at once, and the flour,
which cost \$9 a barrel, was shipped immedi-
ately it is understood to be for the Queen's
private kitchen.UNDER the heading, "A group of misfor-
tunes," the *St. Louis Miller* publishes the item
below:We have received the circular of the Bur-
lington separator and grader, patented and
manufactured by Lane & Stephens, Burlington,
Iowa. We shall speak at greater length in
regard to the above machine in a subsequent
issue.The *S. L. Miller* man will keep away from
Burlington until the thing blows over.BEWARE OF CHEAP BOLTING CLOTH.—There
has been introduced into the market a bolting
cloth which almost exactly resembles the genu-
ine silk cloth, which is made of cotton and
mohair. It can be detected by drawing out a
thread, untwisting it and examining it through
a magnifying glass. Such cloths wear out
quickly and do not bolt well. The imitation
is almost complete. Wire bolting cloths are
coming into use quite extensively.PEAS IN BOLTING REELS.—Some millers who
have tried it claim that a quart of dry peas
put into the bolting reels will increase the
bolting capacity and keep the cloth free with-
out injury. At the place of discharge from the
reels a screen is placed so as to catch the peas
and turn them into the elevator and carry them
back to the reel again. Small rubber balls are
also good as they do not in the least, precept-
ably wear the cloth.THE Wisconsin Boiler Works, F. M. Wilkin-
son, proprietor, has recently been removed to
new, large and convenient quarters at Nos. 23
—33 Oregon street and judging by the number
of workmen employed and the terrible pound-
ing to be heard continually, they are turning
out a great amount of work. The Wisconsin
Boiler works are prepared to turn out at short
notice boilers of any size and made in a work-
man like manner. Those in need of new boil-
ers will do well to write to the proprietor for
terms.A TRAMWAY has been opened in the German
city of Brunswick on a new principle. The
rail has no groove. It is laid exactly flush
with the road's level, and may thus be crossed
at any angle with any description of convey-
ance without any jar or disturbance. The car
is guided and kept in its place on this rail by
slight steel studs on the tire of the wheels,
which fit into corresponding holes punched in
the rail at the distance of every five inches.
The invention is that of an English architect.ALL ON ACCOUNT OF THE NAME.—In a cer-
tain thriving milling town about a hundred
miles north of Milwaukee two flour mills stand
having but the thickness of the walls between
their interiors.—We will say that Brown &
Smith owned mill A and Jones owned mill B.
Finally it was proposed that they should cut a
deor through to connect the two mills and all
should go into partnership. The terms were
all satisfactory and everything was settled,
until Smith proposed that they should have a
sign painted. All agreed that that was neces-
sary, and then came the question of how the
names should read. Smith proposed it should
be Smith, Jones & Brown, Brown objected and
said that the names should come in alphabet-
ical order. The sign should read, Brown,
Jones & Smith. Jones demurred and said he
was the "oldest one of the whole capoodle and
knew more about milling than both of them
put together and that, by Jimeni that sign
should read, Jones, Smith and Brown." Thissort of war went on for two or three days,
when Jones came down to the mill early one
morning and walled up the door way, and
when the astonished Brown & Smith came
down, Jones told them to "run their mill and
he'd run his'n." And thus the selection of a
firm name was the cause of much trouble.ACCORDING to the recent message of its
Governor, Washington Territory is entirely
free from debt, and warrants upon its treasury
are usually paid upon presentation. The
value of property in the territory on the 1st
day of September, 1879, was \$21,021,832,
against \$16,855,988 in 1877. The gain in two
years has been \$4,165,743.IN a recent letter from Hon. Alfred E. Lee,
United States Consul General at Frankfort-on-
the-Maine, he says that the exports from
Frankfort-o-M, to the United States, for the
year ending Sept. 30th, 1879, were of the value
of \$9,951,371.53 against \$8,427,264.81 for the
same period in 1878, showing an increase of
\$1,524,106.72. Of these \$253,361 was for cor-
sets, \$237,456 for kid gloves, \$1,337,804 for
drugs, dyes and chemicals, 484,144 for iron
(pig), hardware, etc., \$581,067 for linen, cot-
ton and woolen goods, \$657,041 for silk goods,
velvet, ribbon and braids, and \$490,705 for
wine brandy, beer and vinegar.

Our Special Request.

We desire all flour mill owners who have
not yet done so to drop us a postal card or
letter giving us,

1. Name of firm at present time.
2. Number of runs of mill-stones.
3. Number of sets of rollers.
4. Do you use water or steam power or both.
5. Postoffice, County and State.

Our object in asking the above questions, is
to secure statistics to aid us in perfecting our
Millers Directory for 1880. Mill-owners can
add greatly to the value of the work by grant-
ing above request. We desire if possible to
have the above answered by the owners of
every flour mill in the United States. We
herewith extend our thanks to those who an-
swered above request published in November
number.

Personal.

During the past month we have received
calls from Andrew Hunter, of Chicago, Ill.,
manufacturer of the Hunter middlings puri-
fier.Henry Hamper, representing Messrs. Howes,
Babcock & Co., of Silver Creek, N. Y.C. M. Palmer, business manager of the
Northwestern Miller, Minneapolis, Minn.Wm. Gerlach, a Milwaukee miller and malt-
ster, has just returned from a two months
visit to Germany.Mr. O. E. Meyer, of Hartland, Wis., called
on us recently. He reports business good.
He is about to add 3 run of stones to his mill.
Mr. Meyer has just perfected a machine of
much value for oat meal millers.Col E. H. Gratiot has been in Milwaukee
the most of the past month, supervising the
manufacture of his celebrated wheat heaters.Guelph is the residence of J. Goldie, one of
the flour "Kings" of Western Ontario. He is
President of the Ontario Millers' Association;
manufactures about 80,000 barrels of flour an-
nually, and buys and ships as much more, his
market being the maritime Provinces and
Great Britain.

The Wheat and Corn Crop of 1879.

The following reports from the Department
of Agriculture have come in, and show a won-
derful increase over all previous harvests. We
quote:Wheat—Returns of November 1st show an
increase in the wheat crop of 26,000,000 bush-
els over last year. This great increase is the
result of a very large yield in all the States
bordering on the Ohio and Missouri rivers.
The Northwestern States show little variation
from last year. Kansas and California both
decline in yield. Texas, of all the Southern
States, is the only one that falls off in the
yield this year.Corn—According to returns of November
1st, the corn crop promises an increase of over
200,000,000 bushels, or nearly fifteen per cent
over last year. The Atlantic and Gulf coast
States note some decrease, but other sections
of the Union have increased their yields. The
Southern Inland States increase nearly thirty
per cent; other sections of the Mississippi
Valley. Pacific States report about the same
yield as last year.C. C. White, of Valparaiso, Neb., is enlarg-
ing the capacity of his mill, and gets his new
work of Nordyke & Marmon Co., of Indian-
apolis, Ind.

The Trade Mark Law.

"Wanted: More power for Congress!" Such
will be the exclamation of many a miller, mer-
chant and manufacturer as he reads the de-
cision of the Supreme Court in reference to
trade marks, which was delivered on the 17th
in Washington. Had the framers of the Con-
stitution understood how important a uniform
law on this subject would become they would
have inserted one little clause more giving
Congress the right to make it. But how could
they foresee this any more than some other of
our present needs and past changes?As in many other cases, Congress passed a
law, because we needed it, without inquiring
very closely after their constitutional right.
The law authorized the registration of trade
marks in the Patent Office and gave owners
the sole right to their use for a period of
thirty years, with a privilege of renewal for
another like period. This was in 1870, and in
the nine years that have intervened, many
thousands of marks have been registered.
But meanwhile many instances of litigation
have occurred, and the unconstitutionality
of the law has been pressed as a chief defence
in suits for trespass. Cases which have found
their way into the Supreme Court have at
length resulted in the present decision in
which the judges declare that they find no
authority for such law in the Constitution,
unless it be in the provision which requires
Congress to pass laws to give full effect to
treaties. This might cover the ground of
foreign trade marks where these had been
provided for by treaty, but not marks owned by
our own people. The clauses conferring on
Congress the power to regulate commerce be-
tween the States, and to secure authors and
inventors the exclusive right to their own
books and inventions for a term of years,
have both been relied on to cover this ground
of the trade mark law, but the Supreme Court
will allow neither as sufficient. The conse-
quence is that the law falls, and with it all
property in these marks except so far as they
may be secured by State laws or the common
law. Merchants may well regret this, but
there is no help. More among them will be
disappointed than among the lawyers who
had looked into the subject and examined the
Constitution in reference to this law. As a
remedy for the difficulty now proved to exist,
it has been recommended in some quarters
that we have concerted action among the
States in the passage by all of a uniform law
which shall protect not only the property of
their own citizens, but that of the citizens of
all other States in these trade marks. Such a
measure might be possible, but would require
so much engineering that it seems hardly like-
ly to be carried through.THE MELBOURNE EXHIBITION.—The work in
connection with the International Exhibi-
tion to be held in Melbourne next year are
being pushed forward rapidly, and it is almost
certain that the whole of the building will be
completed long before the time appointed for
the opening of the exhibition. The main
building is almost finished externally, the
only portion of it remaining in the builders'
hands being the dome. The summit of the
dome will be 220 feet from the ground. The
workmen are at present employed on a shaft at
an elevation of 125 feet. A start has been made
with the flooring of the picture gallery, which
will give a promenade 1,800 feet long by 60
feet wide. The machinery annexes are in
course of erection, and the large staff of gar-
deners employed are effecting quite a transfor-
mation in the surrounding reserve. Several
of the prominent members of the exhibition
commission attended the opening of the Sid-
ney exhibition, and the insight they obtained
into the arrangements there ought to be of
service to them. The inconveniences which
have arisen in Sidney through the incompleteness
of the general arrangements at the time
of opening have caused the Melbourne commis-
sioners to resolve on pursuing their work with
the utmost vigor, so that the same unfavor-
able state of things shall not exist here. Appli-
cations for space continue to come in freely.
The last mail brought information of the ap-
pointment of commissioners by the United
States, Belgium, Holland, France, and other
European nations. A commission has also
been appointed by the Mauritius government.—
*Melbourne Argus, Oct. 3d.*F. M. Davis, of North Salem, Ind., is re-
modeling his mill to the new process, adding
new buhrs and making extensive repairs.Willaman & Griffith, of Orrville, O., the
parties building the fourteen-run mill at above
place.

British and Irish Flour Mills.

SELBY MILL, YORKSHIRE.

In the July number of the *Miller* the destruction of Naburn Mill, near York, at that time in the occupation of Messrs. Dobby & Wright, by fire, was recorded. A new mill has since been built for the firm, at Selby, by Mr. George Woods. The site of this mill is on the river Ouse, eleven miles nearer Hull than Naburn, the river being navigable up to that point, and is consequently a convenient route for taking the raw material to be manufactured to the mill, and for conveying the manufactured article to the important town we have mentioned. In these revolutionary times, when the minds of millers are greatly exercised as to whether, when building a new mill, or reconstructing an old one, they shall proceed upon the old lines or take a new departure through one of the many avenues which are pointed out to them, a miller might almost claim it as a distinction when he turns a deaf ear to the charms of change, and proceeds with his building or reconstructing as if no such person existed.

Shall it be the "New Process," which is said to be enriching the millers of the United States and smothering the English trade in multitudinous barrels and bags of flour? Shall it be the high milling of Hungary and Austria which, according to some lights, will produce flour of the highest quality from wheat of the poorest? Shall it be rollers or millstones? and if the latter are to be discarded as not sufficiently scientific for this enlightened age, are the rollers to be of the porcelain or chilled iron denomination? Then there is the Carr-Toufflin system, the Nagel and Kaemp, and the Daverio systems, each making more or less loud demands for recognition, and promising the grandest possible results. Among these clamant and conflicting systems and processes, how is a poor miller to decide? He may have

had his faith somewhat shaken as to the rightness of the path he has been hitherto pursuing, and which, upon the whole, gives satisfaction to himself and his customers, by the promoters of the adoption of "new lamps for old;" but, unfortunately, he has not been able to satisfy himself that the proffered novel illuminator will yield light of a greater brilliancy than that which he is asked to discard. He is like the boy on the brink of the stream who, in dread of the shiver, hesitates to take the plunge. He has encountered a Gordian knot which he cannot untie and is afraid to cut. Mr. Woods, however, has adopted the latter expedient, and, although he had the advantage of a *tabula rasa* in the shape of a site on which to build, and had an abundance of new systems from which to make a selection, he has erected a thoroughly English mill, which includes few of the novelties in machinery and appliances respecting which so much is said at the present time.

In making this statement of fact we offer no opinion as to its policy. The kind of machinery used in any branch of manufacture has a great deal to do with the quality of the manufactured article, and there can be no doubt that improvements have been made in milling machinery and milling methods by means of which the manufacture of flour has been greatly improved. As an English mill of what may be called a thoroughly national type, it is worth while to present Mr. Wood's new mill at Selby to the notice of our readers, and it will be seen from our engraving of the building that it is of a compact form, and, with its surroundings, forms a picture which is by no means ineffective.

The mill proper is shown on the right hand of the engraving, the portion on the left corner being the wheat cleaning department, divided from the mill by a wall which is shown projecting through the roof, and through which communication is had with the mill by means of iron doors. Attached to the mill is the loekum, to which the grain is elevated from the barges on the river. The mill is sixty-six feet long by thirty-three wide, the height being 50 feet, and it is interesting as being the only flour mill driven by steam power in the district, the engine by which it is driven being of the horizontal condensing

class, 30 horse-power. The building was commenced on the 1st of May, 1878, and was completed and turning out flour before Christmas in the same year. The engineers were Messrs. Whitmore & Binyon, engineers and millwrights, 28 Mark Lane, London, and the Iron Works, Wickham Market.—*London Miller*.

Scientific Gossip from France.

[For the UNITED STATES MILLER, by our own Correspondent.]

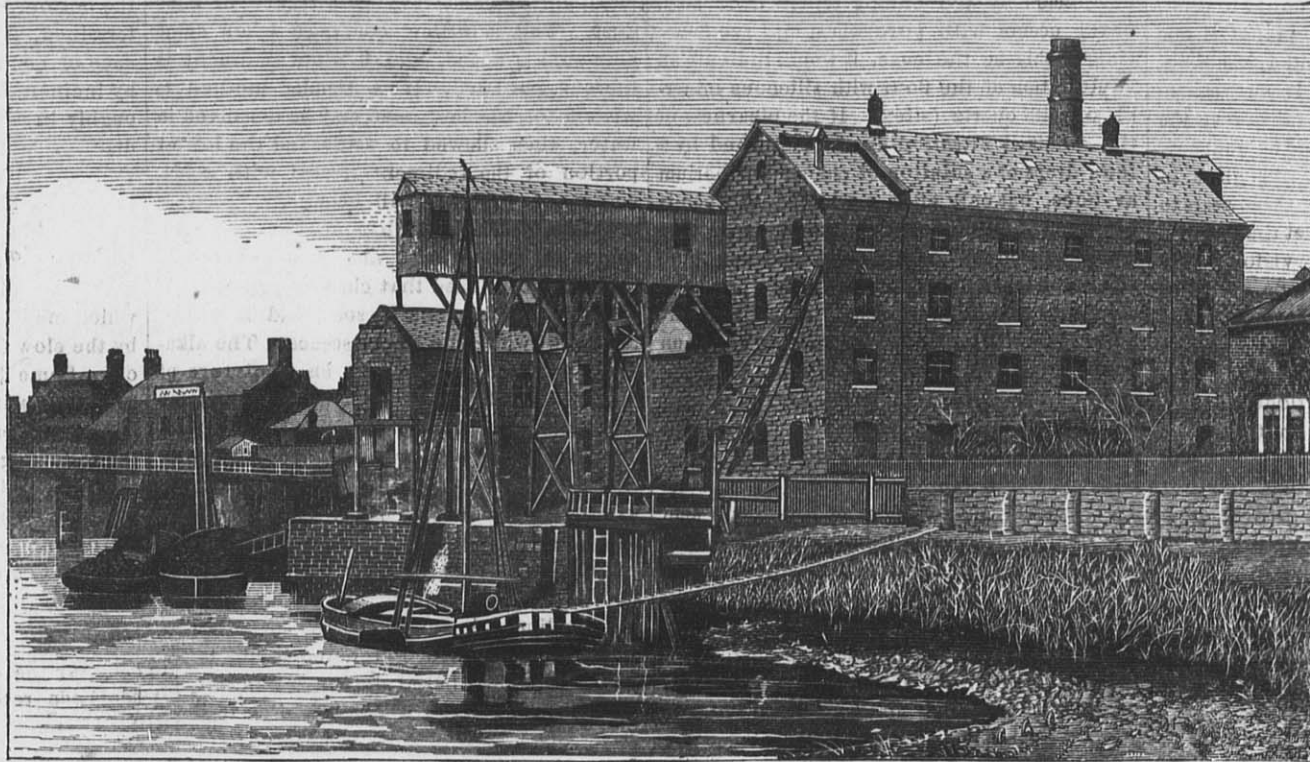
PARIS, October 22.—There is a palm tree in South America *Papaya Carica*, which possesses very remarkable properties. Its sap is a very powerful digestive agent. Digestion is a very complex act. Meat is digested in the stomach; feculas, already modified by the saliva, achieve their transformation in the intestines, while fatty matters are only digested in the intestine. Hence, the explanation why some persons can digest meats and eggs without difficulty, while their stomachs are rebellious to feculent and fatty substances. Individuals on the other hand, who cannot eat veal, can partake of fatty preparations and pastry without inconvenience. Thus each

absolute, but it does not follow that the laws of the school are false, because exceptions to these laws can be adduced. The general ideas respecting nectaries, and the matters they secrete are, that they have for their object the furnishing to insects of a saccharine matter which attracts them, and thus compels them, unconsciously, to directly fecundate or cross the flowers. The latter would be destined to gather and protect the nectar, to attract by their colors and their perfume, the insects, and affording them a passage in such a manner, that in penetrating into the corolla, they will deposit on the stigma the pollen with which they are charged. This view has numerous exceptions, as some plants—the *vicia*—are visited by insects for their nectar before even being in flower. A flower deficient in color can still entice insects by its odors. Nagel for example attracts bees on artificial flowers coated with odoriferous honey; when the latter had been consumed, the bees disappear. M. Bouvier took four square pieces of different colored stuffs, coated them with honey, and spread them on the grass; the bees came and sucked all the same, regardless of the color, and flew away when

Birds; of those birds that we know, that we love, which interest all ages, even infancy. About sixty species are noticed, and what is certainly new, the drawings are all from nature. The authors are very severe on the inhabitants of Southern Spain, of Corsica and Italy, for their massacres of feathered friends; they slaughter with the coldest cruelty, some of the most charming species seeing in them nothing but game. The havoc is more terrible as it is by these regions the migrations pass. The Italian markets are encumbered with robin red breasts, larks, red wings, finches, and thrushes; the nightingale is a good take also, and even young swallows. The chapter on the tom-tit is peculiarly interesting. This bird is a veritable acrobat, and executes gymnastic feats on the extremity of a leaf with a marvelous dexterity—a combination of the monkey and the squirrel, but its play is hunting all the while for the eggs of caterpillars, bugs, and spiders. It is terribly cruel if caged with a weaker bird—will kill it in order to suck its brains. As a parent it is kind, and it cracks hard seeds and grain affectionately for its young. The hawk is the only bird of which

tom-tits have a mortal dread.

Messrs. Cerbeland & Dumont publish a volume of 600 pages of a work treating on the industries of France, and deploring that, while there is no falling off in point of intelligence on the part of the French artisan and manufacture, they are being cut out of their own market by the foreigner. The French are not sufficiently speculative and are timid to change old plans for new. In the matter of coal, France ranks only fourth in the production of that combustible—on a par with Belgium, though she is not deficient in coal mines. England produces as much coal as all the nations of the world together. Excepting in iron, France has to depend on the foreigners for her supply of the other metals, although she is comparatively rich in them herself. It is an English company that works the chief iron mine at Bone, in



SELBY FLOUR MILLS, YORKSHIRE.

organ has its role, and on their state of health depends the integrity of digestion. Inhabitants of cities suffer most from dyspepsia, that is, from an alteration of the digestive ferment. It is to this latter class of sufferers, that Messrs. Wurtz & Bouchut have investigated the action of the *Papaya*. The latter gentleman has experimented with the preparation since two years, and with success, in the hospital for sick children. The papaya is more generally known in America as the "melon tree;" the fruit is rose colored, sweet, and is eaten like an ordinary melon, the trunk and the veins of the leaves contain a bitter, milky sap or juice, which, after a short exposure to the air, emits an odor resembling rotten cabbage. The sap exudes when an incision is made in the trunk; it immediately coagulates, and separates into two parts, a more or less soluble pulp, and a limpid colorless serum. Now if this juice in its natural state be placed in contact with raw meat, fibrine, the white of eggs, or gluten it will soften these substances in a few minutes, and in some hours dissolve them at a temperature of 40 degrees Centigrade. Milk is rapidly coagulated by the juice, and its caseine precipitated and dissolved. False membranes from croup, and intestinal parasites, as the tape worm, &c., are similarly disposed of in a few hours. If a beefsteak be cut up in morsels, placed in a saucer containing some papaya juice, they will be seen to gradually disappear, to melt away as if they were lumps of sugar. Clearly the papaya contains a ferment resembling that peculiar to carnivorous plants, as the drosera, nepenthes, &c. Vegetable pepsine is not exactly a novelty, but that in the sap of the papaya is stronger than what is secreted by the stomach, and possesses this superiority, that it can dissolve nitrogenous matters not only in presence of a small quantity of acid, but even in a neutral medium, or one slightly alkaline. While weak digestions have reason to rejoice, it is not less important to bear in mind the efficacy of the preparation in the treatment of croup and of tape worm.

M. Gaston Bouvier has written a most interesting essay on the nectaries of plants. His aim is to invalidate the conclusions of the Darwin school; if he has failed in this, he has not the less produced many remarkable facts. The Darwinists may have erred in being too

the honey had been consumed. But insects not the less knew such and such a flower has colors indicative of a nectariferous corolla. M. Sachs says: an insect visits always a certain flower in the same manner. Bees, if a flower be closed, will tear or perforate it, in order to arrive—ever in the same direction—at the nectary. Some flowers, the geranium, digitalis, &c., are visited for their nectar after the fall of the corolla. Insects too large to penetrate into certain flowers, perforate them to reach the nectar. Such insects are not agents of fecundation—but all insects are not adapted for this latter function to all plants. The secretion of nectar varies with the weather, and following the hours of the day. If the weather be fine, the volume secreted diminishes from the morning, is least at noon, augmenting towards the night. Certain species of plants may have nectar in one country, as in Norway, and none in the other, as in France. The humidity of the air and soil increase the emission of saccharine juice, and the latter is most productive at the moment of pollenization, and in proportion as the sugar diminishes the glucose augments. The latter feeds the ovary, which changes and swells into fruit. This alteration in the saccharine matters is due to a ferment, which acts in the same manner as the leaven of beer. M. Bouvier agrees with Bravais, that plants can re-absorb their secreted nectar.

Professor Sachardo, of Padua, continues his interesting experiments of artificially coloring the corolla of flowers. There is nothing new in the plan, but the matters employed are original. He simply causes to drink certain colored solutions—analine chiefly, which, penetrating the tissues, modify color—in fact dye the nervelets and veins of the corolla. Gardeners, are aware, that, by mixing iron filings with the soil around hortensias, the latter receive a blue tint. The roots of pansies, and stocks, dipped in a solution of green analine, become colored in their flowers in fifteen minutes. But the plant dies in the course of a week. Watering the soil with a colored solution does no good, as the earth absorbs the coloring material.

Messrs. Rambert and Robert are bringing out a magnificent serial publication of what I might call the natural History of Familiar

Algeria.

The preservation of the sight is engaging much serious attention. Professor Javal is not far from considering that defective eyesight is due to the bad lighting of school-rooms, hence the importance of the subject, when France intends erecting thousands of new primary schools. As general rules, the light should never strike the pupils' eyes directly; it ought to enter the classroom by laterally, and by windows built on a north-west and northeast axis, inclining if possible rather to the latter. The healthy eye requires no protecting glasses, save when traveling across glaciers or in countries full of too brilliant sunshine. The eye has a wonderful power of adaptation, thus the light of the sun is about one million times more intense than that of the full moon, and yet the eye can distinguish objects by the light of either orbs. The variations in the diameter of the pupil contributes something to this power of adaptability. It is in the retina that the sensibility of the eye resides, and which produces the faculty of contraction and expansion following light and obscurity. Reading a book under the direct influence of the sun's rays, will invariably end by producing blindness, and for a time, prevent seeing in dense obscurity. The houses in Madrid are so protected from sun-light by shutters half closed and blinds entirely drawn down, that persons entering such apartments directly from the street can perceive nothing for eight or ten minutes, while the occupants can see quite well. Insufficient lighting is more injurious for children than adults. The pupils of the latter are less dilatate, thus compelling immediate abstention from work when darkness sets in. Also grown-up persons generally patronize glasses, and, if not short-sighted in youth, they rarely contract the infirmity in advancing years. It is an error to suppose that the number of windows in a school ought to be proportioned to the number of scholars. Artificial light is a cause of fatigue for many persons, as it entails a greater dilation of the pupil. The difference in intensity between natural and artificial light can be seen in the burning of a lamp during full day. A lustre with one million of candles would still be very inferior in illuminating a room to the direct light of the sun. A well-known

tour cannot work by day unless the shutters be closed and the lamps lighted; this is owing to the action of the chemical rays and that yellow glasses ought to remedy. After every eclipse of the sun, oculists have an increased number of patients, who have injured their eyes by looking through imperfectly smoked glass. In one of the railway termini of Paris, when the electric light was first employed, there was a general out-cry against its "effulgency." When it was replaced by gas, the complaints were equally loud by the employes that they were plunged in Egyptian darkness. The fatigue resulting from working by artificial light is not due to the dazzle of the flame, but to the inadequacy of the light it emits.

Surgery can justly boast of a new conquest: when an eye is severely wounded, the healthy one is in danger of being impaired by "sympathy;" to preserve the good eye, it was hitherto the practice to remove the injured one. Dr. Boucheron has discovered that, by cutting the ciliary nerves, the "sympathy" is stopped, and thus dispenses with the necessity of removing the injured organ. Forty surgeons have thus operated successfully.

Jupiter at present shines with astonishing brilliancy, yet its light is not peculiar to itself, it is reflected. That colossal planet is 309 times heavier than our earth, and 1,230 times its superior in volume. Were it surrounded by a vast ocean, a steam-ship sailing at the rate of fourteen knots an hour night and day, while able to make the tour of our globe in three months, would take nearly three years to circumnavigate Jupiter. And yet the leaf of a tree can obscure him from our vision; a fly alighting on the glass of a telescope seems to swallow him. After Venus, Jupiter is the most brilliant of all the planets; his diameter is eleven times greater than the earth's, and his surface equal to 114 of our globe's. And yet the diameter of Jupiter is ten times less than that of the Sun's. The materials of which Jupiter is composed are lighter than those of our earth's, but attraction being greater, they weigh more heavily. It takes Jupiter nearly 11 years and 11 months to revolve round the sun, yet its diurnal rotation is effected in ten hours—five hours day and five hours night. There are no seasons in Jupiter; all is an eternal Spring, and four moons marry their light to illuminate him. If inhabited, it must be by extra-terrestrial beings.

Minnesota News

The figures show that the product of flour during the milling year, ending with October 1st, is equal to 1,300,000 barrels, an amount in excess of the preceding year by over 300,000 barrels. So competent and practical a miller as is Mr. Chas Pillsbury estimates that the additional amount has involved the labor of at least seventy-five men in and about the mills, not including the coopers. The starting up within the week of two additional mills will give employment to not less than sixty more millers. There has been in the interim of the year no increase in the wages of men of that class, nor in their reason to believe that there will be. Millers are by far the best paid mechanics in the city. The statement holds good in every grade of that class.—*Minneapolis Tribune.*

The warehouses and mills of Red Wing received 10,000 bushels of wheat and 2,000 of oats on Thursday, about one-half of the wheat being stored with the expectation of doubling in price by spring.

A forty five thousand bushel elevator has been commenced at Le Sueur.

In the United States circuit court in Pittsburgh, Pa. Judge McKennan delivered the opinion in the case of ex-Gov. Washburn, of Minnesota, vs. the Artisans Insurance Company of Pittsburgh. This was an action to recover a policy of insurance on plaintiff's flouring mill in Minneapolis. The primary cause of the loss was a destructive fire on May 28, 1878, which communicated with explosive matter in the mill. An explosion ensued and the entire premises were consumed. The point at issue was, whether the loss was caused by fire or explosion. The opinion rendered says when an insured structure is attacked by fire, in the progress of which the ignition of an explosive substance is involved and its destruction thereby accelerated or rendered more complete, the loss is just as attributable to fire as if the result had been effected by unaided gradual combustion. Judgment was entered in favor of plaintiff for the amount of policy and interest, \$2963. Judgment was also entered for \$1650 in a similar suit against the Pennsylvania Insurance Co.

Subscribe for the U. S. MILLER; \$1 per year.

GRAIN.

Peculiarities in its Normal and Manufactured State.

An Investigation Under the Microscope—Showing the Adulterations and Natural Evils to which It has been Subjected.

A COMPLETE INVESTIGATION OF THE SUBJECT BY ONE OF THE LEADING CHEMISTS OF EUROPE.

Flour in General—Wheat Flour—Rye Flour—Barley Meal—Oat Meal—Indian Corn—Rice Meal.

[Translated from the German of Dr. Herman Klenke expressly for the UNITED STATES MILLER.—cuts reproduced by our special engraver from the original.]

[Continued from November number.]

This mass will dissolve almost completely in distilled water if the flour was pure, and only a few flakes will remain undissolved and cloud the solution. If this solution is filtrated and muriatic acid added to the residue, a considerable quantity of nitric acid will develop itself besides carbonic acid; turbidness, which disappears by the adding of muriatic acid, never occurs with pure wheat and rye flour; should this be the case, it would indicate an adulteration of the flour with siliceous mineral, or with quartz (silex). If the clearness of the acidified filtration is not disturbed by a few drops of a solution of chlorine of barium at once, but only after a while, and then is but faintly affected by it, the flour is free from sulphurous admixtures, because pure wheat and rye flour contain only very little sulphuric acid in their ashes. (An entire kernel of rye will yield 1.6 per cent of ashes on an average, and in them are only 0.17 per cent of sulphuric acid, consequently 100 per cent of rye will contain only 0.0027 per cent of sulphuric acid; a whole kernel of wheat will yield 1.96 per cent of ashes on an average, wherein 0.2 per cent of sulphuric acid are contained, consequently in 100 there are only 0.039 per cent of sulphuric acid.—May and Ogston). Vohl's process is as follows: At least 10 g. of the flour are thoroughly mixed with 20 g. of nitrate of potash and a teaspoonful of this is put into a capacious vessel of platina which has been placed upon a lamp-stand, and the mixture is then ignited with a red-hot wire. To ignite it by applying heat externally is not advisable, because the glowing mass is then liable to be scattered about. After it has detonated, another portion of the mixture is added, and so on until all has been used. After having cooled off, the ashes are tested chemically as to the separate substances. Vohl has been able to prove even 1-10 per cent of an adulteration by minerals with certainty by this method. Since always some, and often a large portion of the glowing mass is scattered about during the operation of detonation, the method can not be applied in determining quantity, and, besides this, it is disagreeable, since there is considerable danger of burning one's self, and one must therefore be well on the guard while the dense smoke developed thereby is highly oppressive, and the detonation must therefore take place out doors or under a chimney having a good draft. Furthermore, a vessel of platina is always required, for should a skillet of porcelain be used, the melted mass would contain silicic acid and clay, and a sudden raising of the temperature would cause the skillet to crack; but a skillet of wrought iron might also answer the purpose. These circumstances will probably prevent the method from becoming universal, and render it applicable only for those having had practice in laboratories. If one wishes to undertake a general examination of the ashes of flour in about 1½ hours and with less incommodity, we recommend the following process: 2 g. of flour may quite well be reduced to ashes in a skillet of platina in course of an hour, so that the ashes do not alone remain a pure white, but will also not yield a carbon-like residue when treated with acid; it is only necessary to keep the temperature as low as possible in the beginning. The only time required is that occupied by the weighings. If the ashes constitute more than one per cent, the adulteration is already proved, for pure flour does not contain a full per cent on an average. If the ashes are soluble in diluted muriatic acid, which process is accompanied by effervescence, the fraudulent admixture is chalk; but if it will not dissolve therein, but will dissolve in heated concentrated muriatic acid, and if then, while cooling off, fine needles are separated from the solution, the admixture is gypsum. If the ashes will dissolve neither in diluted nor in concentrated muriatic acid, but when moist-

ened with the muriatic acid will give the flame a green color, the admixture is baryta; if none of the reactions mentioned take place, quartz or clay have been added. For a qualitative test the most reliable and most quickly done is the test with chloroform, which does not at all change the flour chemically, and the special process of which we shall state later. If one wishes to examine the flour chemically as to the presence of a certain substance, the following methods may be applied: In the first place, the gluten is separated from the suspected flour in the well-known manner, and the milky liquid is collected in a liquor or champagne glass tapering at the bottom. The mineral, heavier components will settle first; after a few hours the liquid above the sediment that has formed meanwhile is poured off by laying a small glass tube at the rim of the glass out of which the liquid is to be poured and letting this run down the tube; now the sediment is carefully taken out and dried. If the point of this cone (that is the lowest portion of the sediment) is burned to ashes and muriatic or nitric acid added, the result will be an effervescence showing that phosphoric or carbonic lime is present. The phosphoric lime betrays the presence of bone dust. This is further confirmed when some ammonia is added, and a white sediment is thereby generated. If a simpler method is wished for, the flour need only be dissolved in water, then allowed to settle, and the lowest portion of the sediment treated with acids, and an effervescence will betray the presence of lime (chalk). If flour is kneaded with somewhat moist hands, and resistance is felt, it may be concluded that chalk is present. If water, and subsequently some acid is added, the result will be an effervescence. The alkaline reaction also discloses an admixture of lime, if the dough and the water it contains are tested with lacmus lime. Pure wheat-flour will give a very pale reddish color to the lacmus paper; lime, on the other hand, will color red lacmus paper blue. To find with absolute certainty the presence of gypsum (sulphate of lime) in flour, it must be tested as to the presence of sulphuric acid and of lime. A small quantity of flour is boiled with distilled water, the liquid is filtrated and distributed into two small test-tubes. Into the one a solution of nitrate of baryte is poured, drop by drop; into the other oxalate of ammonia. If the liquid becomes whitish in the first tube, and if this turbidness will not disappear when a few drops of pure nitric acid are added, it contains sulphuric acid. If a whitish turbidness was likewise perceptible in the second tube, caused by the oxalate of ammonia, and if this turbidness will not disappear when some acetic acid is added, there is lime present, consequently in both sulphate of lime (gypsum). A sample of the flour may also be burnt to coal in a small crucible, and, when red hot, the gypsum contained therein will decompose; if a few drops of muriatic or nitric acid are now added, and sulphurated hydrogen escapes thereby, which is discernible by its odor, this betrays the presence of decomposed sulphate of lime. A simpler method of examination is to dip the thumb and forefinger in sweet oil and then to rub flour between them. Pure flour will not adhere to the fingers, but it will acquire a darker color; if it contains gypsum, however, it will adhere like mortar, and change its color but little. The following is a simple process by which mineral admixtures may be detected, and which may be carried out easily even by novices: A tablespoonful of flour is mixed with three to four tablespoonfuls of alcohol in a glass, and a few drops of muriatic or nitric acid are added. If an effervescent of carbonic acid ensues, there is chalk in the flour. Gypsum, baryte or clay can not be detected in this way. To ascertain their presence, a knife's pointful of flour is put into a test-tube (reacting glass) together with a 10 ccm. of concentrated nitric acid; when thoroughly mixed, the glass is heated over the flame of a spirit-lamp; the flour will dissolve in the acid and settle as yellow flakes on the upper rim of the glass; the mineral admixtures will sink to the bottom. The sediment is collected by filtration, washed out with water, boiled in water, then again filtrated, and now the liquid is examined in portions. If one portion will produce a white precipitate when treated with a solution of chloride of barium, which would indicate the presence of sulphuric acid, and if another portion when treated with a solution of oxalate of ammonia will also produce a white precipitate, which indicates the presence of lime, there is gypsum (sulphate of lime) in the flour. To detect the presence of clay or baryte which were not dissolved in the water,

some of the residuum which had previously remained undissolved is put upon a tin of platinum or into a small skillet of porcelain, tipped with half a drop of a solution of cobalt, and the powder heated over the flame of a spirit-lamp, or by means of a soldering pipe; if the mass is colored blue, this indicates the presence of clay; if it does not change its color, it indicates the presence of baryte. Half a tablespoonful of flour may be shaken up well in a high champagne glass tapering at the bottom with five times that quantity of chloroform, whereby a milky liquid is produced which remains diaphanous, however; 20 to 30 drops of water are then added, shaken up well, and then it is left alone. The flour, the specific weight of which is less, will slowly rise to the top, and there collect, the heavier mineral substances will sink to the bottom; if some of the flour still adheres to the glass, its separation from it is assisted by stirring it with a glass tube.

The upper layer of the flour is finally taken off with a small spoon, which is facilitated by previously mixing it with 10 to 15 drops of muriatic acid, whereby it is reduced to a jelly-like mass. The mineral substances lying at the bottom are then likewise examined and determined, as has been stated above. The presence of common salt in flour may be detected by incinerating it and boiling the ashes thoroughly in a vessel of glass or porcelain with distilled water, then filtrating it and adding some dissolved nitrate of silver, drop by drop, to the liquid obtained. If a reddish, caseous, white precipitate is produced, which will not disappear after a few drops of nitric acid have been added, there is common salt present, which may be again obtained in crystal cube by the slow evaporation of the liquid in a saucer. Some dealers in flour mix their poorer grey flour with alum, so as thereby to make it appear whiter. The means of detecting it are the following: The flour is grated in a mortar with distilled water, and the solution is then filtrated. This liquid already betrays a slightly astringent taste, and if a few drops of chloride of barium are added, a white precipitate is produced which is insoluble in nitric acid; but, if ammonia is added, a white, flocculent precipitate will be formed, which will again dissolve in water having a considerable admixture of kali. Admixtures of baryte (sulphate of baryte) and silica may be detected as follows: If neither sulphuric nor muriatic nor nitric acid will exercise any influence whatever on the ashes of the flour, the amount of the ashes however awakens suspicion, they may be boiled for a longer space of time in a solution of carbonate of natron, whereby the loss of the water evaporating is occasionally repaired by a supply of fresh water; the undissolved residuum is then united with diluted muriatic acid after the liquid has been poured off, and then this liquid is tested with sulphuric acid. A white precipitate betrays the presence of baryte. But if the liquid that has been boiled and acidified with muriatic acid leaves an insoluble white powder after evaporation and after having been again dissolved in water, this is silicic acid. In all of these cases, when mineral substances have been used for the adulteration of the flour, the microscope furnishes clear proofs, and with the aid of chemistry the kind of the mineral must, if necessary, be determined in the manner prescribed. We have dwelt more minutely on the examinations of wheat-flour and its adulterations, since what has been said in this case is applicable also to other grain-flours. Since similar cases have to be examined in treating of the kinds of flour which will now follow, such as have been described already when speaking of wheat-flour, may be referred to to avoid repetition.

[To be continued.]

ANIMAL RUBBER.—An insect which produces a species of India rubber has been recently discovered in the district of Yucatan, Central America, by an American explorer. It is called Neen, and belongs to the Coccus family; feeds on the mango tree, and swarms in these regions. It is of considerable size, yellowish brown in color, and emits a peculiar oily odor. The body of the insect contains a large proportion of grease, which is highly prized by the natives for applying to the skin on account of its medicinal properties. When exposed to great heat the lighter oils of the grease volatilize, leaving a tough wax behind which resembles shellac, and may be used for making varnish or lacquer. When burnt this wax produces a thick semi-fluid mass, like a solution of India rubber, and it is expected that this glutinous liquid will be very valuable for cement and waterproofing.

Scientific Facts.

CAPT. BOYTON'S NEW DEVICES TO SAVE LIFE FROM THE PIERS, AND TO THROW A LINE FROM A SHIP.—The following are from Capt. Boyton's statements, as extracted from the New York Sun:

"My invention is simply this: Here is a wooden bobbin, to which 60 feet of the strongest Manilla line is attached by one end, and a four-pronged steel grappling iron fits in the hollow part of the wood. The whole is enclosed in a leather case, and does not weigh a pound. If every policeman on duty had one of these, the saving of persons from drowning in the rivers would be lessened 80 per cent. If the person in the water accidentally fell in, the officer could hold the grappling iron in his hand, and throw the bobbin, which floats, out to the struggling person. If the case was one of attempted suicide, or where the person was too drunk to make any effort to save himself, he could throw out the grapple, and haul him in. I propose to give the police force of this city and Philadelphia the right to manufacture these for themselves; and, I suppose, they can make them for fifty cents a piece.

"My other invention is equally simple: When a ship is driven on a lee-shore, and her back is being broken by the sea beating against her, the efforts of the coast-guard to throw a rope on board by means of a rocket or mortar frequently fail, owing either to the wind coming into the shore blowing the rocket back or to one side. Now, here is a box, four feet by three, which can be easily placed under the table in the cabin of any vessel. It contains a long, fine, strong line attached to a rocket, of peculiar construction. The ship is driven on shore, and the coast-guard men are there, unable to establish communication between the vessel and the land. The captain brings this box on deck, opens it, and adjusts the rocket to the angle of the box cover, and fires it off. The rocket, by its own force, and that of the wind blowing in shore, is carried to land. In addition to the tail of fire shown by its passing through the air, the rocket on falling on the ground bursts, and burns a brilliant red light for ten minutes. This is seen by the coast-guard men, who fix the cable to the line and it is thus hauled aboard, and the crew saved." A common felt-hat may be made use of as a life-preserver. Place the hat upon the water rim downwards, and with the arm around it, pressing it slightly to the breast, the compressed air within will sustain a man for hours."

RELATIVE HARDNESS OF WOODS.—Taking shell bark hickory as the highest standard of our forest trees, and calling that 100, other trees will compare with it for hardness as follows:

Shell Bark Hickory.....	100	Yellow Oak.....	60
Pignut Hickory.....	46	Hard Maple.....	56
White Oak.....	84	White Elm.....	58
White Ash.....	77	Red Cedar.....	56
Dogwood.....	75	Wild Cherry.....	51
Scrub Oak.....	73	Yellow Pine.....	54
White Hazel.....	72	Chestnut.....	52
Apple Tree.....	70	Yellow Poplar.....	51
Red Oak.....	68	Butternut.....	43
White Beech.....	65	White Birch.....	43
Black Walnut.....	62	White Pine.....	30
Black Birch.....	62		

Timber intended for posts, is rendered almost proof against rot by thorough seasoning, charring, and immersion in hot coal tar.

ALTITUDE OF MOUNTAINS AND HEIGHT OF WATER FALLS.—The slide of Alpach, extending from Mount Pilatus to Lake Lucerne, a distance of 8 miles, is composed of 25,000 trees, stripped of their bark, and laid at an inclination of 10° to 18°. Trees placed in the slide rush from the mountain into the lake in 6 minutes.

The Alps comprise about 180 mountains, from 4,000 to 15,732 feet high, the latter being the height of Mont Blanc, the highest spot in Europe. The summit is a sharp ridge, like the roof of a house, consisting of nearly vertical granite rocks. The ascent requires two days, 6 or 8 guides are required, and each guide is paid 100 francs (4£). It was ascended by 2 natives, Jacques Belmat and Dr. Packard, Aug. 8, 1786, at 6 a. m. They staid up 30 minutes, with the thermometer at 14° below the freezing point. The provisions froze in their pockets; their faces were frostbitten, lips swollen, and their sight much weakened, but they soon recovered on their descent. De Saussure records in his ascent, Aug. 2, 1760, that the color of the sky was deep blue; the stars were visible in the shade; the barometer sunk to 16.08 inches (being 27.08 in Geneva); the thermometer was 26½°, in the sun, 29° (being 87° at Geneva). The thin air works the blood into a high fever; you feel as if you hardly touched the ground, and you can scarcely make yourself heard. A Frenchwoman, Mademoiselle d'Angeville, ascended in September, 1840, being dragged up the last 1,200 feet by the guides, and crying out, "If I die, carry me to the top." When there, she

made them lift her up, that she might boast she had been higher than any man in Europe. The ascent of these awful solitudes is most perilous, owing to the narrow paths, tremendous ravines, icy barriers, precipices, etc. In many places every step has to be cut in the ice, the party being tied to each other by ropes, so that if one slips he may be held up by the rest, and silence is enforced, lest the noise of talking should dislodge the avalanches of the Aiguille du Midi. The view from the mountain is inexpressibly grand. On the Alps, the limit of the vine is an elevation of 1,600 feet; below 1,000 feet, figs, oranges and olives are produced. The limit of the oak is 3,800 feet, of the chestnut, 2,800 feet, of the pine, 6,500 feet, of heaths and furze to 8,700 and 9,700 feet; and perpetual snow exists at an elevation of 8,200 feet.

On the Andes, in lat. 2°, the limit of perpetual snow is 14,760 feet. In Mexico, lat. 19°, the limit is 13,800 feet; on the peak of Teneriffe, 11,454 feet; on Mount Etna, 9,000 feet; on Caucasus, 9,900, feet; on the Pyrenees, 8,400 feet; in Lapland, 3,100 feet; in Iceland, 2,890 feet. The walnut ceases to grow at an elevation of 3,600 feet; the yellow pine at 6,200 feet; the ash at 4,800 feet; and the fir at 6,700 feet. The loftiest inhabited spot on the globe is the Port House of Ancumarca, on the Andes, in Peru, 16,000 feet above the level of the sea. The fourteenth peak of the Himalayas, in Asia, 25,659 feet high is the loftiest mountain in the world.

Lauterbrunnen is a deep part of an Alpine pass, where the sun hardly shines in winter. It abounds with falls, the most remarkable of which is the Staubbach, which falls over the Balm precipice in a drizzling spray from a height of 925 feet; best viewed in the morning sun or by moonlight. In general it is like a gauze veil, with rainbows dancing up and down it, and when clouds hide the top of the mountain, it seems as if poured out of the sky.

In Canada, the falls of Montmorenci are 250 feet high, the falls of Niagara (the Horse Shoe Falls) are 158 feet high and 2,000 feet wide, the American Falls are 164 feet high and 900 feet wide. The Yosemite Valley Falls are 2,600 feet high, and the Ribbon Falls of the Yosemite are 3,300 feet high. The waterfall of the Arve, in Bavaria, is 2,000 feet.

Useful Information for Engineers.

BY STEPHEN ROPER.

Rule for finding the horse-power of steam engines.—Multiply the area of the piston by the average pressure in lbs. per square inch; multiply this product by the travel of the piston in feet per minute; divide this product by 33,000, the quotient will be the horse-power.

EXAMPLE:

Dia. of Cyl.....	19 in.
Area.....	283.5 sq. in.
Average pressure.....	40 lbs. per sq. in.
Travel of piston in ft. per minute.....	300 ft.
78.55	
40	
3141.60	
3.00	
33000)942480 00	
28.56 horse-power.	

Rule for finding the horse-power of steam engines by indicator diagrams.—Multiply the area of the piston by its travel in feet per minute, and divide by 33,000; the quotient will give the value of one pound mean effective pressure, which, if multiplied by the total mean effective pressure, as shown by the card, will give the indicated horse-power.

EXAMPLE:

Area of piston.....	113
Travel of Piston in ft. per minute.....	333½
113x333½	
=1.141 H. P. value of 1 lb. M. E. P.	
33,000	36 M. E. P. as shown by card.
6846	
3423	
41.076 horse-power.	

Rule for finding the horse-power of locomotives.—Multiply the area of the piston by the pressure in lbs. per square inch, which should be taken at about ½ the boiler pressure; multiply this product by the number of revolutions per minute; multiply this by twice the length of the stroke; multiply this product by 2, and divide by 33,000, the result will be the horse-power.

EXAMPLE:

Dia. of Cyl.....	19 in.
Area.....	283.5 sq. in.
Stroke.....	24 in.
Dia. of wheels.....	34 in.
Running speed.....	2½ miles per hour.
Boiler pressure.....	130 lbs. per sq. in.
Maximum pressure in cylinders.....	80 lbs. per sq. in.
283.5x80x24x2x2½	
=81.6 horse-power.	
33,000	

Rule for finding the horse-power of steam fire engines.—Multiply the area of the piston (if double engines, multiply by 2), by the steam pressure in lbs. per sq. inch; multiply this product by the travel of the piston in

feet per minute, divide by 33,000, and .7 of the quotient will be the horse-power.

EXAMPLE:

Area of piston.....	50.2656 sq. in.
Steam pressure.....	60 lbs.
Travel of piston.....	250 feet.
50.2656	
60	
3015.9360	
250	
753984.0000	
60318720	
33000)753984.0000	
22.81	
.7	
15.967 horse-power.	

Rule for finding the required diameter of a cylinder for an engine of any given horse-power, the travel of piston, and available pressure being given.—Multiply 33,000 by the number of horse-power; multiply the travel of piston in feet per minute by the available pressure in the cylinder. Divide the first product by the second; divide this quotient by the decimal .7854. The square root of the quotient will be the required diameter of the cylinder.

Rule for finding the quantity of steam any engine will use at each stroke of the piston.—Multiply 6 times the area of the cylinder by ½th the stroke, and divide by 1728; the quotient is the cubic contents of the cylinder in feet; divide this quotient by the cut-off ½, ¼, or ⅓, as the case may be, the result will be the quantity of steam used at each stroke of the piston.

Rule for finding the cubic contents of a steam cylinder.—Multiply the area of the cylinder in inches, by the length of the stroke in inches, and divide this product by 1728. The quotient will be the number of cubic feet.

Rule for finding the horse power of wind-storms.—Multiply the area acted on in inches, by the pressure in pounds per square inch; then multiply this product by the speed in feet per minute, and divide by 33,000. The quotient will be the horse-power of the storm.

EXAMPLE: 2,007,244,800 square inches x 1.5 pounds pressure, x 5,800 ÷ 33,000 give as a result, 70,557,700 horse-power developed for each mile of breadth of the track of the storm.

Rule for finding the horse power of water falls.—Multiply the area of the cross section of the water fall in feet, by its velocity in feet per minute; this product will give the number of cubic feet flowing through per minute. Multiply this by 62½ pounds, the number of pounds in a cubic foot of water; multiply this last product by the fall in feet, and divide by 33,000. The quotient will be the horse-power of the water fall.

EXAMPLE: With a stream or flume 10 feet; depth, 4 feet; area of cross section, 40 feet; velocity in feet per minute, 150. Then, 40 x 150=6,000 cubic feet of water per minute; 6,000 x 62½=375,000 pounds of water per minute. 10 x 375,000=3,750,000 foot pounds of the water fall; 3,750,000 ÷ 33,000=113 7-11 horse power of water fall.

Rule for finding the contents of an elliptic or oval tank in cubic feet or gallons.—Multiply the long diameter in inches by the short diameter in inches, this product by .7854, and this last product by the height of the tank in inches, then divide by 1,728, and the result will be the contents of the tank in cubic feet, which if multiplied by 7.5 gives the number of U. S. gallons in the tank.

Rule for finding the cubical contents of a triangular tank.—Multiply the length of the base by half its height; multiply this by .7854, then divide the product by 1,728; the quotient will be the number of cubic feet, which, if multiplied by 7.5 will give the number of U. S. gallons in the tank.

GRINDING WHEAT BY GROOVED ROLLERS.—A German correspondent says the grinding of wheat by grooved rollers is getting more and more preference over the millstones everywhere where hard wheat is so bad. This is also the case in the United States, where in Minneapolis and Milwaukee, millers are going in heavily for the roller system; but for the breaking of wheat grooved chilled iron rollers will take the lead over other materials. Our correspondent continues: "The new mills of Governor Washburn, that of Messrs. J. A. Christian & Co., of Mr. Archibald, in Dundas, and quite a number of other mills in Minnesota and Wisconsin, are being erected on the pure Hungarian roller principle from the beginning of the grinding process to the end. I am fully convinced that in the next decade the Americans will be at the head of all milling communities, for even the Pesth mills although their system is very highly developed—are far behind the Americans, with their mill arrangements, their labor contrivances, and their finely finished machinery."—Cor. London Miller.

Terrible Explosion.

THE WASHBURN MILL AFFAIR OUTDONE—MILLERS SHOULD NEVER TAKE PILLS.

Living at the present day is an extremely dangerous business; so dangerous, in fact, that a prudent man feels hardly justified in undertaking it. Within the last few years our facilities for being blown up have increased to a frightful extent. Not only have the kitchen boilers and the gas-pipes made every man's house his own volcano, but substances which have been harmless for centuries have suddenly become explosive. A flour mill is now little better than a powder-mill. Starch explodes and blows buildings and girls into pieces, and our celluloid tooth-brushes are liable at any moment to scatter our teeth over an area of several square miles. There are reckless persons who wear celluloid collars and cuffs, thus taking their lives in their coat-sleeves and neck-ties, and there is little doubt that many of the men who mysteriously disappeared and have never been heard of afterward were blown into impalpable dust by a collar or cuff explosion. And now this general tendency to explosiveness has reached the apothecary's shop and the medicine chest; and we must henceforth live in dread of being blown up by quinine and shattered by rhubarb. A recent tragedy which occurred in England is the first pill explosion which has been reported, but the wide-spread diffusion of pills over the earth's surface renders it only too probable that other medicinal tragedies of the same general character will soon become painfully frequent.

An English physician was recently consulted at his office by a lady who was in need of certain repairs. He decided that pills were what her system really required, and he therefore gave her a large box containing six dozen pills, with instructions how to take them. Now it so happened that the lady had no pocket in her dress and carried no hand-bag. The question then arose how she should carry the pill-box. It is well known that, while nature has deprived women of pockets—the rudimentary organ popularly known as a woman's pocket is not a true pocket—she has given them two excellent substitutes therefor. One of these is the glove. On the inside of the female glove and adjoining the palm of the hand is an enormously capacious space for storage, in which a woman can and frequently does, carry money, cards, button-hooks, sewing materials, rubber overshoes, and quantities of other articles. The other receptacle is situated in the bosom of the female dress, and has never, as a matter of course, been explored. Its capacity, is, therefore, a matter of masculine conjecture, though it is known to vary in women of different races. Thus, it is believed that the average Western woman can carry several cubic feet of cargo in this receptacle, while the carrying capacity of a Boston school-teacher would be heavily taxed by a single visiting card.

The English lady in question placed the pill-box in her bosom, gave the doctor his fee, and returned to her home. Half an hour later, as she was seated in the library conversing with her husband, she blew up with a tremendous crash. Not only were the entire out-works of her dress destroyed, but she was so seriously injured that she survived but a few hours. As may be supposed, her husband was somewhat surprised, and he subsequently made inquiries which led to the discovery that the explosion was due to the pills. The doctor testified that each pill contained a small quantity of oxide of silver, and that this substance becoming heated had exploded, with the surprising and fatal consequences which the husband had remarked.

The assertions made by the doctor in regard to the pills may be partially true. Very probably the pills did contain that substance, and undoubtedly that substance, when heated to a certain temperature, will explode. The explosion of the English lady was not, however, due to the cause mentioned by the doctor. A temperature of at least two hundred degrees Fahrenheit is needed to explode oxide of silver, and it is very certain that no English lady ever reaches that temperature, even when provoked to the limit of human endurance. It is probable that the pills exploded not because they contained oxide of silver, but for some other reason, and it is our duty to ascertain what the reason was.

It is said that the lady had a dislike to large pills, and that the doctor therefore made the pills which subsequently exploded less than one-fourth the usual size. This may have been the cause of the explosion. Starch and flour when in large masses do not explode; and it is only when they are finely divided that

they assume explosive proclivities. The same may be true of pills. This, of course, is a mere hypothesis, but it is worth examination, and in the meantime prudent persons will do well to use no pills that are smaller than a good-sized marble.

Prudence also dictates the temporary isolation of pill-takers. The husband of the English lady cannot be too thankful that his wife's pills exploded before she took them. Had they exploded after having been swallowed, the result would have been very deplorable. Since it has been shown that pills will in some circumstances explode, no one should be allowed to take them within at least a mile of any human habitation. There should be a pill range provided within easy reach of this city, to which persons about to take pills could retire, and where they could remain until all danger of explosion had passed. Parents cannot be too careful to avoid chastising children within, say twenty-four hours after pill-taking. A boy containing three or four pills may be as dangerous as a can of nitroglycerine, and the blow of the parental cane may explode him, with consequences as disastrous as those which follow the explosion of a fifteen-inch shell.

Relation between the Grate Surface and the Heating Surface of Boilers.

The theory that for proper efficiency there must be maintained certain definite relations between the grate surface and the heating surface of boilers, so long held and persistently defended by engineers and boiler builders, has of late years suffered so many attacks as to be no longer tenable; yet even now there are many of its defenders who refuse to acknowledge the weakness of their position and take up the stronger one which is offered to them in the indisputable fact that the service of a boiler depends more upon the manner of its firing than upon any other special condition—complete combustion and slow consumption producing the best results.

In one way this fact is clearly demonstrated by the new style of locomotive in use on the Reading railroad for burning the hitherto useless anthracite culm. The dimensions of their common locomotive firebox are 60 and 66 by 32 inches; the new design is 8 feet 6 inches long by 7 feet 6 inches wide; the heating surface of the firebox is 106 square feet, and of the combustion chamber 26 feet, making a total of 982 square feet. The grate rest is between water bars to prevent them from burning out, and the area is 64 feet. The consumption of coal is only 16 pounds per hour per square foot of grate surface against 40 to 60 pounds in the ordinary locomotive.

The fuel remains perfectly quiet in the firebox, the consumption is slow, the steam is more freely made than in the common style of locomotive boiler, and no smoke or sparks (an assurance of complete combustion) are ejected from the smoke stack.

This is an instance of superior boiler service obtained with much smaller consumption of coal, and that of an inferior quality, per square foot of grate surface, than old practitioners would have deemed possible. Its success must lead to extensive trials in this direction and greatly modify general practice.

Not long since a protracted series of trials was made by a board of experienced engineers to determine the relative value of as great a departure in an other direction from the common practice of firing—the reduction of a stationary boiler grate surface from 17 square feet to 3 square feet, and the burning of a larger portion of the coal, reduced to a fine powder and injected on a current of air into the heated firebox, instead of consuming it all on the grate.

To begin with, most careful conducted and repeated trials were made with Cumberland lump coal burned in the usual way on the full grate surface, 17 square feet; then, with the surface reduced to 3 square feet, the new process was repeatedly tried, in which 40 per cent of the coal was consumed on the grate, and 60 per cent injected over it and burned in the powdered condition.

The results showed an average gain in the calorific value of the coal of 30 per cent in favour of the new method, and the thoroughness of the combustion was evinced by the total absence of smoke escaping up the stack.

In one of the instances the grate surface was relatively to the boiler, very much larger, and in the other very much smaller than was before used, and in neither case was the calorific value of the fuel, or what in this connection amounts to the same thing, the service of the boiler, dependent upon the relative area of the grate, but entirely upon the conditions—widely unlike as they at first sight appear, yet the same

in principle—that assured complete combustion and slow consumption.

In the one case a much less weight of coal is consumed per hour per square foot of grate surface, and in the other a very much greater than is done in common practice; and yet both methods are found to lead to the same point.

The ratios of 25 or 30 to 1, as representing the relative areas of heating and grate surface in common practice, refer only to the best conditions obtained by the ordinary method of firing, which generally implies extreme waste of fuel: there is no direct relation between them.

The new methods of mechanical stoking—gradually sprinkling fine coal over the fire surface, feeding the fire from below, etc.—are all opposed to the idea, as are also the radiating brick arch over the fireplace, the use of the steam jet for blowing the fire, the two fire boxes, consuming the smoke by their alternative action, and several other approved devices which are growing into use.

The manner of firing on which the old theory was based is too expensive in these times; new methods, each with special conditions and advantages, will be gradually substituted, and the most profitable investigations for steam engineers will be into the conditions most favorable for the highest economy in fuel and labor and the least dependent upon the unskillful fireman.

The Manufacture of Millstones in Germany.

Now that scarcely any millstones are in favor except French burr, the following account, written forty years ago, will be read with interest.

In the province of the lower Rhine, and at about ten miles from Coblenz, is a small town called Andernach, the principle part of whose trade is in millstones procured from the quarries of Nieder-Mendig, not far from Andernach. These quarries have supplied Europe with millstones for upwards of 2,000 years. They are dug from a rock of very hard porous lava, about five miles in length and 3 in breadth, which is supposed to be the product of an extinct volcano in the neighborhood.

About half a mile from Nieder-Mendig is an extensive plain called Hacher, where the principal quarries are situated; these are seven in number, and the average depth is 50 feet. The workmen are divided into four classes: 1, the miners, who get out the stones; 2, the lifters, who elevate them to the surface by means of machinery; 3, the cutters, who bring the stones to the required shape; and 4, men who pile the stones in heaps, or assist in loading vehicles which are to bear them away.

The appearance of the quarries is exceedingly remarkable. The shaft, if such it may be called, is a kind of inverted cone, or, more properly, a funnel without its stem. At the top this funnel is about 25 feet in diameter, at the bottom about 12 feet, and in depth 50. A narrow path winds spirally round this shaft, by which the workmen ascend and descend. This path is so easy that it is not uncommon to see children amusing themselves by running up and down.

The shafts are all formed artificially, and as but little machinery or capital is employed to sink one, it is usual for four or five poor families to unite their means for the purpose of sinking the shaft. Patience and persevering labor constitute the capital of these industrious laborers, and in sinking the shaft both are indeed required; for 50 feet must be dug through before the smallest return can be obtained for their labors. The workmen have to dig through a stratum consisting chiefly of gravel and masses of lava. They at length arrive at a layer of hard, blackish, heavy stone, regularly porous, and yielding sparks when struck with iron. This is the millstone, and requires good and well prepared tools to work it. The rocky bed of stones is fortunately not solid through its whole extent, but is separated into large masses, so that numerous cracks are formed, into which the miners insert wedges and levers, and break away masses which enable them to form millstones 4 or 5 feet in diameter. These cracks were probably formed by the solidification of the melted lava in very remote ages in the history of the earth. If the stone were regularly solid, it could not possibly be worked by the simple apparatus of these poor peasants.

These quarries have been so industriously worked, that numerous galleries have been formed, the roofs of which are supported by prismatic pillars of millstone. The appearance of the quarries is vast, imposing and picturesque, and the pigny appearance of the workmen seen from above heightens the effect.

The stones are brought to shape by means of hammers and chisels. A deep socket is cut through the middle of such stones as are intended for runners, or upper stones. The furrows on the surface of the stone, before alluded to, are produced by means of a double-edged hammer, weighing 14 pounds.

When the stones are properly cut and ready for exportation, they are sent down the Rhine upon the immense timber rafts which are annually sent to Holland. The principal seat of the millstone commerce is Andernach; but a considerable traffic in the article is carried on among the numerous small towns and villages in the neighborhood of the quarries. At Andernach, the numerous small rafts of timber, with their millstone cargoes, are united into one enormous raft, upon which houses of tim-

ber are erected on two sides, so as to form a street, and as many as 500 travellers are thus accommodated, who prefer or are compelled to adopt this cheap but rude mode of conveyance. When the raft arrives in Holland, it is broken up, and the timber alone often sells for many thousands of pounds. The millstones, and other articles of commerce which have been brought down on the raft, are distributed in various quarters according to the demand from different places.

Mechanical Make-Shifts

So long as "Chordal" continues to "leak information," we shall occasionally present a few "drippings." He says, in the *American Machinist*: Among the saw-mills of the West could be found many triumphs of unlettered genius. There were few real mechanics in these mills, shops hundreds of miles away by wagon road, and accidents always happening. The stop-valve on the engine gives out, but the mill must run while a new one is coming. A brake is put under the fly-wheel to slow the engine, and a stick of cord-wood thrown under the connecting rod stops it. Rod boxes and cross-head "brasses" of oak were common. A slide-valve of black-walnut was found once in a while. Oil gives out and water is used till a hog is killed. The saw gets sprung, and the factory wants thirty dollars to exercise the saw maker's magic art upon it, and the mill would stand still three weeks. The backwoods sawyer straightens it in an hour, without knowing just how he did it. The cylinder gets cut, and the negro engineer bores it out with a grate-bar. I saw him doing it. Flange joints are made with white sand mixed with the white of an egg, and the main belt is spliced with bark. A boiler wanted new fire-box and tubes. The negro engineer undertook the job. He never saw the inside of a boiler shop, and never saw a piece of machinery outside that mill, but the owner had sent him for iron, tubes and rivets, and the man had gone to work in his own way. When I happened in that section, he was boring the tube sheets. His special tools were a four-by-four scantling and a five-eighths bolt. All these mills have a ratchet drill. He laid off and drilled the center holes, put the bolt through the hole and scantling, as a lever, walked round and cut the holes, feeding by driving on the cutter. I was interested enough to caliper some holes already done and found them as good as the ordinary boiler shop job. I am satisfied the fellow finished the thing up in good shape. An educated or skilled mechanic would never have attempted to do this work in the woods.

Some men seem to be deficient entirely in power for devising make-shifts, or in adaptability to novel circumstances. I was told of a well-educated engineer who found himself fifty miles from port with a broken vacuum gauge. He showed utter helplessness, and proposed immediate return. His assistant was a shovel engineer. He saw nothing amiss in a broken gauge, or in the absence of one. He traded places with his chief, and made the trip by sense of feeling. When his condenser felt too hot he gave her more injection. We are told of a party of royal astronomers who went into the northern regions to make observations. The expedition was an important one, but the weather was so severe that the mercury forming the artificial horizon was frozen, thus rendering their instruments useless. They gave it up and came home without the idea of a lamp under the mercury having occurred to them.

Died.

Walter Derwent, of Champaign, Ill., one of the proprietors of the Derwent flouring mills, died Oct. 31, 1879, of typhoid fever. He was a Master Mason of the Star of the East Lodge, No. 166 A. F. & A. M. He leaves a family consisting of a young wife and one child.

James Lichty, miller, Goshen, Ind., October 28th, 1879.

Edward Forman, engineer in Alexander Morman's flour mills, at Allinville, Ill., Oct. 21, 1879. Cause, boiler explosion.

The steamship Great Eastern is to be fitted up with new boilers and machinery at a cost of £140,000, to carry cattle between London and Texas. She is capable of holding 2,000 head of cattle and 56,000 head of sheep.

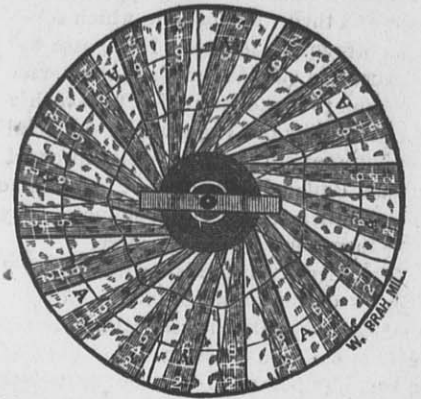
THE UNITED STATES MILLER has the largest circulation of any milling journal published in America, and was the first milling journal started in America entirely independent of connection of interest with some machine or mill-furnishing establishment.

LEHMANN'S

IMPROVED METHOD OF

TRUING THE FACE

MILL STONES.



After many years of study and experiment have at last succeeded in discovering a Method of Truing or Staffing the Faces of Mill-Stones, and have secured Letters Patent therefor. My Method has already been introduced into many mills in Wisconsin, Illinois and many other States, and several of the leading mills in Milwaukee are now using it. The Method is simple and comparatively inexpensive, and with its use the faces of stones can be brought to as true a face as can possibly be desired.

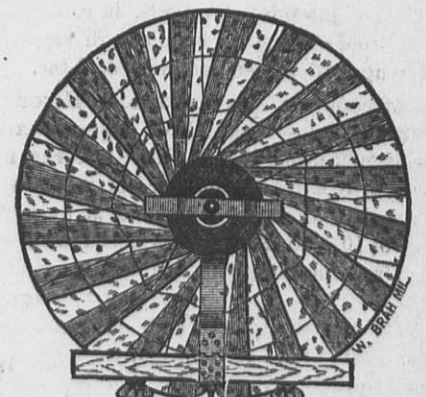
This a result never before accomplished by any staff or method heretofore used. Millers understand the value of such a condition of the stones. Those who take an interest in this, and what miller will not, will do well to address me, and I will send them a circular giving further particulars. My price is very reasonable.

Lehmann's

Improved Adjustable

MILL-STONE

BOSOM STAFF



[Patent applied for.]

This is unquestionably the best Staff ever invented for the purpose of securing a perfectly proper incline from the eye of the stone to the grinding surface, and still keeping that incline in true face. This Bosom Staff sells at sight to any practical miller. He can see in a few moments how accurately it will do its work. It is suitable for high or low grinding. It can be so adjusted in a few moments as to give any incline desired.

With the use of my Method and IMPROVED ADJUSTABLE BOSOM STAFF work equal to the best Roller Mills can be performed. To those that will write me, I will take pleasure in mailing an explanatory circular. Address all communications to

WM. LEHMANN,

Fourth St., Milwaukee, Wis.

NEWS.

EVERYBODY READS THIS.

ITEMS GATHERED FROM CORRESPONDENTS, TELEGRAMS AND EXCHANGES.

The Semple & Berge Mfg Co., of St. Louis, has again started in business.

The mill at Millwood, Kan., is being enlarged and remodeled.

D. H. Holmes, of Eminence, Ind., has ordered machinery for a two-run flour mill.

A new steam flouring mill is almost ready for operation at Avon, O.

John D. Grimes, of Lexington, N. C., is building a two-run steam mill.

Atkins & Bell, of New Ross, Ind., are remodeling their mill to the new process.

W. K. Embrey, of Florence, Ala., is building a two-run mill at the above place.

L. Zimmerman, of Urbana, Ind., is adding new buhrs, fixtures, elevator, etc., to his mill.

N. C. Hart, of Nortonville, Kan., is erecting a flouring mill.

Mathew Lynn, of Belden Ind., is remodeling his mill to the new process. Nordyke & Marmon Co., of Indianapolis, Ind., furnish the purifier, buhrs, brush machine, bolt, etc., for same.

W. A. McCandlis, of Clarinda, Iowa, is having his mill remodeled and enlarged.

S. M. Hurd, of Atchison, Kan., is adding two run of buhrs and necessary machinery to increase his mill to six run. Nordyke & Marmon Co., Indianapolis, Ind., furnish all the work.

J. H. Williamson, of Yorktown, Ind., is adding a run of buhrs, two purifiers, elevators, bolts, etc., and other extensive work, to his mill.

Post & Parr will remove their mill from Avoca, Wis., to Barron.

The new corn-sugar refinery at Peoria, Ill., is consuming about 3,000 bushels of corn per day.

A new flouring mill is being erected in Kirwin, Phillips Co., Kansas, by John Skinner, on the site of the one recently burned.

Georgia flour mills have sufficient wheat in their own State to keep them running until another harvest.

J. W. Austin & Co., proprietors of the Rose City Mills at Little Rock, Ark., took the first premium for flour at the Arkansas State Fair. Robt. Nethercott is their head miller.

The Hessian fly is reported to be in Missouri wheat fields.

The Washburn B Mill, Minneapolis, starts up Dec. 1st.

The Crown Mill at Minneapolis, will be ready for business about Feb. 1st, 1880.

The corn crop in the Indian Territory suffered much from drought.

A new grain elevator is being built at Marshall Ill., by D. S. McMullea.

New grist mill at Warehouse Point, Ct.

A new steam mill is being built at Marshall, Dakota.

Wm. Thorpe, proprietor of the large flour mill at Meadville, Pa., has made an assignment.

D. K. Sharp, Esq., of Millersburg, Ohio, is about to remodel and reconstruct his flour mill, and has awarded the contract to C. F. Miller, of Mansfield, Ohio, who will furnish materials and plans. The millwright work will be executed under the supervision of S. W. Bliss, of Mansfield, Ohio.

Nordyke & Marmon Co., the flour-mill contractors at Indianapolis, Ind., are building a mill for C. F. W. Von Pegert, at Randolph, Oregon.

A new mill with all the latest improvements is being built at Manti, Utah, by Nordyke & Marmon Co., Indianapolis, Ind., for Geo. Sidwell, of Manti.

Waggoner & Gates, of Independence, Mo., have more than they can do since they had their mill overhauled by Nordyke & Marmon Co., of Indianapolis, Ind., and are now adding two new run of buhrs, to their mill.

The Yeager Milling Co., have contracted with Wm. A. Harris, of providence, R. I., to build for them a vertical Direct Acting Engine, cylinder to be 42 inches in diameter by 60

inches stroke. At a moderate pressure this engine will develop about 1,000 horse power! It displaces one of Mr. Harris engines built about 4 years since and whose cylinder is 28 inches in diameter by 48 inches stroke, which will be for sale, to be delivered in the spring.

The excellent quality of the flour-mill machinery shipped to Sweden by Nordyke & Marmon Co., of Indianapolis, Ind., has created quite a furor, and additional orders have been received from Denmark by the manufacturers.

The little city of Paris, Ill., is getting to be quite a milling and grain center. C. Link & Sons, of that place, are building a fine four-run merchant mill, with Atlas engine, all of which is being furnished by Nordyke & Marmon Co., of Indianapolis, Ind.

A. Eisenmeyer, of Fenton, Ill., has just ordered of Wm. A. Harris, Providence, R. I. one of his Harris-Corliss Engines. 18 inches cylinder by 42 inches stroke.

Chouteau & Edwards, Waterloo, Ill. have ordered a condenser with their 28 by 60 inch Harris-Corliss engine of Wm. A. Harris, Providence, R. I.

Wm. A. Harris, of Providence, R. I., sold to Chouteau & Edwards, of Waterloo, Ill., Nov. 15, a 28 inch by 60 inch cylinder engine, for their flour mill, which will give 450 horse power at a pressure of 100 lbs, 54 revolution of shaft and steam cut off 1-5 stroke.

Crown Mills of Belleville, Ill., have ordered of Wm. A. Harris, Providence, R. I., a new Harris-Corliss engine, 22 inches by 42 inches cylinder, which will give 250 horse power. This is Mr. Harris' third engine in that place, having supplied a 20 inch by 48 inch about 3½ years since to Cassel Minchly, and last spring a 20 inch by 48 inch to B. P. Switzer & Co.

The rubber belt for Angus Smiths new elevator in Milwaukee, is a single piece 275 feet long, 4 feet wide and one-half inch in thickness.

Mr. D. R. Yarnall, of Londonville, Ohio, has recently reconstructed his mill so as to operate on the improved system, and is doing first-class work. The materials and plans were furnished by C. E. Miller, of Mansfield, Ohio.

The Brewster Mill Co., of Akron, Ohio, whose mill was refitted and refurnished by C. F. Miller, of Mansfield, Ohio, some months ago, is doing excellent work, and the proprietors are very much pleased with results.

Messrs. R. Zilchrist & Son, mill owners and operators, near Akron, Ohio, have lately purchased a complete outfit of new materials for their mill of C. F. Miller, of Mansfield, Ohio, under whose direction it is to be fitted to operate on the improved system.

Mr. Isaac Snyder, of Clinton, Ohio, has concluded the old system of milling don't pay, and has purchased middlings purifiers, bolting cloth and other mill materials of C. F. Miller, of Mansfield, Ohio, and is to have a new process mill.

The Star Flour Mills of Milwaukee, Nunnemacher Co. proprietors, have replaced the Gratiot wheat heaters in their mill, having become satisfied that they could do much better work with their assistance than without.

Mr. A. O. Mead, formerly of Mead & Templar, has just completed his new grain elevator. The "Alton," as it is called, is located at the foot of Cherry street and the Chicago & Alton railroad, and has a capacity of 150,000 bushels. It is under the immediate management of Mr. Mead, who announces its formal opening for business last Tuesday. This swells the elevator capacity of our city to upwards of 1,000,000 bushels.—*Kansas City Price Current.*

Messrs. Gratiot Bros., Platteville, Wis., manufacturers of the Gratiot wheat heater report business prosperous. They have recently taken the contract for supplying the new mill of the Milwaukee Milling Co., also they have shipped heaters during the month to Indiana, Illinois, Wisconsin, Minnesota, etc. Messrs Sidel, Holmes & Co., of Minneapolis, have put them in their new mill. Mr. Bodendorfer, of Cedarburg, has also introduced them in his mill. They have also just made another large shipment to London England.

D. R. Sparks & Co. of Alton, Ill., are reaping a rich reward in the use of a new Harris-Corliss engine put in their mill last summer by Wm. A. Harris of Providence, R. I. in the saving of \$300 per month over and above their old engine. Mr. Harris will soon issue a pamphlet giving the details of this test, as well as the test at the mill of Meyer & Guye

at Bethalto, Ill. and in the mill of A. A. Freemann & Co. at La Crosse, Wis. All these tests demonstrate the immense superiority of the Harris-Corliss over all other makers of that engine.

A recent dispatch from Dalas Texas to the San Antonio Herald says that the wheat crop of Northern Texas is almost a failure. Many farmers have plowed up lands sown in wheat and resown.

J. B. M. Kehlror & Co. at their model mill at Edwardsville Ill., are about ready to start up. They have already had set up one of Mr. Harris' engines built at Providence, R. I. The cylinder is 22 inches diameter by 42 inch stroke.

O. A. Pray & Co., Millwrights of Minneapolis, Minn. are building a mill at East Union, Ill., for A. J. Carlson, also one at Sheldon, Iowa for U. Iselin, as well as very much other work well in hand, and his new shops are the best arranged of any for this business. In both cases above named they contracted with Wm. A. Harris of Providence, R. I. for the engine.

The Cotton Mills at Janesville, Wis. has just started a 100 horse-power engine, and one of 100 horse-power is now being set up at Dubuque, Iowa for the Norwegian Plow Co., also one soon to be shipped for Deere & Co., Moline, Ill., of 350 horse-power, and one of 80 horse-power for the Jacksonville Ill. Hospital for the Insane, all built by Wm. A. Harris of Providence, R. I., the only builder of the Harris-Corliss engine.

The Wisconsin Boiler Works, of which F. M. Wilkinson is proprietor, is crowded with business. The contract has recently been awarded them for four 60-inch boilers for Pfisters & Vogel's tannery, one of which has already been delivered. They have just completed the three 60-inch boilers for the new flouring mill of the Milwaukee Milling Co.; also three 54-inch boilers for Roennitz tannery in Sheboygan, Wis., and another 60-inch for Fuedlner's planing mill in Milwaukee, besides many others for small boilers of various sizes.

The flour mill at Canal Fulton, Ohio, in charge of Messrs. Whitmyer & Smith is running night and day on custom and merchant work, and is making a very superior brand of flour. This mill was changed from the old to the new system of milling about six months ago, materials and plans being furnished by C. F. Miller, of Mansfield, Ohio. Much credit is due Mr. P. A. Smith, who proves to be more than ordinarily successful as a miller.

A dispatch from St. Louis, dated Nov. 14th, says: "There is a movement among the millers here to close their mills until the price of wheat declines. Two mills closed to-day. Two more will shut down as soon as the wheat they have on hand is ground. This action will probably become general. The principal reason assigned for this is that flour is below the price of wheat, and can only be made at a loss. Many millers have already lost heavily on contracts made when wheat was less than a dollar a bushel, and they see no profit in the immediate future. But little flour has been shipped from here the last three weeks, and large amounts are in store—more than enough to supply all demands for some time. The millers are satisfied there must be a decline in wheat pretty soon. At all events they will not purchase until prices fall or there is a margin on flour."

Foreign News Notes.

It is now stated that an English miller has used magnets in his mill for extracting metallic substances from grain for over 20 years. "Nothing new under the sun again."

Liverpool commission merchants charge our shippers enormous rates. "Rattage," or destruction by rats, forms a large item, and the other day a Liverpool agent charged "rattage" on a cargo of lead.

The London Miller and The Corn Trade Journal and Millers' Gazette (London) for November, contain complete descriptions, with illustrations, of Jonathan Mills' Gradual Reduction System and machinery; also a view of McKean Bros. mill at Terre Haute, Ind.

English commercial papers are wondering at the procrastination of American dealers in adopting the cental.

How manufacturers are thriving in the West is illustrated by the fact that there are in Cincinnati, 5,172 manufacturing establishments, representing an invested capital of \$57,509,215, giving employment to 87,145 workmen. The value of products last year was \$138,736,165. In the last forty years the manufactures of the city have increased about ten fold.

Flouring Mill and Elevator Fires.

Reel's flouring mill at Mound City, Ill., burned Nov. 2d.

Richmond & Jackson's elevator at Dubuque, Iowa, burned Nov. 2d.

November 8th, a fire occurred at McKeesport, Pa., by which the Washington House, a large grist mill, and other buildings were totally destroyed, entailing a loss estimated at \$80,000.

November 11, about 2 o'clock a. m., the grain elevator and mill of Statler & Jacobus, at Good Hope, Ill., took fire and burned down with 9,000 bushels of grain, mostly oats. Loss about \$8,000; no insurance. The cause of the fire is unknown, but is supposed to be from the engine.

The Calverton Mills, at Baltimore, Md., burned Nov. 17th. Loss, \$20,000.

Cargill & Van's steam elevator at Shelburne, burned Nov. 18th, with 2,000 bushels of wheat. The elevator was valued at \$10,000 and was partially insured.

A. G. Spicers flour mill at Elizaville, Ky. burned Nov. 7th. A negro sleeping in it was burned to death. Loss on the mill, \$30,000; no insurance.

The Peoria, Ill., starch works were totally destroyed by fire Nov. 14. Loss, \$30,000; covered by insurance.

At Louisville, Ky., Nov. 14, a fire nearly destroyed Ferguson, Mitchell & Co.'s flour mill on East Market street. Loss on machinery, \$10,000. Nearly 20,000 bushels of wheat was destroyed. Total insurance, \$9,000. The property was valued at \$30,000. Aggregate loss, \$25,000. Cause, accidental.

Wolman, Ken & Co.'s flour mill on Walnut street, Philadelphia, Pa., was damaged by fire Nov. 24; 1,500 barrels of flour and a car-load of grain were consumed. Loss covered by insurance.

A. Locke's mill, and Tibbitts & Dearborn's grist mill on the Grand Trunk R. R. near Portland, Me., were burned, Nov. 24.

The Oronoco Mill, owned by Gooding & Allis, Oronoco, Olmstead county, Minn., burned Nov. 25. Loss on mill \$30,000. Thirty thousand bushels of wheat in warehouse also burned. The total loss will not be less than \$50,000. The mill was new, with valuable modern machinery. The fire is supposed to have originated in friction of the rollers.

The Harris-Corliss Engine.

To the Editor:

The reputation of the Harris-Corliss engine has gained for itself such an ascendancy that unscrupulous persons, to gain certain ends, are offering to build for millers and others, the engine bearing my name, and I now state to all that as my improvements are patented, such proposition to build or to use any engine with my improvements is unwarranted, and will be prosecuted to the full extent of the law. Truly yours,

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

Only builder of the Harris-Corliss engine.

MELTING STEEL IN AN INSTANT.—A Pittsburger named Reese, who has heretofore attracted attention by ingenious inventions for the desulphurizing of ores, and other processes in the making of iron and steel, comes again to the front with a new and remarkable discovery in metallurgy. He claims to be able to melt instantly a bar of cast steel one inch in diameter—which cannot be fused in less than five minutes in the highest heat attainable—simply by throwing against it a column of air having a velocity of 25,000 feet a minute. The instant the air touches the metal the fusion takes place. He further claims to be able to anneal bars of steel or iron at the rate of one foot per second, thus increasing the ductility of the metal 100 per cent, without the use of other fuel than that contained in the metal itself. He simply unlocks the occluded (latent) heat. It becomes sensible and enlarges the metal, and by the method of doing this the enlargement is made permanent. Mr. Reese informed the *American Manufacturer* that he gets \$1,000 royalty for each machine for instantaneous fusion of steel, and further that he sold to a company of capitalists his patent for the United States for a given royalty per ton graded to the various sizes of the metal operated upon by this process for rapidly annealing bars of iron or steel without other fuel than is contained in the metal itself, increasing the ductility 100 per cent.

M'LEAN'S Millers' Text Book and the UNITED STATES MILLER, for one year, for \$1.25. Order now. Send money or postage stamps.

The Trade-Mark Decision—United States Supreme Court.

THE UNITED STATES VS. STEFFENS. SAME VS. WITTEMANN.

On certificates of division in opinion between the Judges of the Circuit Court of the United States for the Southern District of New York.

THE UNITED STATES VS. JOHNSON, ET AL.

On a certificate of division in opinion between the Judges of the Circuit Court of the United States for the Southern District of Ohio.

Decided November 18, 1879.

[Defendants being indicted for violation of the civil and criminal statutes of the United States for the protection of Trade-Marks, the Circuit Judges of the Courts where the indictments were pending were divided in opinion as to the constitutionality of those laws, and certified that division to the Supreme Court: Held by that Court that—]

1. Property in trade-marks has long been recognized and protected by the common law and by the statutes of the States, and does not owe its existence to the act of Congress providing for their registration in the Patent Office.

2. A trade-mark is neither an invention or discovery, nor the writing of an author within the meaning of the clause of the Constitution in regard to securing to authors and inventors the exclusive use of their writings and discoveries.

3. As a regulation of commerce, if trade-marks can be in any case the subject of Congressional action, that action is limited by the Constitution to their use in "commerce with foreign nations, among the several States, and with the Indian tribes."

4. The legislation of Congress in regard to trade-marks contains nothing in its terms, or in its essential character, which looks to a regulation thus limited, but in its language it embraces, and was intended to embrace, all commerce, including that between citizens of the same State.

5. As the statute is so framed that it is impossible to separate that which has reference to commerce within its control and that which has not, and as Congress certainly did not intend to pass the limited registration law which such a construction would imply, the whole legislation must fall, as being void for want of constitutional authority.

Mr. Justice Miller delivered the opinion of the Court.

The three cases whose titles stand at the head of this opinion are criminal prosecutions or violations of what is known as the trade-mark legislation of Congress. The first two are indictments in the Southern District of New York, and the last is an information in the Southern District of Ohio. In all of them the Judges of the Circuit Courts in which they are pending have certified to a difference of opinion on what is substantially the same question, namely: Are the acts of Congress on the subject of trade-marks founded on any rightful authority in the Constitution of the United States?

The entire legislation of Congress in regard to trade-marks is of very recent origin. It is first seen in sections 77 to 84, inclusive, of the act of July 8, 1870, entitled "An act to revise, consolidate, and amend the statutes relating to patents or copyrights." The part of this act relating to trade-marks is embodied in chapter 2, title 60, sections 4,937 to 4,947 of the Revised Statutes. It is sufficient at present to say that they provide for the registration in the Patent Office of any device in the nature of a trade-mark to which any person has by usage established an exclusive right, or which the person so registering intends to appropriate by that act to his exclusive use; and they make the wrongful use of a trade-mark, so registered, by any other person, without the owner's permission, a cause of action in a civil suit for damage. Six years later we have the act of August 14, 1876 (19 U. S. Statutes, 141), punishing by fine and imprisonment the fraudulent use, sale and counterfeiting of trade-marks, registered in pursuance of the statutes of the United States, on which the informations and indictments are founded in the cases before us.

The right to adopt and use a symbol or device to distinguish the goods or property made or sold by the person whose mark it is, to the exclusion of the use of that symbol by all other persons, has long been recognized by the common-law and chancery courts of England and of this country, and by the statutes of some of the States. It is a property right, for which damages may be recovered in an action at law, and the violation of which will be enjoined by a court of equity, with compensation for past infringement. This property and the exclusive right to its use were not created by the act of Congress, and do not now depend upon that act for their enforcement. The whole system of trade-mark property and the civil remedies for its protection existed long anterior to the act of Congress, and remain in full force since its passage. These propositions are so well understood as to need no citation of authorities or elaborate argument to prove them.

The property in trade-marks and the right to their exclusive use, resting on the laws of the States in the same manner that other property does, and depending, like the great body of the rights of persons and of property, for their security and protection on those laws, the power of Congress to legislate on the subject, to establish the conditions on which these rights shall depend, the period of their

duration, and the legal remedies for their protection, if such power exist at all, must be found in some clause of the Constitution of the United States, the instrument which is the source of all the powers that Congress can lawfully exercise.

In the argument of these cases this seems to be conceded, and the advocates for the validity of the acts of Congress on this subject, point to two clauses of that instrument, in one or in both of which, as they assert, sufficient warrant may be found for this legislation.

The first of these is the eighth clause of section 8 of the first article of the Constitution. That section, manifestly intended to be an enumeration of the powers expressly granted to Congress, and closing with the declaration of a rule for the ascertainment of such powers as are necessary by way of implication to carry into efficient operation those expressly given, authorizes Congress, by the clause referred to, "to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

As the first and only attempt by Congress to regulate the right of trade-marks is to be found in the act to which we have referred, entitled, "An act to revise, consolidate and amend the statutes relating to patents and copyrights," terms which have long since become technical as referring, the one to inventions and the other to writings of authors, it is a reasonable inference that this part of the statute also was, in the opinion of Congress, an exercise of the power found in that clause of the Constitution. It may also be safely assumed that, until a critical examination of the subject in the courts became necessary, it was mainly, if not wholly, to this clause that the advocates of the law looked for its support.

Any attempt, however, to identify the essential characteristics of a trade-mark with inventions and discoveries in the arts and sciences, or with the writings of authors, will show that the effort is surrounded with insurmountable difficulties.

The ordinary trade-mark has no necessary relation to invention or discovery. The trade-mark recognized by the common law is generally the growth of a considerable period of use rather than sudden invention. It is often the result of accident rather than design; and when under the act of Congress it is sought to establish it by registration, neither originality, invention, discovery, science, nor art is in any way essential to the right conferred by that act. If we should endeavor to classify it under the head of writings of authors, the objections are equally strong. In this, as in regard to inventions, there is required originality. And while the word writings may be liberally construed, as it has been, to include original designs for engravings, prints, etc., it is only such as are original and are founded in the creative powers of the mind. The writings which are to be protected are the fruits of intellectual labor, embodied in the form of books, prints, engravings, and the like. The trade-mark may be, and generally is, the adoption of something already in existence as the distinctive symbol of the party using it. At common law the exclusive right to it grows out of the use of it, and not its mere adoption. By the act of Congress this exclusive right attaches upon registration. But in neither case does it depend upon novelty, upon invention, upon discovery, or upon any work of the brain. It requires no fancy or imagination, no genius, no laborious thought. It is simply founded on priority of appropriation. We look in vain in the statute for any other qualification or condition. If the symbol, however plain, simple, old, or well known, has been first appropriated by the claimant as his distinctive trade-mark, he may by registration secure the right to its exclusive use. While such legislation may be a judicious aid to the common law on the subject of trade-marks, and may be within the competency of Legislatures whose general powers embrace that class of subjects, we are unable to see any such power in the constitutional provision concerning authors and inventors and their writings and discoveries.

The other clause of the Constitution supposed to supply the requisite authority in Congress is the third of the same section, which, read in connection with the granting clause, is as follows:

"The Congress shall have power to regulate commerce with foreign nations, and among the several States, and with the Indian tribes."

The argument is that the use of a trade-mark—that which alone gives it any value—is to identify a particular class or quality of goods as the manufacture, produce or property of the person who puts them in the general

market for sale; that the sale of the article so distinguished is commerce; that the trade-mark is, therefore, a useful and valuable aid or instrument of commerce, and its regulation by virtue of the above provision of the Constitution belongs to Congress, and that the act in question is a lawful exercise of this power.

It is not every species of property which is the subject of commerce, or which is used or even essential in commerce, which is brought by this clause of the Constitution within the control of Congress. The barrels and casks, the bottles and boxes, in which alone certain articles of commerce are kept for safety, and by which their contents are transferred from the seller to the buyer, do not thereby become subjects of Congressional legislation more than other property. (Nathan vs. Louisiana, 8 How., 73.) In the case of Paul vs. Virginia (8 Wallace, 168), this Court held that a policy of insurance made by a corporation of one State on property situated in another was not an article of commerce, and did not come within the purview of the clause of the Constitution we are considering. "They are not," says the Court, "commodities to be shipped or forwarded from one State to another and then put up for sale."

On the other hand, in the case of Almy vs. The State of California (24 How., 160) it was held that a stamp duty imposed by the Legislature of California on bills of lading for gold and silver transported from any place in that State to another out of the State was forbidden by the Constitution of the United States, because such instruments were a necessity to the transaction of commerce, and the duty was a tax upon exports.

The question, therefore, whether the trade-mark bears such a relation to commerce in general terms as to bring it within Congressional control, when used or applied to the classes of commerce which fall within that control, is one which, in the present case, we propose to leave undecided. We adopt this course because, when this Court is called on in the course of the administration of the law to consider whether an act of Congress or any other Department of the Government is within the constitutional authority of that department, a due respect for a co-ordinate branch of the Government requires that we shall decide that it has transcended its powers only when that is so plain that we cannot avoid the duty.

In such cases, it is manifestly the dictate of wisdom and judicial propriety to decide no more than is necessary to the case in hand. That such has been the uniform course of this Court in regard to statutes passed by Congress will readily appear to any one who will consider the vast amount of argument presented to us assailing such statutes as unconstitutional, and will count, as he may do on his fingers, the instances in which this Court has declared an act of Congress void for want of constitutional power.

Governed by this view of our duty, we proceed to remark that a glance at the commerce clause of the Constitution discloses at once (what has been often the subject of comment in this Court and out of it) that the power of regulation there conferred on Congress is limited to commerce with foreign nations, commerce among the States, and commerce with the Indian tribes. And, while bearing in mind the liberal construction, that commerce with foreign nations means commerce between citizens of the United States and citizens and subjects of foreign nations, and commerce among the States means commerce between the individual citizens of different States, there still remains a very large amount of commerce, perhaps the largest, which, being trade or traffic between citizens of the same State, is beyond the control of Congress.

When, therefore, Congress undertakes to enact a law which can only be valid as a regulation of commerce, it is reasonable to expect to find on the face of the statute, or from its essential nature, that it is a regulation of commerce with foreign nations, among the several States, or with the Indian tribes. If it is not so limited it is in excess of the power of Congress. If its main purpose be to establish a regulation applicable to all trade, to commerce at all points, especially if it is apparent that it is designed to govern the commerce wholly between citizens of the same State, it is obviously the exercise of a power not confided in Congress.

We find no recognition of this principle in the chapter on trade-marks in the Revised Statutes. We would naturally look for this in the description of the class of persons who are entitled to register a trade-mark or in reference to the goods to which the trade-mark should be applied. If, for instance, it described persons engaged in a commerce be-

tween the different States, and related to its use in such commerce, it would be evident that Congress believed it was acting under the clause of the Constitution which authorizes it to regulate commerce among the States. So, if, when the trade-mark has been registered, Congress had protected its use on goods sold by a citizen of one State to another, or by a citizen of a foreign State to a citizen of the United States, it would be seen that Congress was at least intending to exercise the power of regulation conferred by that clause of the Constitution. But no such idea is found or suggested in this statute. Its language is: "Any person or firm domiciled in the United States, and any corporation created by the United States, or of any State or Territory thereof," or any person residing in a foreign country which by treaty or convention, affords similar privileges to our citizens, may, by registration, obtain protection for his trade-mark. Here is no requirement that such person shall be engaged in the kind of commerce which Congress is authorized to regulate. It is a general declaration that anybody in the United States, and anybody in any other country which permits us to do the like, may, by registering a trade-mark, have it fully protected. So, while the person registering is required to furnish "a statement of the class of merchandise, and the particular description of the goods comprised in such class, by which the trade-mark has been or is intended to be appropriated," there is no hint that it is goods to be transported from one State to another, or between the United States or foreign countries. Section 4939 is intended to impose some restriction upon the Commissioner of Patents in the matter of registration, but no limitation is suggested in regard to persons or property engaged in the different classes of commerce mentioned in the Constitution. When we come to the remedies provided by the act for infringement of the rights of the owner of the registered trade-mark, there is no restriction of the right of action or suit, to a case of trade-mark used in foreign or inter-State commerce.

It is, therefore, manifest that no such distinction is found in the act, but that its broad purpose was to establish a universal system of trade-mark registration for the benefit of all who had already used a trade-mark, or who wished to adopt one in the future, without regard to the character of the trade to which it was to be applied or the locality of the owner, with the solitary exception that those who resided in foreign countries which extended no such privileges to us were excluded from them.

It has been suggested that, if Congress has power to regulate trade-marks used in commerce with foreign nations and among the several States, these statutes shall be held valid in that class of cases, if no further. To this there are two objections: First, the indictments in these cases do not show that the trade-marks which are wrongfully used were trade-marks used in that kind of commerce; secondly, while it may be true that when one part of a statute is valid and constitutional and another part is unconstitutional and void the Court may enforce the valid part where they are distinctly separable, so that each can stand alone, it is not within the judicial province to give to the words used by Congress a narrower meaning than they are manifestly intended to bear, in order that crimes may be punished which are not described in language that brings them within the constitutional power of that body. This precise point was decided in the case of the United States vs. Rees (97 U. S. R., 221). In that case Congress had passed a statute punishing election officers who should refuse to any person lawfully entitled to do so the right to cast his vote at an election. This Court was of the opinion that, as regarded the section of the statute then under consideration, Congress could only punish such denial when it was on account of race, color, or previous condition of servitude. It was urged, however, that the more general description of the offense included the more limited one, and that the section was valid where such was in fact the cause of the denial. But the Court said through the Chief Justice:

"We are not able to reject a part which is unconstitutional and retain the remainder, because it is not possible to separate that which is constitutional, if there be any such, from that which is not. The proposed effect is not to be attained by striking out or disregarding words that are in the section, but by inserting words that are not there now. Each of the sections must stand as a whole or fall together. The language is plain. There is no room for construction, unless it be as to the effect of the Constitution. The question, then, to be determined is whether we can introduce words of limitation into a penal statute so as to make

it specific, when, as expressed, it is general only. * * * To limit this statute as now asked for would be to make a new law, not to enforce and old one. This is no part of our duty."

If we should, in the case before us, undertake to make by judicial construction a law which Congress did not make, it is quite probable we should do what, if the matter were now before that body, it would be unwilling to do, namely, make a trade mark law which is only partial in its operation, and which would complicate the rights which parties would hold in some instances under the act of Congress and in others under State law. (Cooley on Cons. Limitations, 178, 179; Commonwealth v. Hitchings, 5 Gray, 485.)

In what we have here said we wish to be understood as leaving the whole question of the treaty-making power of the General Government over trade-marks and the duty of Congress to pass any laws necessary to carry such treaties into effect untouched.

While we have in our references in this opinion to the trade-mark legislation of Congress had mainly in view the act of 1870 and the civil remedy which that act provided, it was because the criminal offenses described in the act of 1876 are by their express terms solely referable to frauds, counterfeits, and unlawful use of trade-marks which have been registered under the provisions of the former act. If that act is unconstitutional, so that the registration under it confers no lawful right, then the criminal enactment intended to protect that right falls with it.

The questions in each of these cases being an inquiry whether these statutes can be upheld in whole or in part as valid and constitutional must be answered in the negative, and it will be so certified to the proper circuit courts.

Rules and Regulations.

FIRST MILLERS' INTERNATIONAL EXHIBITION, 1880.

The following rules will be strictly enforced:

RULE I.

The halls and grounds will be open for the reception of articles from and after May 17. The exhibition will be open to the public on Monday, May 31st, and will continue open from day to day thereafter (Sunday excepted) from nine o'clock A. M. to ten o'clock P. M., until Saturday Evening, June 12th inclusive.

RULE II.

All articles will be entered for exhibition only, except those specifically named in the published list of articles, to which premiums will be awarded. Articles named in the premium list may, however, be entered for exhibition or competition, at the option of the exhibitor. If entered for competition the articles must be in position, receipted for and the entry tag attached not later than Monday, May 31. Articles entered by the exhibitor for competition, but not entered and in position up to the time specified, to wit., Monday, May 31, shall not, under any circumstances, be allowed to compete, except when the written consent of all the contesting exhibitors for that premium shall have been filed in the office.

RULE III.

The driving engine will be in operation previous to the opening of the exhibition to the public and exhibitors of machinery in motion will be required to have their machinery in running order on the day of opening.

RULE IV.

Each Exhibitor will be required to pay an entry fee of five dollars for the first machine entered for competition, and two dollars extra for each additional machine.

NOTE.—Millers and others furnishing samples of flour and grain will not be considered exhibitors or charged an entrance fee, except they enter for premiums.

RULE V.

Applications for space may be made any time after December 1st, 1879, and shall be made as early as possible prior to the opening of the exhibition. All applications must be made on the printed blank forms, which will be furnished by the secretary. Space will be awarded as early as practicable (after the application has been received) consistent with the plans for the classification and proper arrangement of the goods. Notice of the award of space will be mailed to the applicant. Space allotted to the applicants and not taken possession of by them, by the arrival of their goods or otherwise on or before Monday, May 24th, may be assigned to other exhibitors.

NOTE.—A large portion of the space will be reserved for foreign exhibitors, who are earnestly requested to make early applications for space.

RULE VI.

Exhibitors will be furnished by the Entry Clerk with original cards or tags describing each article and indicating whether it is entered for exhibition or competition; these

will be countersigned on the receipt of the articles into the exhibition. A duplicate card shall be conspicuously attached to the article which it describes and the original must be retained by the exhibitor and be presented as his order for the delivery of the articles specified, at the close of the exhibition.

RULE VII.

Sec. I.—There shall be three Jurors in each class, to be appointed by the Millers' National Association.

Sec. II.—The Jurors shall be wholly disinterested, with skill and experience in the class of articles assigned them. Articles entered for exhibition only shall be so reported by the Jurors and shall appear in the report as not in competition. No premiums will be awarded in any class where there is no competition, except articles of great merit and utility and by the unanimous award of the Jurors. Jurors may refuse to award any premium where all articles competing are not meritorious.

Sec. III.—In every case where the Jurors have reached a decision they shall file with the Secretary a report giving the names of the exhibitors, the articles examined, and the number of the class in which it is entered. The Jurors shall thereupon secure from the Secretary, who alone shall be the custodian thereof, a premium badge which they shall place prominently upon the article to which the award has been made, as soon as confirmed by the Committee appointed for that purpose.

Sec. IV.—There shall be no appeal from the decision of the Jurors, except in cases where the award has been made in direct violation of the printed rules.

RULE VIII.

Sec. I.—Exhibitors of steam engines entered for competition, shall furnish the Jurors with indicator diagrams of their engines taken in the building and under the supervision of the Jurors. These diagrams shall be used by the Jurors in determining the efficiency of the steam as used by the competing engine.

Sec. II.—Specimen diagrams accompanied by full data from each competing engine to be furnished to each competing exhibitor.

RULE IX.

The premium list will be furnished and all awards shall be for the first degree of merit in each class. No second class awards or decisions will be made or reported in any case.

RULE X.

The two lines of shafting from which power will be furnished for machinery in operation are each 2 15-16 inches in diameter. One of these lines will be driven at a speed of 200 revolutions per minute, and the other at 300 revolutions. Driving pulleys of any required diameter, also counter shafts and pulleys and belts and hangers will be furnished to exhibitors at cost, if timely arrangements for them are made. All pulleys for the main line of shafting must be split pulleys and if furnished by exhibitors must be accurately balanced and must have the exhibitors name plainly marked on them and should be received before the 24th of May to enable them to be put in place on the shaft without unnecessary labor and inconvenience.

RULE XI.

No article on exhibition can be removed from any department during the exhibition; but all appropriate facilities for making sales of articles for delivery at the close of the exhibition will be afforded.

RULE XII.

An adequate police force will be in attendance upon the premises during the day and night, but all articles on exhibition will be at the risk of the owner. Insurance against loss by fire will be effected by the Board in behalf of all exhibitors who apply and pay for same.

RULE XIII.

In order to preserve the general harmony of the exhibition and to make the display of goods attractive, the Board reserve the right to direct the general arrangement of all articles

on exhibition and to regulate the dimensions of all signs and advertisements.

RULE XIV.

Sec. I.—Each Exhibitor may procure for himself and employees (when it is shown that such employees are necessary for the care of Exhibitors articles) season tickets at one dollar each, from the secretary: Said tickets to be registered and numbered at the Secretary's office.

Sec. II.—Employees' ticket found to be unnecessary for the purpose for which they were issued, will be taken up and forfeited.

Sec. III.—Every ticket of general admission will be registered and taken up and forfeited if presented by any other person than the party to whom issued.

Sec. IV.—Members of the Millers' National Association will have free admission to the Exhibition upon presentation of the proper credentials to the secretary.

RULE XV.

Any articles left by the Exhibitor in the halls uncalled for on or before June 20th will be disposed of according to law, or if samples of flour or grain, will be sold for account of Exhibition fund.

Premium List of the Millers' International Exposition.

At a meeting of the Board of Commissioners of the Millers' International Exposition at Cincinnati the following premium list was adopted, subject to any change that may be hereafter made:

CLASS 1—*Motive Power.*—Best automatic cut-off stationary steam engine; best stationary steam engine, slide valve, not less than 25 horse power; best turbine water-wheel; best automatic windmill.

CLASS 2—*Steam Boiler and Engine Fittings, &c.*—Best low-water indicator for steam boilers; best steam gauge; best safety valve for steam boilers; best smoke consuming device attached to steam boiler; best steam engine governor; best combined heater and lime extractor for steam boilers; best lubricator for steam cylinders; best piston packing; best grate bars for furnaces; best combined stop and check valve for steam boilers; best gauge cock for steam boilers; best water injector; best oil-feeding cups; best steam pump with crank and fly-wheel; best automatic boiler feeder; best oil for millers' use; best shaft coupling; best pulley fastening for shafting; best shafting hanger.

CLASS 3—*Milling Machinery and Millers' Supplies.*—Best complete flour mill; best bolting chest; best smut machine; best middlings puffer; best flour packer; best millstones; best brush machine; best rolls; best middlings mill; best bran duster; best bran dresser or scourer; best separator and grader; best receiving separator; best bolting cloth; best millstone feeder; best self-tramming, driving and balance iron for millstones; best automatic grain meter; best backlash spring; best millstone ventilator; best wheat heater; best cockle separator; best display of milling machinery; best assortment of mill tools; best hominy mills; best mill picks; best bag holder; best attachment to prevent clogging of bolting cloths; best display of wire cloth; best emery or corundum hand tool; best mixing and sifting machine; best proof staff; best millstone dressing machine (power); best millstone dressing machine (hand); best barrel tally; best conveyer; best elevator bucket; best millstone feeder; best portable corn mill.

CLASS 4—*Grain.*—Best spring wheat (all varieties); best winter wheat (all varieties); best rye, best buckwheat, best yellow corn for meal, best white corn for meal, best oats for meal best display of grain.

CLASS 5—*Products of the mill.*—Best barrel patent flour (or new process) from spring or winter wheat; best straight grade flour from winter wheat; best straight grade flour from

spring wheat; best rye flour, best buckwheat flour; best corn flour; best rice flour; best purified middlings; best middlings not purified; best cleaned bran; best white hominy; best coarse grit; best fine grit; best case of maize; best oatmeal; best cracked wheat; best barrel of flour made at Exposition.

CLASS 6—*Bread, Crackers, &c.*—Best display of bread made on the grounds; best display of crackers made on the grounds; best display of fancy biscuit made on the grounds; best display of pretzel.

CLASS 7—*Baking Powder and yeast.*—Best baking powder; best compressed yeast; best yeast preparations.

CLASS 8—Best flax bagging; best cotton bagging; best hemp bagging; best jute bagging; best mixed bagging; best display of satchel bottomed flour bags; best display of jute bags; best display of cotton bags; best sample envelope.

CLASS 9—*Scales.*—Best automatic grain scales; best platform scales; best hopper scales.

CLASS 10—*Barrel Labels.*—Best printed barrel labels; best lithographed barrel label.

CLASS 11—*Miscellaneous.*—Best leather belting; best gum belting; best paper-bag machine; best cracker machinery; best flour barrel; best belt fastener; best side-lace leather; best grain and agricultural display by any State or railroad company.

BODMER'S



"HET ANCHOR" Bolting Cloths.

The First and Best Goods Imported.

RUSSELL & WILLFORD,

General Mill Furnishers,

dec MINNEAPOLIS, MINN.

SCRAP IRON, RAGS, METALS.

We are in the market for SCRAP IRON, RAGS and METALS, for which we are ready to pay

Highest CASH Prices!

FRANZEN & CO.

WAREHOUSE:

OFFICE:

Nos. 1505 and 1507 State st. | 60 Oneida st., Opera H.

Milwaukee, - Wisconsin.

Correspondence solicited. Please state where you saw this advertisement. nov29

THE UNITED STATES MILLER.

Eighth Vol.—Issued Monthly.



TERMS OF SUBSCRIPTION:

For One Year.....\$1.00
For Half Year......50
For Three Months......25

Sent free of postage to any address in this country or Dominion of Canada, at the above rates. Remit in cash or postage stamps to

UNITED STATES MILLER,
Milwaukee, Wis.

CUT THIS OUT.

Date,.....18.....

E. HARRISON CAWKER,

Publisher UNITED STATES MILLER, Milwaukee, Wis.:

Enclosed please find \$1, for which send the UNITED STATES MILLER to

Name..... Post-Office.....

County..... State.....

Correspondence.

[From W. Trow & Co., Madison, Indiana.]

"Wheat crop this last season very good with us—heaviest receipts from wagons we have ever had. Very large area sown this fall but considerable complaint of damage by drouth and fly; late rains may soon improve the outlook. Business with us is good, have been sold ahead the whole season; hurt no trade having order from one house in New York for every barrel we can ship, so we are not troubled in that respect. Have carried heavy stock of wheat which we still have at low price and will want it worse after awhile. As for improvements we need a good many but have not the room or time to make them and are at present content to let well enough alone."

[From Theo. Dodson, Jerseyville, Ill.]

"Wheat good here and the milling business moderate."

[From P. J. Johnson, Appleton, Wis.]

"Milling is very lively at good profits. Mr. N. Wieland in the 'Stone Mill' has sold his share to Mr. S. K. Wambold, formerly a merchant in Menomonee Falls, and the new firm is Hanert and Wambold, he is a very thrifty and successful business man and highly esteemed citizen. Mr. M. J. Boul's new 'Riverside Mills' is nearly completed, and it will be running in a couple of weeks; Mr. C. H. Near, a very fine and clever man, thoroughly conversant with New Process milling, is the head miller; and the mill is solid and substantially built of heavy frame work, stone foundation, and veneered with brick, 4 stories with basement, 4 run of stones, with room for more to be added; 2 large Leffel wheels; and excellent machinery throughout, furnished under contract by Hulbert & Paige Painsville Ohio, and the millwright work superintended by Mr. H. Waters. The mill is 40 by 60, and presents the finest appearance of any on the Water Power, and will undoubtedly prove a first rate investment to the owner. Kimberly & Clark have rebuilt their large mill, and are turning out about 350 barrels per bay, They have 4 run of stones and 18 rollers on gradual reduction; this is all that is known about it to those not 'initiated'; for, whereas they are Neenah men and live in Neenah, they have adopted the 'Neenah Policy' of letting no miller into their mill under any circumstances."

[From D. H. Spencer, millwright and draughtsman, Corinne, Utah.]

There is a method of photographing tracings of drawings by placing them upon a sheet of prepared paper, covering the whole with a plate of French glass, and exposing to sunlight. I want to know how to prepare the paper and execute the details of the method. I am informed that the necessary information was contained in a number of the UNITED STATES MILLER. I have not been able to find the right number. If you can publish the desired information, please do so, and oblige a subscriber.

[From Geo. G. Smith, millwright, Milwaukee, Wis., in answer to the above.]

Put into an opaque bottle and keep it in the dark. To 10 ounces of rain water, add 1/4 oz. of red prussiate of potash. Allow this to dissolve. In a second dark vessel containing 6 oz of water, to which add 1 1/2 oz. ammonia citrate of iron; allow this to dissolve. Then mix the second liquid with the first and shake it thoroughly and keep it in the dark. The paper should be transfer paper, such as lithographers use. Apply the solution with a broad camel hair brush just sufficiently to moisten the surface. Leave no dry spots. When the paper is thus prepared, keep it in the dark until ready to use. To use, place the paper on a smooth, flat surface; place the tracing to be copied upon it face side up, and on this place a pane of glass large enough to cover the whole; then expose to sun-light five minutes, and longer if the sun is not shining brightly. Then remove the paper and immerse quickly into clean water.

[From A. Costner, Lincoln, N. C.]

Please answer the following questions: Have the so-called Minnesota self-adjusting rubber balls or springs been introduced, and with what result, in your section of the country. They are being introduced here in N. C. now, as a new thing, patented, at \$50 per bed stone. I have some on trial but have not found them worth the cost to me as yet.

[We have made inquiry but only heard of one mill in Minneapolis, Minn., which introduced them, and they took them out for some reason. If any of our readers know anything about the above subject please write.—EDITOR.]

[From J. G. Patton & Co., Catlettsburg, Ky.]

The milling business has been better here this year than for many years past, but even in this year it falls so far below your section

(Northwestern States) that we are almost ashamed of it. We have put in no new machinery the last season, but have built an addition 4 stories high, 35x50 feet, preparatory to putting up an entire new mill in the spring. We are now looking for the best and cheapest place. This makes our main building 50x80 feet, 4 stories high. Under the late decision of the U. S. Court in regard to trade marks what are we to do to protect our good flour brands. Other millers can repack our barrels with a low grade of flour—which they are doing—with impunity. Urge upon the Millers' National Association the importance of having something done this winter.

[From J. G. Steinbrenner, Annaton, Wis.]

"The milling business in our neighborhood is very good—especially at this place."

[From Perry Hutchinson, Marysville, Ky.]

This promises to be a good year for milling interests in this section. We have a very good quality of wheat and good demand for flour. I have put in E. P. Allis Porcelain Rolls and am making good export flour.

[From Chas. Epsenchied of the Goodhue Mills, Cannon Falls, Minn.]

Milling business has not been very profitable so far this season here.

The Manufacture of Bolting Cloth.

[Translated from the Austro-Hungarian Miller for the UNITED STATES MILLER.]

In the beautiful little canton of Appanzell, in Switzerland, on the summit of a fine hill which commands a picturesque view of the Boden-see and the Valley of the Rhine, there is situated the enterprising village of Heiden. The place is handsomely situated, with verdant undulating meadows towards the South, and with the majestic and imposing Alps in the rear, and towards the North, in the valley, the outlet of old father Rhine into the Boden-see. The tourist is well acquainted with the village, it being one of the healthiest places in the country, where, during the summer season, persons of every nationality may be met with.

People here are also of very industrious habits, and the most valuable of their products is that of bolting cloth, known to every miller. It is in this same place where that fabric is manufactured, and it may be of interest to the reader to acquaint himself with the process of its manufacture.

Holland is deservedly called the first country in which bolting cloth was first manufactured and used, and the name of "Het Anker" and "Buylgaas" originated in the said country. These names are still in use, even in French as well as Swiss factories.

At present it is Switzerland which takes the lead in the manufacture of silk bolting cloths, having superceded all other fabrics of the kind, and it is due to the people of the canton of Appanzell to acknowledge the superiority in the manufacture of the article which is of such great value to the profession.

We meet among the profession of millers oftentimes with the view that the bolting cloth is generally manufactured in large and extensive factories, and in a mechanical manner. It is an error, as it is woven in the cellars and basements of those neat little Swiss cottages, and in such basements or cellars you will find only from one to three looms.

The manufacture of bolting cloth is a so-called home industry; the weaver is supplied with the necessary amount of silk by the man for whom he works, takes is home with him to his loom, which by the way is of very expensive construction.

The work makes rather slow progress, more particularly the finer numbers, and at times no work is done at all; when, for instance, the "Fohnwind" is blowing. This warm wind blowing from Italy has the effect of turning the silk crisp and coarse, so that the fibre will not pass through the fine comb and it becomes liable to break.

It is of moment to pay attention to the use only of superior and faultless silk, yet much also is dependant on the skill and attention of the weaver, as otherwise great damage may be caused to the manufacturer, as a poor piece of cloth will be utterly worthless to him.

The cloth is returned to the manufacturer in the form of a roll, and it being sometimes fastened to the loom for a month or two, this may account for the generally soiled appearance of the fabric before its going through a process of washing and cleaning with large sponges, thus being relieved of all dirt, and dried again. It is next folded in book form, carefully made up in parcels, and then is ready for the trade.

The "Anchor" brand of bolting cloth is

manufactured out of "classic" silk only, such as is spun only in the best workshops of Upper Italy.

ORIGINAL HOME OF THE CEREALS.—There can be no doubt that those countries which furnish the greatest variety of important or nourishing plants possessed all the chief conditions for the rapid development and culture of the inhabitants. In the light of history, there can be no hesitancy in pronouncing as such the prosperous and fruitful regions which occupy a large portion of Southern and Western Asia—the countries near the Caucasus, lying between the Euphrates and Tigris and extending to the Hindoostan. From this, we are led to infer that the first important development in civilization should be ascribed to India, rather than to Egypt; for although the latter is very fruitful, it has not furnished a single important plant. The secluded Delta of the Nile was populated as early as 4,000 years before Christ by immigrants who, in all probability, brought food-plants with them. Almost every country originally possessed its own foot-plants; and the development and dissemination of the latter stood in the closest relation to the development of the people to whom it originally belonged, or those to whom it was transferred. In Europe, it was oats; in Northern Asia, barley and wheat; in Southern Asia, rice and millet; in Africa, sorgho, and in America, rice and maize, that gradually supersedes all other plants as breadstuffs. Australia is the only division of the earth which possessed no food-plant, and her aboriginal inhabitants never progressed beyond the first rudiments of civilization.

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.

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 & Marmor Co., Indianapolis, Ind.

Situations Wanted, etc.

Millers, Engineers, Mechanics, etc., wanting situations, or mill-owners and factors wanting employes, can have their cards inserted under this head for 50 cents per insertion, cash with order.

WANTED—Situation as miller in some good Merchant or Custom Mill. Have had 12 years' experience, and will guarantee entire satisfaction. Can give the best of references. Steady employment preferred to large wages. Am sober and industrious. Parties writing me will be promptly answered. Address H., Box 132, Lathrop, Clinton County, Mo. novtf

WANTED—Situation in either merchant or custom mill. Have had several years experience both in merchant and custom mills and will guarantee satisfaction in all branches of the business. Am a single man and willing to go anywhere. Parties in need of a first-class miller will do well to correspond with me. Parties answering will please state terms, &c. Address, J. P. Rauch, Charleston, Kanawha Court House, Kanawha Co., West Va. novtf

SITUATION WANTED—Mill-men wanting a head miller who can improve their brands of flour and make every machine in the mill do the best work of which it is capable, and a man upon whom they can rely in every respect, should correspond with the undersigned. Parties contemplating building new mills or remodeling old ones will find in him just the man they want to plan a successful arrangement of machinery on the gradual reduction system, in whole or part, and to manage same when completed. Correspondence solicited. Address S. S., care of United States Miller, novtf Milwaukee, Wis.

For Sale or Exchange.

Advertisements under this head \$2 per insertion, cash with order.

FOR SALE—One new No. 1 Nagle & McNeal Smut Machine, manufactured at Silver Creek, N. Y. It is a first-class machine, and will be sold at a big discount from the regular price. The owner is not now in the milling business and therefore has no use for the machine. Address at once MILWAUKEE MIDDINGS MILL-STONE CO., Milwaukee, Wis. novtf

FOR SALE—At Hill's Ferry, Hertford County, N. C., a valuable sawmill, with fixtures, situated on the Maherrin River, a stream navigable for large boats. Also a large body of the finest standing pine and oak timber in Eastern North Carolina. Address d B. B. WINBORNE, Winton, N. C.

STEAM FLOUR MILL FOR SALE—A steam flouring mill, located at Grand Haven, Michigan, two run, with room, power, and business for two more. An outlay of \$500 will put the mill in first-rate repair. Grand Haven is the centre of a productive and fast developing farming country. No other mill within fifteen miles of the place. The whole product of the mill may be readily sold at home. Facilities for receiving and shipping by lake and rail unsurpassed. Cheap and on easy terms. Call upon or address the First National Bank, Grand Haven, Mich. d

FOR SALE OR LEASE—The old established flouring mill, known as "Armleders Valley Mills," near Georgetown, Brown County, Ohio. The mill has a good custom, three run of burrs, good water supply, with large brick dwelling, outhouses, stone stable, large tobacco shed, etc., with 77 acres of land. To be sold or leased on very favorable terms. Apply to F. I. MAYER, 159 Dayton street, Cincinnati, Ohio. d

WATER MILL FOR SALE—A merchant mill, situated in Clermont, Iowa, with six run of French burrs and the best machinery throughout. Driven by the best water power in the State. Always plenty of water, with 12 feet fall on solid rock. Located in the best wheat-growing country. Mill building 40x80 feet, five-story brick, near railroad depot. Mill doing a fine business. Mill doing a fine business. Town 1,000 inhabitants, with good schools and churches and good society. Will sell whole on reasonable terms. Reasons for selling, poor health. Address d S. M. LEACH, Clermont, Fayette Co., Iowa.

A USE has at last been found for the immense accumulation of slag from blast furnaces. A coarse kind of glass is made which is toughened by a process of Mr. Siemen's, the celebrated telegraph engineer, and converted into railway sleepers. These have been proved by experiment to be practically indestructible, and, as substitutes for the ordinary wooden ones, they may effect a large saving of expense and partially stop the present enormous drain upon the forests of the world.

Attention, Millmen.

OFFER FOR SALE AT PUBLIC AUCTION FOR CASH, a never-failing Water Power of 35 horse power, milldam, flume, with wheel in, ready to attach power and use of water; 10 acres of land, one small building, one blacksmith shop with tools, etc., one iron lathe; also irons for circular sawmill, all on the place. This is an excellent chance for a saw, grist, or woolen mill, situated on Rush River, 6 miles north of Maiden Rock, Pierce county, Wis. Auction at said place positively at 10 o'clock a. m. on the 26th day of December, 1879. For particulars address G. F. BLASHEK, dit Maiden Rock, Pierce county, Wis.

MILLER'S PATENT COMPOSITION BURR RUBBER.

The best, cheapest, and most durable in the market. Will out wear any half dozen others made, try it and be convinced. Face Rubber 12x6x3 inches, weight 12 lbs; price, \$2.50. Fallow Rubber, 12x6x1 1/2, 1 1/4, or 2 inches as required, \$2.50, or both for \$5, by express. Marble Proof Staff (Logan's Patent), best in use. Not affected by heat or cold like iron. Warranted true; 4 1/2 feet, weight 100 lbs. \$15. Send for circulars. Order of MILLER & McCARTHY, Mount Union, Pa. de

Salem Elevator Bucket.

SEEK NO FURTHER. IT CAN'T BE BEAT. Most approved shape and construction; body made in one piece; wearing curved in one piece; curved front; rounded bottom corners. THE FAVORITE. Be sure to see it before deciding where to buy. W. J. CLARK & CO., Manufacturers, Salem, Ohio. \$2 Sample mailed on receipt of 15c stamps. d6m

Wisconsin Boiler Works

F. M. WILKINSON, MANUFACTURER OF

Steam Boilers,

SMOKE STACKS,

Britchen and Tanks,

AND SHEET IRON WORK

OF EVERY DESCRIPTION.

23, 25, 27, 29, 31 & 33 OREGON ST.,

Between Barolay and South Water Sts.,

MILWAUKEE, - - - WISCONSIN.

Marine Work a Specialty.

Repairing of all kinds promptly attended to in town or country. d3t

THE BEST PAPER! TRY IT!

BEAUTIFULLY ILLUSTRATED.

35TH YEAR. The Scientific American

THE SCIENTIFIC AMERICAN is a large First-Class Weekly Newspaper of Sixteen Pages, printed in the most beautiful style, profusely illustrated with splendid engravings, representing the newest inventions and the most recent Advances in the Arts and Sciences; including New and Interesting Facts in Agriculture, Horticulture, the Home, Health, Medical Progress, Social Science, Natural History, Geology, Astronomy. The most valuable practical papers, by eminent writers in all departments of Science, will be found in the Scientific American. Terms, \$3.20 per year; \$1.60 half year; which includes postage. Discount to Agents. Single copies, ten cents. Sold by all Newsdealers. Remit by postal order to MUNN & CO., Publishers, 37 Park Row, New York.

Patents. In connection with the SCIENTIFIC AMERICAN, Messrs. MUNN & Co. are Solicitors of American and Foreign Patents, have had 35 years experience, and now have the largest establishment in the world. Patents are obtained on the best terms. A special notice is made in the SCIENTIFIC AMERICAN of all the inventions patented through this Agency, with the name and residence of the Patentee. By the immense circulation thus given, public attention is directed to the merits of the new patent, and sales or introduction often easily effected. Any person who has made a new discovery or invention, can ascertain, FREE OF CHARGE, whether a patent can probably be obtained, by writing to MUNN & Co. We also send FREE our Hand Book about the Patent Laws, Patents, Caveats, Trade-Marks, their costs, and how procured, with hints for procuring advances on inventions. Address for the Paper, or concerning Patents, MUNN & CO., 37 Park Row, New York. Branch Office, cor. F & 7th Sts., Washington, D. C.