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# DOMINION MECHANICAL & MILLING NEWS

DEVOTED ESPECIALLY TO THE INTERESTS OF OWNERS AND OPERATORS OF

Flour Mills, Saw Mills, Planing Mills and Iron-Working Establishments.

Vol. XII.—No. IV.

TORONTO, CANADA, APRIL, 1889.

Price, 10 Cents  
\$1.00 PER YEAR.

## SLOW BURNING CONSTRUCTION, APPLIED TO MILLS AND FACTORIES.

THE fearful losses of life and property by fire in the United States have lately attracted the attention which is due to the causes of such loss and to the means for preventing them.

The question therefore arises, can buildings be constructed either wholly of timber, or of brick, stone, or iron for the outer walls, combined with wood for the inside construction, in such a way as to eliminate the greater part of the causes of the fearful fire tax which now constitutes a waste equal to an average of at least fifteen per cent. on the net savings or possible additions to the capital of the country in a fairly prosperous year?

To this question an affirmative reply may be given. It is based on many years' experience in the construction of textile factories under the supervision and guidance of the mutual underwriters by whom these factories have been insured on an absolutely mutual principle for a period ranging from thirty to fifty years in respect to the principal companies.

In what does slow-burning construction consist? It may be considered somewhat amazing that so simple an art should not have been common for generations. We will begin at the weakest point in the common art of combustible architecture, to wit, with the roof, and describe its evolution.

In the evolution of the factory all the faults have been discovered and remedied which now infest nearly all the warehouses, hospitals, dwelling houses, school-houses, college buildings, and other examples of combustible architecture of this country.

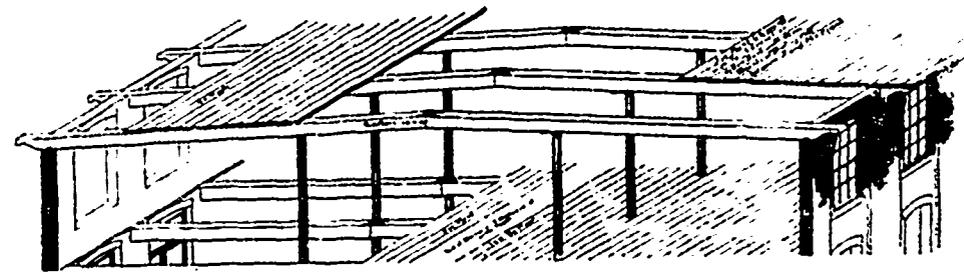
The first form of factory roof resembled the gambrel roof of the dwelling-house. In early days it was constructed of solid timbers set wide apart, as they should be, covered with good thick boards and shingled; in some cases the shingles were laid over mortar. I have an example of shingles which are more than fifty years old yet still in good condition, having been preserved by the interposition of the mortar between the shingles and the roof boards.

This method of outside construction might not be objected to in itself; on the inside, however, the owners were apt to put vertical sheathing at a little distance from the eaves and horizontal sheathing across the upper timbers of the roof, making a cockloft. These hollow spaces, in which fire may spread out of the reach of water, are among the most dangerous elements of bad construction, especially when connected with the basement or the cellar by vertical flues in the walls or partitions of the building.

The next form of roof came into vogue when heavy timbers were displaced by joist or plank rafters set close together. It is commonly known among factory people as a "barn-roof," consisting of an ordinary pitched roof made of rafters set eighteen inches or two feet apart on centers, covered outside with thin boards and slated, sheathed inside vertically at the eaves, and horizontally across the apex.

This barn-roof is the most abominable, unsafe, and

atrocious roof ever devised for the covering of buildings of any kind. The slates serve to attract the heat of the sun, which beats in through the interstices of the open boards and converts the interspaces of the roof into ovens for the concentration of heat and for its distribution throughout the building, especially when the roof spaces are connected with hollow walls. The most effectual method of diffusing heat in a factory has proved to be to suspend the steam-heating pipes overhead, at some distance from the walls—the warm air following



THE FACTORY ROOF, FIRST DEvised BY W. B. WHITING.

the cold air as it passes out by bottom ventilation. By analogy it may be assumed that the heat concentrated by the slates in the interspaces of a hollow roof diffuses itself through the hollow walls of a building of ordinary construction. Thus the thin-slated roof fails in summer as well as in winter. In this kind of roof a fire is completely protected from water; the slates when exposed to outside heat are readily cracked; they then fall and cut open the firemen's heads; the interspaces at the eaves also make excellent nesting-places for the rats, which carry into them only waste and other combustible

or two feet apart on centers, covered on the outside with boards and then with composition or metal and sheathed within upon the under side of the rafters. The humidity generated in any room warmer than the external air and in the processes of many of the manufacturing arts passes into the interstices of this roof, where the moisture is condensed on the under side of the thin boards of the outer covering, from which it drops upon the sheathing and rots it, while the interspaces add not only to the danger of fire, but work the speedy destruction of the whole roof by the rotting of the rafters, especially near or upon the walls. This roof was usually furnished with a hollow wooden cornice, also bad and dangerous.

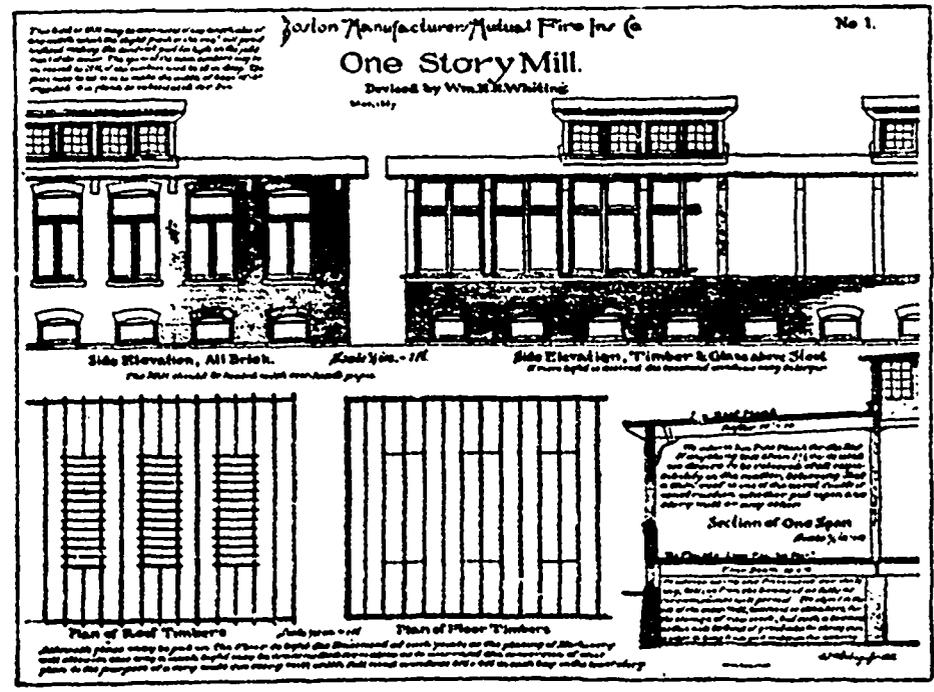
It remained for the officers of the Factory Mutual Insurance Company to suggest that the same solid floor which is required in the construction of the mill might well be adopted in the construction of the roof, only

changed so as to give a pitch of half an inch to the foot. It was also suggested by the underwriters that the wooden coverings and gutters and the sham hollow cornices, by means of which fire was conveyed from building to building in the great Boston conflagration, were a dangerous and superfluous element in the construction of the roof of the factory. In pursuance of these suggestions all the former bad forms described gave way to a simple deck constructed of three-inch plank grooved and splined, placed on timbers set from eight to eleven feet apart on centres, sheathed underneath between the timbers if the owner desires a fine finish, and covered on the outside with any of the customary materials; the ends of the timbers sometimes projecting outside the wall and the deck carried far enough over to form a suitable coving, according to the height and character of the building; or else the finish may consist of a brick cornice, without gutters, the drainage being below.

Again: the old type of textile factory, from which the plans of a great many other factories have been derived, was very narrow and very high. It had not entered the minds of the constructors of the earlier factories that the spaces of wall between the windows might be very narrow and that the windows might be very wide; nor had it apparently occurred to any one that the tops of the windows had better be carried up flush or even with the ceiling of each room in order that the light might be better diffused within. Consequently the wall of the factory consisted mainly of a great blank of brick-work with small holes in it for windows, the mill being seldom more than fifty-two feet wide, often less, and many stories in height.

The width of the mill was gradually extended and the size of the windows enlarged by degrees; for many years about sixty-two feet was considered the proper width and the windows began to occupy a larger part of the wall space, while the wall itself was increased in thickness.

At last it was discovered that if the tops of the windows were carried up flush with the ceiling and as much space, or a little more, was devoted to windows as to



ONE-STORY MILL, DEvised BY MR. W. B. WHITING, C. E.—No. 1.

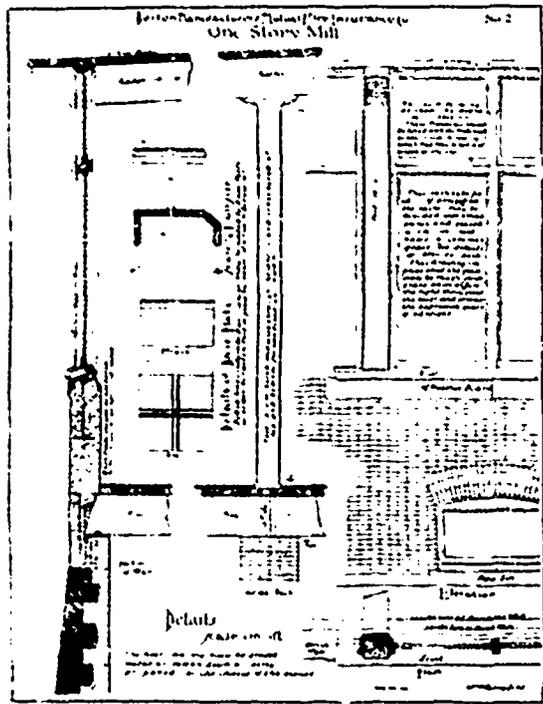
substances to be ignited by spontaneous combustion in the heat of summer, to the partial or total destruction of many a mill.

The next abomination came with what is called the French roof. This, when put upon the top of a factory, is nearly as bad as the barn-roof; it restricts the space in the attic within, adds greatly to the cost of the building, while in it are commonly repeated nearly all the faults of construction of the barn-roof.

The next roof was a little better. It consisted of a flat roof made of ordinary plank rafters set eighteen inches

wall, the width of the mill might be carried to ninety feet; then to a little over one hundred feet.

Until now in England, where the light is less intense than in this country, cotton-mills have been built five or six stories in height and one, one hundred and twenty-eight feet wide, that being the width in which certain kinds of machinery can be most economically placed and operated,—with six feet of window space to four feet of wall, the tops of the window panes being absolutely flush with the ceiling between the beams, and the window caps placed opposite the floors. Of late, however, the mutual underwriters, having discovered the great danger of high buildings as compared with those of wide, low construction, began to ask their members who were about to build mills to be operated by steam power in the open country, "Why do you follow this inherited and bad type of building? A mill of two or three stories in height can be constructed at less cost per square foot of floor than a mill of any greater number of stories; if you have room enough, even a one-storey mill properly constructed may be built at as low cost per square foot of floor as the mill of four or five stories, while it will be as warm in winter, cooler in summer, and lighter and better ventilated all the year round than any other type of mill can possibly be." Since that suggestion was made a large number of factories of only one storey in height, covered in with three-inch pine roofs, protected outside with gravel roofing, tin, or with cotton duck properly prepared, and lighted with what are known as monitors,



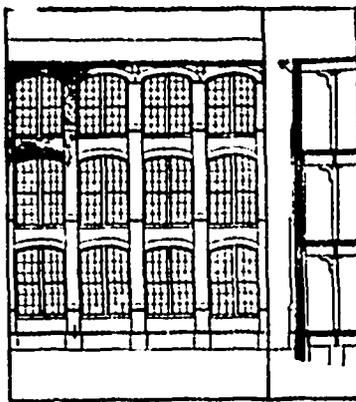
DETAIL OF ONE-STOREY MILL. No. 2.

have been constructed in many parts of New England, ranging from half an acre to three and a half acres in size: a very common type being a mill of sixty thousand feet on the main floor, constructed on a moderate slope so as to give a basement under one-third of the mill for wet work or for other subsidiary purposes. Such one-storey buildings are best adapted to weaving, and are often built in connection with spinning-mills of two or three stories in height.

In one instance, in a case where the machinery is very heavy and is subject to great vibration, a one-storey mill of this sort was substituted for one of two four-story factories which had been burned; the owners were advised to reconstruct a one-storey mill in place of the burned mill, but to make it large enough to accommodate all the machinery then in the other four-story mill which had not been destroyed. They were warned that the new mill would bankrupt the old one on account of the greater economy of the work and the better conditions for its operation. The prophecy has proved true; sixty-seven men accomplished the work in the new one-storey mill on the same machinery which required one hundred men in the old four-story mill; therefore that old mill has been taken down in order to make way for the extension of the one storey factory, and the old material has been put together in a better form.

What, then, is the slow-burning construction? It consists simply in constructing the wooden material in frame, floor, and roof in such a way that a fire can be held long enough in any room in which it may originate for a fairly competent fire department, public or private, to get it under control, or where it may be extinguished or held in check by sprinklers. The timbers used may be solid or may be cut in two parts to be bolted together. The latter is perhaps the better way, in order that the air may reach the centre of the timber and season it, great care also being taken in mill practice not to paint, oil, or varnish the outside of any heavy timber for at

least three years after it has been placed in the building, lest what is called dry rot should occur from the fermentation of the sap in the green timber. Where an outside finish is required some architects use the timber in two parts bolted together with an air space between, each timber being also bored through the centre lengthwise for ventilation. This latter plan is the customary



CONSTRUCTION OF FACTORY DEvised BY EDWARD ATKINSON, THE PURPOSE BEING TO CONSTRUCT THE ALLEYWAYS SO THAT THEY SHALL BECOME HORIZONTAL TRUSSES, TO PREVENT THE VIBRATION OF THE STRUCTURE.

method with posts when wood is used for supports, a crossway hole being also bored near the top and bottom, connecting with the centre. Upon these heavy timbers—which are commonly placed eight or ten feet on centres resting directly on properly adjusted posts without the interposition of any girders lengthwise of the building, in lengths or spans from eighteen to twenty-two feet—the floors are laid of plank not less than three inches thick when the beams are eight feet on the centers. If the beams are ten feet or even twelve feet apart on centers, ordinary weights will be carried by floors consisting of four-inch or five-inch plank; the timbers themselves may be from fifteen to not exceeding twenty-two feet in length from wall to post and from post to post, for ordinary factory loads. If provision is required for extraordinary loads, a special computation should be made to meet the case. If a fine finish is desired, sheathing may be placed underneath between the timbers, nailed close to the under side of the plank; it the most absolute security against fire is called for, the finish may consist of plastering laid on wire lathing close against the plank. This plastering may be carried around the outside of the timber on the line of the timbers, provided no skim coat of lime putty is put upon the plastering, thereby cutting off the air from the timber. The top floor may be laid directly upon the plank, or a layer of mortar may be laid between the plank and the top floor; in some cases asbestos paper has been interposed. The layer of mortar offers great security in preventing the passage of fire downward. The roof which has been described corresponds substantially to

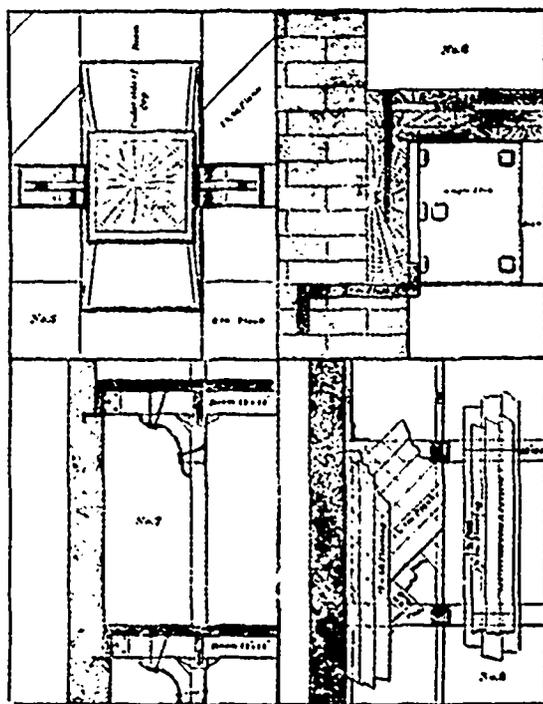


DIAGRAM SHOWING THE OUTER LINE OF POSTS (HORIZONTAL TRUSSES OR ALLEYWAYS) AND OUTER WALLS, SO ADJUSTED THAT THE FLOORS INSIDE THIS LINE OF POSTS MAY FALL FROM THEM WITHOUT STRAINING THE POSTS OR THE WALL. IN ANY CUSTOMARY METHOD THESE POSTS SHOULD BE THUS PROVED.

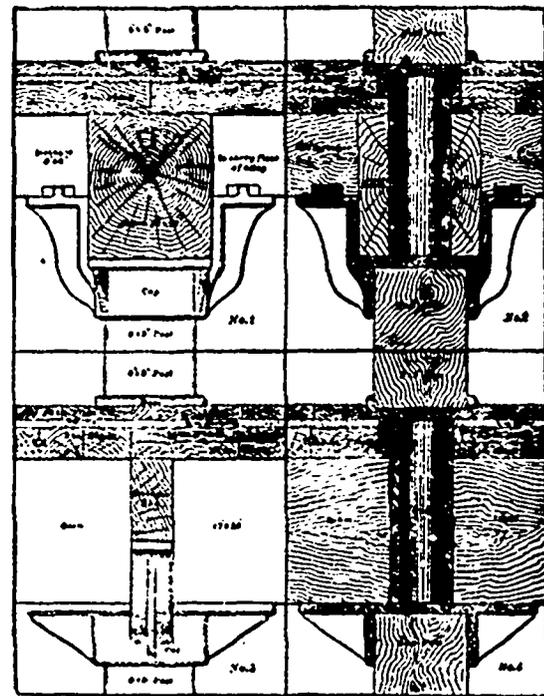
the floor, to wit; three-inch plank laid upon the timbers, one-inch sheathing on the under side if desired, and sometimes one-inch boarding on the plank; then the ordinary outer covering of whatever kind may be adopted. If the roof is exposed to great humidity with-

in, as in the machine-room of a paper-mill, one inch of mortar may be interposed between the roof boards and the plank. This latter roof proves to be impervious to cold or heat, and with proper means of ventilation gives security against any possible condensation of moisture from the atmosphere within.

An alternative plan consists in setting the first line of posts at the right distance from the wall to make a passage-way, the floor of the alley being laid of two thicknesses of plank crossed—the posts being fitted with hackmatack knees. This form of horizontal truss braced to wall and post gives great stability to the building.

If the building is over one story in height the stairways ought to be placed either in separate towers outside the building proper, or else in the corners of the building surrounded by brick walls, the doorways being protected by adequate fire-doors consisting of wood encased in tin, iron being one of the most treacherous materials customarily made use of for the protection of doorways in party walls. In such a factory no cornice is required or permitted, and no sheathing within set off by furrings from the wall can be tolerated. No concealed space is allowed anywhere in which a fire can pass from room to room or from cellar to attic. Every part of the building must be open, so that water from bucket or hose can be thrown anywhere.

If these plans and specifications are compared with the ordinary method of combustible architecture, the



POSTS, PINNACLES AND CAPS CUSTOMARILY ADOPTED IN MILL CONSTRUCTION.

reason will be apparent why textile factories, paper-mills, and other works are better fire risks and are insured at less cost than the average so-called stone church, brick hospital or asylum, or iron warehouse, although the nature of the work done carries with it almost every cause of fire hazard from ignition, friction, or spontaneous combustion, while in many cases the material used is almost explosive.

The builders of factories in city or in country may perhaps derive some useful information from this description of slow-burning construction, for the reason that if carried out consistently and economically it will cost less than the ordinary method of combustible architecture.

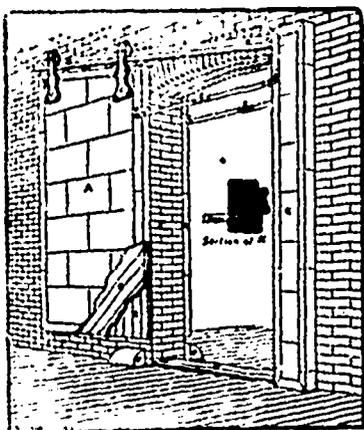
It may be interesting to add that a mill building of from three to five stories in height can now be constructed in New England in accordance with these plans at a cost above the foundation varying from sixty to seventy-five cents per square foot of floor, counting every floor, but not counting the basement unless it is a high basement to be made use of in the same way that the other floors are used. The cost per square foot of floor will vary somewhat according to the position, and according to the interior finish required with respect to sheathing and other matters. A mill two stories in height, *i. e.*, of two floors for use, can be constructed at somewhat less cost, as the walls may be lighter in proportion to the area.

Under ordinary conditions a mill of one story in height can be constructed at about the same cost per square foot of floor as the four or five story mill if the ground is level and the subsoil is such as not to require any excessive expenditure in the foundation. A lighter frame work and less expensive methods have been adopted in some cases in one-storey construction, so that the cost of the building per square foot of floor has been considerably less than the sum named—even as low as

fifty cents per square foot of floor. For many purposes, such as for shoe factories or other light work, these changes and this kind of economy may be admitted, provided a false economy is not applied in the construction of the roof. The whole comfort and welfare of the operative in the one-story factory depends upon the solid construction of the roof and the monitors, the plank to be three inches thick. Ordinary sloping skylights should never be permitted, as they transmit heat; while the monitor, with its vertical windows, reflects the heat and may be made use of to promote ventilation. In all cases the windows in the monitors either should be double or the sash should be glazed with two plates of glass in the same frame, in order that the condensation of moisture on the inside of the windows may be avoided. Experience proves that these flat-roofed buildings, even when constructed from one to three acres in extent, are not more liable to collect snow than are other forms of roof, and they are very much more easily cleared of the snow when it does collect. The English saw-toothed roof, so called, generally placed over the weaving buildings, has not proved to be desirable in this country north of Philadelphia owing to the tendency of the snow to collect in the valleys; it is also more costly than the roof of the one-story building lighted by monitors, as given in this plan. The light in the saw-toothed roof being always taken from the north it may possess a slight advantage, but in the monitor the windows towards the south can be clouded so that there will be no objectionable glare within the room.

The plan has been adopted in many cases of carrying the brick-work to the roof between the windows; more often, though the brick or stone work is carried only to the window-sills, the superstructure being wholly of timber and glass.

In many cases it is desirable that there should be no open space under the floor, both with the view to avoid



AUTOMATIC FIRE-DOOR.

danger and to give stability and freedom from vibration to heavy machinery. To meet these conditions special plans are furnished by the factory mutual companies for laying plank directly on the ground without danger of decay.

It is not a pleasant experience for the officers and inspectors of the factory mutual insurance companies to pass, day by day, bad examples of combustible architecture occupied as shoe factories, clothing factories, and the like, or to see other unsafe buildings in which branches of industry are conducted which have not yet come under the supervision of skilled inspectors and underwriters, but which in their intrinsic hazard are safer than the textile arts. It is not pleasant to witness the mushroom growth of five-story wooden buildings standing often in the middle of a field where land is of little value, in which hundreds of people may be daily exposed to great danger, and hundreds of thousands or even millions of dollars' worth of property are subject to a heavy charge for insurance because the buildings have no right to exist. These officers and inspectors know from their own experience or that of their predecessors, covering fifty years, that more commodious, better ventilated, better lighted, more comfortable, and safer buildings could be constructed for the same or for less money than these examples of combustible architecture usually cost.

It would not be within the province of this article to describe the customary equipment of factories with pumps, pipes, hydrants, automatic sprinklers, watchman's electric record clocks, fire-escapes, and the like; all these safe-guards are fully described in the technical publications of the factory mutual insurance companies. The purpose of this paper is only to call attention to the relatively low cost of slow-burning construction, and to suggest that because the customary methods of building are bad it is not therefore necessary to rush to the opposite extreme and to spend money in futile attempts at fire-proof building for ordinary uses. In fact, there

is no such thing as a fire-proof building; a building may be constructed wholly of incombustible material and may yet be totally destroyed by the combustion of the contents, especially when the iron members of such a building are unprotected from the heat of a fire among the contents. Granite is one of the most worthless materials for withstanding heat. In a recent fire in one of the factories insured under the supervision of the writer a granite post 12x12 inches was reduced to sand by the same fire that burned into a wooden post next to the granite less than one inch. Sandstone and marble are not quite so bad; unprotected iron is most treacherous and unsafe, especially cast iron; brick, having already passed the ordeal of fire, is substantially indestructible, and when combined in a suitable manner with heavy timber and plank, the latter being protected by wire lathing or by other methods for retarding the action of heat, serves the best for the safest construction.—Edward Atkinson.



F. L. Green, of Greenwood, has ordered a "sperry feed" for his Allis rolls from Wm. & J. G. Greey, of Toronto.

H. Brown & Son, Carleton Place, Ont., have ordered six "sperry feeds" for their rolls from Wm. & J. G. Greey, of Toronto.

The Columbia Flour Mill Co., of Siccamoos, B. C., has ordered a No. 2 wheat heater from Wm. & J. G. Greey, of Toronto.

P. R. Hoover, of Green River, Ont., is adopting Wm. & J. G. Greey's system of connected rolls and rope drive for his rolls.

The Geo. T. Smith Co., are removing the stones from Heslop Bros' mill at Wellandport, and substituting one of their two break roller and centrifugal mills.

Robert Bruce, Esq., of Gormley, Ont., has ordered 3 double sets of 6x18 rolls, one No. 1 aspirator, and one No. 1 centrifugal reel from Wm. & J. G. Greey of Toronto.

We regret that a change of advertisement for the W. F. Cochrane Roller Mill Supply Co., reached us too late for this issue, but will appear in our May number.

Messrs. Sherk & Snider, of Baden, Ont., are putting in one of Greey's improved vibratory scalpels, also a motion indicator manufactured by Wm. & J. G. Greey, of Toronto.

Messrs. Bingham & Webber have just completed a delivery to Patterson Bros. & Co., of Woodstock, Ont., of 40,000 of the finest agricultural catalogues ever prepared in the Dominion.

Mr. J. S. Barker, formerly of Alvinston, Ont., has connected himself with Messrs. Wm. & J. G. Greey, and is at present engaged in the work of rearranging the roller mill of H. Brown & Son, at Carleton Place, Ont.

In our March number our reference to Messrs. Frost & Wood's order for catalogues from Bingham & Webber was made to read as though it was only for 1,000. The order was for 25,000 and the notice referred to the first shipment only.

Messrs. Wm. & J. G. Greey, of Toronto, will supply the new roller machinery for the mill at Utopia, Ont., owned by Messrs. J. & R. Bell. It is to be on the short system with provision for increasing the capacity should the trade warrant it in the future.

Sir W. P. Howland expresses himself as highly pleased at the result of the change made in his mill at Lambton Mills, by the Geo. T. Smith M. P. Co. It is now a full roller mill of 150 bbls daily capacity, making three breaks on wheat, and using the Geo. T. Smith full Centrifugal Bolting system.

Messrs. Lomer, Rohr & Co., of Montreal, placed an order with Wm. & J. G. Greey of Toronto, for 2 No. 1 centrifugals and two run of millstones, also elevator cups, belting, etc. This machinery is for the preparation of phosphate.

Pearen Bros., Brampton, are erecting at that place a 100 bbl. mill. No expense will be spared to make this one of the most complete mills of its size in Canada. The Geo. T. Smith Co., furnished the building plans and plans for locating machinery, and all the machinery from engine to flour packer will be made at their shops in Stratford.

M. Staples of Bethany, Ont., has ordered an outfit of roller machinery for his mill, and work will soon be commenced. It is expected that the mill will be ready for work by the time seeding is over. Messrs. Wm. & J. G. Greey of Toronto, have the contract.

The millwrights employed in remodelling Hon. Justice Cross' mill at River Beaudette had a rather unpleasant experience. They had just commenced work there, and had part of the machinery in the building, when it was levelled to the ground by a cyclone. Fortunately none of them were seriously injured. The mill has since been rebuilt and is now in successful operation.

Messrs. Wm. & J. G. Greey, of Toronto, have contracted with Mrs. Catharine Bonfield, Eganville, Ont., for the rebuilding of her mill lately destroyed by fire. The mill will contain besides the roller machinery, 3 run of stones for provender, rye, etc., and will be on a larger and more complete scale than before its destruction last January.

Mr. James Norris recently made a contract with the Geo. T. Smith Middlings Purifier Co., of Stratford, to change his mill at St. Catharines, to their full roller and Centrifugal system, using their noisakas belt drive roller mills, together with their horizontal cleaning machinery and bran dusters in connection with their centrifugals, inter-elevator flour dressers, purifiers, &c. It is expected the mill will be ready to start early in April.

Messrs. Wm. & J. G. Greey have completed and started in operation Mr. Stephen Knight's mill, at St. Marys, Ont., it being exactly five weeks from the time the mill was stopped till it was running again as a roller mill. Any one interested in short system or small mills will be amply repaid by a visit to this neatest of little roller mills.

Mr. Robert Noble of Norval who has the finest mill building of its size in Ontario, and who has been a successful stone miller when inferior roller mills were useless, has abandoned the stones, and is changing to the full roller and centrifugal system. The Geo. T. Smith Co., of Stratford, have the contract. The mill will have a capacity of 300 bbls., and the arrangement of the machinery is peculiar from the fact that one half the mill can be shut off in case of low water, and the other half run at 150 bbls.

Wm. & J. G. Greey have a contract for the refitting of Thos. Stephenson's mill at Omamee, on the roller system. It is to contain all the latest improvements including 4 double sets of 9x15 rolls of Greey's improved system of connected rolls and rope drive, and will be a complete and perfect roller mill. Mr. Wm. Bate, of Peterboro, is to do the millwright work, the plans and flow sheet being supplied by Messrs. Wm. & J. G. Greey.

The attention of those interested in the manufacturing and working of grist mill machinery is directed to the advertisement of Alonzo W. Spooner, of Port Hope, Ont., maker of copperine. This metal stands the pressure and wear of roller mills admirably. It is peculiarly adapted to the uses of all kinds of grist mill machinery, and many of the best manufacturers are using it in preference to any other metal. It is reliable, always true to its character, and can be procured from nearly every hardware dealer in the Dominion. It requires nothing more than an iron ladle and a wood fire to melt it, and is a great saver of oil. It is not expensive, and will give great satisfaction. It speaks volumes, that the largest engines in the Dominion, those of the Toronto water works, run on copperine bearings night and day for weeks without stopping, and Chief Engineer John C. Ferguson recommends for general use, Spooner's copperine.

The W. F. Cochrane Roller Mills Supply Company will open their Dundas shops again in the first week of April. Readers of the DOMINION MECHANICAL AND MILLING NEWS will remember Mr. W. F. Cochrane under whose patents the W. F. Cochrane Roller Mills Supply Company manufacture, was killed in Northern Michigan in January last, since which time the shops at Dundas have been closed down pending the adjustment between the Company and Mr. Cochrane's heirs. We are informed that this has been accomplished and the shops will open again at the time above indicated. The Company claims that their mills are giving the most entire satisfaction. They guarantee in writing a saving of 25 per cent. in power over any belted mill of any make whatever, and if the mills do not do what is claimed, to remove them and pay all damages sustained. They also refer any intending purchaser to any of the mills that are now being operated, which are twelve in number. They are also prepared to recorrugate and regrind rolls to any cut on short notice.

### A DANGEROUS PRACTICE.

THE fifth annual report of the State inspector of workshops and factories in Ohio is full of instructive matter, and shows that Inspector Dorn has been mindful of his duties. Among other things, says *Locomotive*, he makes some good suggestions regarding the care of boilers and fittings, which we quote and commend: "Another dangerous practice is the caulking of joints in steam pipes while pressure is on. If pipes or fittings are corroded, as they very frequently are, there is danger that the chisel or caulking tool may be driven through the pipe. In such a case the workman is likely to be seriously scalded. The practice of screwing up man-hole, hand-hole, and similar plates, while boilers are under pressure, to stop leakage, is of a similar nature and should be as strongly discountenanced. A great many accidents have been caused in this manner. The following occurred some years ago: A battery of three horizontal tubular boilers was fired up, and on raising steam the joint of one of the man-hole plates was found to leak quite badly. Instead of letting down the steam and repacking the joint, a wrench was applied and the attempt was made to stop the leak by screwing up on the bolt. This proving insufficient, a long piece of pipe was slipped over the handle of the wrench and more force applied. The immediate result was the fracture of the man-hole frame, the explosion of the boiler, the destruction of about \$10,000 worth of property, and the loss of three lives."

Messrs. H. Lovell & Sons of Coaticook, P. Q., run five saw mills, and pay out in wages, \$2,000 per week.

A local paper, speaking of the rapidly diminishing pine supply of the Province of Quebec, draws attention to the effect that the war of the rebellion had on the trade of the port of Quebec, when the southern ports were closed. For some years before the war the annual supply of red pine was about two millions, and for the last three years of the war the annual supply was over five millions, and after the war was over the supply of this wood fell to less than its previous proportions. Yet, going back to 1847, it is found that the supply of red pine alone was over eight millions, that is to say, over one million feet more than what is now ascertained to be the total manufacture this winter of red and white pine combined from the Ottawa district, the Nipissing and the New Country together, and when the enormous increase in the trade of the United Kingdom to-day, compared with the dates mentioned is considered, the time can not be far distant when for purposes of trade the white pine tree will become as rare as the buffalo is to-day.



PUBLISHED MONTHLY,

BY

CHAS. H. MORTIMER,

Office, 81 King Street West,

TORONTO, - - CANADA.

#### ADVERTISEMENTS.

Advertising rates sent promptly upon application. Orders for advertising should reach this office not later than the 25th day of the month immediately preceding our date of issue.

Changes in advertisements will be made whenever desired, without cost to the advertiser, but to insure proper compliance with the instructions of the advertiser, requests for change should reach this office as early as the 22nd day of the month.

Special advertisements under the headings "For Sale," "For Rent," &c., if not exceeding five lines, 50 cents for one insertion or 75 cents for two insertions. If over five lines, 10 cents per line extra. Cash must accompany all orders for advertisements of this class.

#### SUBSCRIPTIONS.

The DOMINION MECHANICAL AND MILLING NEWS will be mailed to subscribers in the Dominion, or in the United States, post free, for \$1.00 per annum, 50 cents for six months. Subscriptions must be paid strictly in advance.

The price of subscription may be remitted by currency, in registered letter, or by postal order payable to C. H. Mortimer. Please do not send cheques on local banks unless 25 cents is added for cost of discount. Money sent in unregistered letters must be at sender's risk. The sending of the paper may be considered as evidence that we received the money.

Subscriptions from all foreign countries, embraced in the General Postal Union will be accepted at \$1.25 per annum.

Subscribers may have the mailing address changed as often as desirable. When ordering change, always give the old as well as the new address. Failure upon the part of subscribers to receive their papers promptly and regularly should be notified at once to this office.

#### EDITOR'S ANNOUNCEMENTS.

Correspondence is invited upon all topics pertinent to the mechanical and milling industries.

This paper is in no manner identified with, or controlled by, any manufacturing or mill-furnishing business, nor will a bestowal or refusal of patronage influence its course in any degree. It seeks recognition and support from all who are interested in the material advancement of the Dominion as a manufacturing country, and will aim to faithfully record this advancement month by month.

*Readers of the "MECHANICAL AND MILLING NEWS" will confer a favor upon the publisher and derive material benefit themselves by mentioning this paper when opening correspondence with advertisers. Drop us a postal card when you have written to an advertiser, give us his name, and then we will put you in the way of getting the benefit. Don't forget this.*

TO manufacturers the illustrated article in the present number of the MECHANICAL AND MILLING NEWS, on "Slow-Burning Construction as applied to Mills and Factories," will no doubt prove instructive and valuable. The discussion of ways and means to prevent extensive fire losses in mills and factories, and reduce the cost of insurance on the same, cannot be otherwise than profitable.

THE special committee of the Ontario Legislature appointed to consider Mr. Garson's Bill providing for the examination and licensing of stationary engineers has decided that the matter cannot be dealt with this session. The Committee recommends that the Government take the matter up next session. The conflicting interests affected by the proposed measure doubtless accounts for the apparent disinclination of the legislators to come to a decision regarding it.

IN the matter of granting bonuses to manufactories, the people of British Columbia appear to be wiser in their day and generation than those of Ontario. The Vancouver News-Advertiser opposes the bonusing of a flour mill on the sensible ground that to a mill which contemplates doing an export trade the city offers advantages of location sufficient to secure the establishing of the enterprise without a bonus; while on the other hand, if the mill only contemplates doing a local trade, its importance would not justify the city in giving it assistance.

IN a recent number we advocated the formation of a Millers' Association for Ontario, and pointed out a few of the advantages which would be likely to result therefrom. On another page of this paper we print an able address on "The Advantages of Association," delivered by the Chairman at the Central Millers Convention held recently at Indianapolis. A perusal of this address shows that the advantages of association on the part of men engaged in the same line of business are sufficiently numerous and important to justify Canadian millers in taking advantage of them.

THE *Mail* says free trade with the Americans would help the Canadian miller out of his difficulties. We must candidly declare that we don't believe anything of the kind. How can the Canadian miller hope to obtain profitable sale for his flour in the markets of the United States, when those markets are already so congested that American millers are obliged to combine to limit production in order to realize any profit whatever on their operations? The *Mail's* suggestion may further be dismissed from consideration on the ground that with such a surplus production of flour in the United States, there is not the ghost of a chance of the American import duty being removed.

AN English mechanical journal recently drew attention to the carelessness in packing machinery for foreign shipment characteristic of American, as compared with English manufacturers. While heavy castings from English houses are said to often reach their destination in a damaged condition, the most breakable American castings are delivered in perfect order. Here is a matter that should receive the attention of Canadian manufacturers who have already entered or intend to compete in foreign markets. The *American Machinist* truly remarks that the manner in which machinery is packed has a good deal to do with the shape in which it gets to its destination, and the shape in which it gets to its destination has a good deal to do with future orders.

MILLERS and other users of bags will be interested in knowing that a rise in price of this article is regarded as among the probabilities of the near future. The reason given for this belief is the report that the jute bagging trust in the United States, is to be revived. It is said that eight firms have bought up all the jute butts and practically own every ton of jute in the world. They are thus in a position to force the outside mills to come to their terms. The Standard Oil Company, which is believed to be interested in the jute trust, is said to have bought up all the patents covering the process of converting pure straw into bagging, thus eliminating one of the chief means of creating competition with the jute. The single cheering feature about the situation seems to be the fact that there will be little or no demand for a covering for cotton until the middle of August. In the meantime, it is hoped that some way out of the clutches of the combine will present itself.

THE experiment of sharing profits with employees, which has been found to work satisfactorily in many instances in the United States, is being tried by a few large employers of labor in Canada, amongst whom we learn, are Messrs. Bertram & Sons, proprietors of the Canada Tool Works, at Dundas, Ont. Nearly a year ago, this firm entered into an arrangement with its employees by which each of them receives a bonus in proportion to the amount of his earnings during the year, but forfeiting 25 cents for each day that he absents himself from work, except that he does so on account of sickness. The first distribution of profits recently shows that at least so far as the employees are concerned, the system has worked advantageously. The fund amounted to nearly \$1,200, and the amounts received by each employee, including apprentices, ranged from \$25 to \$50. No doubt equal advantages have accrued to the proprietors. The regular attendance of workmen upon their duties, would of itself, we imagine, be almost a sufficient recompense to the employers. It is hoped that the success attending such common-sense methods as this of making more harmonious and mutually profitable the relations of employers and employees, will lead to their wider adoption.

THE eyes of many persons interested in saw milling and lumbering are at present turned in the direction of British Columbia, as a field for future profitable operations. Until quite recently a great scarcity of information prevailed in the east regarding British Columbia as a lumbering country. The completion of the Canadian Pacific Railway has afforded the means whereby many of our Eastern mill owners have personally visited the Pacific province, acquainted themselves with the present situation of affairs, and formed well-founded opinions regarding the future. To those who have not had the opportunity of seeing for themselves, the following information supplied by Mr. Levi Bonth, of Ottawa, who has recently returned from an extended visit to British Columbia, will be of interest:—"The lumber prospects in British Columbia are enormous. There appears to be no limit to the amount of timber there. The dimensions of the trees are something grand. On the day that we arrived at Vancouver, near the city a tree that leaned over the C. P. R. track was

cut down, and out of part of it was cut a square of timber 4 feet by 3 feet 10 inches. We also saw a single log in which there was 7,000 feet of timber. Frequently trees are cut down in which 47,000 feet of timber are sawn. The timber there is of the finest quality, consisting principally of fir, pine and spruce. The spruce is very much like our Ontario white pine, being equally soft and smooth. The milling industries there are not so advanced as they ought to be; they appear to be thirty years behind Ottawa in the sawing of the wood. In Ontario we try to be as economical of the timber as possible in the sawing of it, and our saws are of such a nature as to make the smallest waste possible in the way of sawing. In British Columbia the cutting of their saws through the log hacks a road through it at least half an inch wide, and you can fancy the waste in that. The difference between our loss and theirs is that we would make 900,000 feet of lumber they would make only 800,000. But they appear to be satisfied, and look upon any arrivals among them in the shape of Ottawa lumbermen as greenhorns who want to learn how to work the timber properly. The whole trouble lies in the saws they use. I asked them why they do not use band mills, but they said they preferred those they had. Owing to this conservatism, they find difficulty in the handling of the timber, as it is too large, and usually split up the logs with gunpowder, thus incurring great waste, as the logs often split in all directions. At Seattle we only saw one band mill running. The Americans are building two mills at Tacoma, and are putting in two band-saws and a gang. The British Columbians would do well to follow suit. Another great drawback to millers on the coast is the ravages of the timber worm. Owing to it the mill owners cannot keep a stock of logs afloat in the salt water. This worm is about 1 1/2 inches long and gets into the log through the water. In a couple of years enormous logs will look apparently perfect and can be crushed flat, owing to the interior being completely honey-combed by the insect. When piles are sunk for wharves or other purposes they are sometimes covered with boards to protect them from the worms, but these soon go. The only way to get ahead of the enterprising creatures is to sink iron piles, which, however, are expensive. The lumbering is all done in the driest part of the summer. In Ottawa we use horses and sleighs; in British Columbia oxen are used, and the logs dragged out on skids, over the dry, slippery ground."

#### THE FLOUR DUTY.

WE are pleased to see the spirit of persistency manifested by the millers who are endeavoring to secure justice from the Government in the shape of an increased duty on flour. Having "put their hands to the plough," after years of silent suffering, we trust there will be no turning back until the object sought is attained. It is gratifying also to notice that the millers are gaining friends and assistance as the justice of their demand becomes more widely understood. The Toronto Board of Trade is lending its powerful aid to the movement by the adoption of the following resolution, moved by Mr. M. McLaughlin, seconded by Mr. Edward Gurney, of this city: "Whereas the ruling principle in our tariff of customs is the protection of home industry by the imposition of higher import duties on the manufactured article than on the raw material; and, whereas, in one of the most extensive industries of the country—flour milling—the reverse of this principle is applied, wheat, the raw material, being subjected to a much heavier duty than flour, the manufactured article, the result being that of the total imports for home consumption of wheat and flour 99 per cent. is flour; and, whereas, large stocks of American flour are now held for home consumption in Canada, while great depression exists in the milling business of this country in consequence, many of the largest mills being entirely shut down and their employees paid off, while few, if any mills, large or small, are running enough to pay expenses; be it therefore resolved, that this board appoint a deputation of its members to go to Ottawa to respectfully and urgently press on the Government the necessity for so far amending the duty on flour as to relieve the Canadian milling industry from the disability under which it labors." Messrs. Matthews, McKinnon, McLaughlin and Gurney were appointed a deputation to lay the resolution before the Government. The basis of appeal contained in the above resolution is the one upon which the millers should firmly stand and continue uninterruptedly the agitation so successfully begun. The Government of this country has declared its adherence to a policy of protection to home industries as best calculated to develop and maintain our national prosperity. The people of this country have again and again expressed by their votes their concurrence in and approval of the

protective policy of the Government. Protection has been granted most of the manufacturing industries of the country, in spite of the fact that some people objected on the ground that the price of the manufactured article would thereby be increased to the consumer. The Government and the people decided—wisely, as we believe—that the development of our manufactories and affording means for the employment of our people, was a matter of more importance to the welfare of the commonwealth, than the endeavor to make this a cheap country to live in by allowing it to become the slaughter market for foreign manufactures. This brings us to the important question—why are the two thousand millers of this country refused protection under a Government elected by the people to administer the principles of the National Policy? No attempt has ever been made to answer this question. It admits of no answer. The *Toronto Mail*, in an article on the subject puts the matter thus:—"The better argument in favor of a readjustment, however, is the circumstance that the duty upon the raw material is so far in excess of that upon the finished product as to make manufacturing impossible. Here the millers have a logical standing ground, for it is downright inhuman, as both protectionists and free traders must admit, to tax the material out of which an article is made, beyond the point to which protection is carried, and to expect the over-taxed industry to continue its operations and to make money. While this discrimination continues it is absurd for the protectionists to talk of the beneficial results of the National Policy. Why, the present fiscal arrangement is a National Policy raised by Canada on behalf of the Americans. It does not discriminate against the Americans. It does not give them free trade. It positively levies a duty upon the Canadian miller, and allows the American miller to escape scot free. It is protection for the American. Even those who do not approve of high duties can sympathize with the Canadian manufacturer who is thus crippled." When Sir Charles Tupper, as Financial Minister, brought down his proposition to increase the duty on imported iron, a shout of indignation went up from end to end of Ontario that the price of iron to the large number of consumers would be considerably increased, while the imposed duties would benefit but a handful of manufacturers. There was without doubt considerable ground for this complaint. What answer did Sir Charles make to the numerous deputations which called upon him to protest against the imposition of the higher duty? In effect he said, "The Government has committed itself to a policy of protection to Canadian industries, and is determined to consistently administer that policy." Why does not the Government display an equal amount of consistency and back-bone in dealing with the anomaly of the tariff in its bearing upon the important industry of milling? Canadian farmers are nominally protected to the extent of 15 cents per bushel, which is no more than they are entitled to, seeing that the American market is secured to the American farmer by a duty of 20 cents per bushel on imported grain. What the Canadian miller is entitled to under the National Policy, is a duty on flour proportionate to the duty on wheat. With the large and widely distributed milling capacity of this country, and the rapidly increasing number of mills in the Northwest, it is folly to talk of an advance in price to the consumer as the result of a higher import duty on flour. We contend, however, that under its present policy the Government is bound, even should it result in increasing the price of flour, to accord to the millers the protection which has been given to manufacturers in other lines. If it is not prepared to administer the National Policy consistently, that policy at once ceases to become protective as well as national. "Consistency is a jewel." The millers ask for nothing more than justice, and the Government can rest assured that there is no danger of the political heavens falling should justice be granted them. In any event, however, its plain duty is to see justice done.

#### PUBLICATIONS.

WE are in receipt of a copy of *Once-a-Week*, a journal devoted to fiction, fact, sensation, wit, humor and news, published by P. F. Collier, at 104 Attorney St., New York. *Once-a-Week* is handsomely printed and illustrated, and contains a large amount of interesting literary matter in the various departments mentioned. One of the humorous features to a Canadian in the number before us is a double-page illustration, representing "The Annexation of Canada." The Prince of Wales is depicted in the act of hoisting the American flag over the Dominion in the presence of many distinguished Britishers, Canadians and Americans. This picture should alone be a sufficient indication that the journal in question keeps not only abreast, but in advance of the times.

#### A CRIPPLED NATIONAL POLICY.

TEN or twelve years ago the Canadian people determined by a large majority in favor of a system of National Policy. It was perfectly well understood at the time that the policy so named included protection to agriculture as well as to manufactures; and, in fact, it was on this broad and inclusive quality that the claim of the Policy to be called "National" was founded. Unfortunately the new policy has gone lame and crippled from the start, simply because it has never yet had fair play—having never yet been fairly and fully carried out. As regards manufactures a passably good beginning has been made and with such success as might well encourage us to go further on the same road. But by a strange fatality we have failed to carry Protection out as we should have done—to the farmer on his wheat and to the miller on his flour. A piece of glaring and most indefensible injustice has been continued, and has been tolerated, for ten years after the country had voted that it should come to an end. Now, unless this injustice be remedied, and the system of National Policy carried out as originally intended, then not only the whole N. P., but the coherence of the Dominion itself, may be in danger.

There are two reasons why the injustice which has been tolerated for ten years would not be a safe thing to continue now. First, because it is only recently that the market in Europe for American flour has so given way as to leave dealers over the border with a very large unsaleable surplus on hand. In the face of this tremendous pressure to sell, our trifling duty of 50 cents per barrel is practically no barrier at all. Those who are "posted" as to the condition of the flour trade over the border will confirm us in this assertion—that not for very many years has there been such a failure of markets to sell in as has been experienced of late. The spasmodic effort made last year by "Old Hutch" and others did raise prices more or less in Chicago, but in Europe its main effect was to draw increased supplies of wheat from other parts of the world. And those increased supplies from India, South America and elsewhere now stand in the way, blocking the sale of what Chicago and Minneapolis are anxious to get rid of. These considerations should make it easy to understand how it is that ever since September last, low grade western flour has been coming in like a flood upon Canadian markets from Toronto to Montreal, and from Quebec to Halifax and the far east and of Nova Scotia. American dealers have always been ready to exchange their poor quality flour for Canadian cash, that is an old story. But not for many years before have they been under such pressure to sell as since the opening of the current year—September, 1888, to September, 1889. However, it is not much to our present purpose to go further back in the record than 1879, for that was the year in which our own great change of system took place. Both our farmers and our millers had a right to expect that, from 1879 forward, the injustice of former years would trouble them no more. And if it does trouble them now, it is not because the National Policy has failed but simply because the National Policy has not yet been carried into effect. Try to "catch on" to this fact, that now the situation is no longer what it has been during most of the years since 1879. What Canadian millers did endure before, in a manner, they cannot endure now, because the collapse of the European market for American flour amounts to a revolution in the trade. Say not therefore that Canadian millers have stood it before, and that you "guess" they can manage to stand it yet. We beg to assure you that things are not now what they used to be, and that what has been endured in time past will after this be found too grievous to be endured at all.

The other reason referred to we must state very briefly for the present, though it is likely to require a good deal of re-stating in time to come. It is substantially this—that the bringing in of the great Northwest has created a new situation within the Dominion itself. Before, there was only one Province with wheat and flour to sell, Ontario to wit. But the case being altered alters the case. Manitoba is now in the market with her surplus to sell, and there are other new Provinces soon to follow. The wheat and flour interest has been an important one in Canada for long, but you can see that from this time on it must be growing more important every year. And the greater and more important it becomes the less will farmers and millers be inclined to allow anybody to "sit" on them. The young giant is growing and he knows it, and if you are wise you will do him justice on this wheat and flour question quickly ere he takes a notion to try his strength on you. All you, manufacturers or whoever else, who are interested in the permanence of the N. P., see that you have justice done as soon as possible to the wheat and flour interest,

which is the great and growing one of the Northwest. Can you not understand what the addition of this vast new country means, as regards *changing the balance* of interests in Canada? Let us whisper it "in your lug" that, if you refuse justice to the wheat and flour interests, your own may not long be as safe as you imagine. A word to the wise ought to be enough; let us hope it will be in this case.—*Toronto World*.

#### JOTTINGS OF A TRIP OVER THE MARITIME PROVINCES.

By L. A. MORRISON.

AN invitation to visit Montreal during carnival week and see the sights, led to my considering whether it might not pay to take a run down into these Eastern Provinces, and form the acquaintance of the customers we had down in this part of the Dominion. After a little consideration of the matter I came to the conclusion to arrange so as to spend one or two months, if necessary, looking up business in New Brunswick and Nova Scotia, and now that I am here and getting acquainted with the people, their facilities for manufacturing, their methods of production and the direction of their markets, I thought perhaps, an occasional letter to my mechanical friends, who were readers of the *MECHANICAL AND MILLING NEWS* might be acceptable. First then as to general impressions:

I came down to this Province on the Intercolonial Railway and my first impressions were, that it was a pretty desolate, snow-covered wilderness, the snow ranging from 4 to 6 feet deep on the level, in the northern part of the province; and this I was assured was a very light snowfall.

As seen from a car window the next impression is that the country is all new, as whatever little clearing was to be seen above Newcastle, looks as if it had been done within the last ten years; I am informed that all that part of the Province along the line of the Intercolonial is comparatively new, and just being cleared up.

I cannot judge of the value of the farm land, but a large amount of lumbering is being done, so much so that some of the saw and shingle mill manufacturers down here are doing a great deal more business than some larger concerns in Ontario are doing. Their shingles are made out of spruce and cedar, very nearly exclusively out of cedar, and most of the mill men are satisfied if a machine can cut 15,000 shingles a day.

A very large proportion of the entire province is yet to be lumbered over before being cleared up.

A great deal of American lumber milling is done in this Province as the head waters of the St. John River, and a number of its tributaries have their source in the State of Maine. The logs are cut up there and floated down the river to the mills situated at one place or another along the river down within the reach of navigation. Not only this output of the mills, but practically all the other output of the saw and shingle mills of this Province goes to the United States, and one can very easily understand, knowing these facts, why quite a number of the people should be strongly in favor of reciprocal trade, or annexation. All the money for their fish and lumber industries comes to them from the United States, and they say that very little goods are sold from this Province up into the upper Provinces. I am pleased, however, to note among all the mill men I have come in contact with yet, and the business men, a very warm thorough Canadian sentiment, and a desire, as much as possible, to trade with their sister Provinces, and I have no doubt that with the completion of the new Canadian Pacific Railway connections, which will shorten the distance between Montreal and St. John over 300 miles, an increasing reciprocal trade will be done between the Provinces, and this, more than any other one element of connection, will foster and build up as one country this Canada of ours.

With your permission I will touch the line of industries one at a time in future letters, giving particulars and statistics.

St. John, N. B., Feb. 27, 1889.

The Sawyer & Massey Company are seeking incorporation for the manufacture of machinery, engines, boilers, waggons, carriages, cars, agricultural implements, etc. The chief places of business of the company within Canada will be Toronto and Hamilton, and the proposed amount of its capital stock is \$100,000. The names of the applicants are Messrs. Hart Massey, Toronto; Henry P. Coburn, Hamilton; Chester D. Massey, Walter Edward Massey and Frederick Massey, Toronto.

Recent improvements in the transmission of electrical power are expected to lead to its adoption in factories on the score of economy. A considerable saving can be effected in the avoidance of loss by friction where belts and pulleys are used, while one set of machinery can be run to better advantage, allowing the rest to remain stationary. The same dynamo can also be made to supply light without additional cost. The facilities for transmitting power to several detached buildings are also immeasurably greater than by any other system.

## Western Letter.

HERE in Western Canada we are now in the midst of seeding. We have always claimed for the West that the spring is earlier than in the East, and this year it is not an exception to the rule. This year seeding may be said to have commenced on the first day of March. On Saturday, March 2nd, a ten acre field of wheat was sown on the experimental farm at Brandon. On the closing days of the same week and during the following week, some sowing was done here and there all over the Province of Manitoba, and at the same time of the weather is as warm as a May day. Indeed, I have experienced colder weather on the 24th of May in Western Ontario, than it is here to-day. There is no delay about seeding in Manitoba. The ground is not left wet and muddy when the snow goes off, but seems to dry from the top downward, so that the farmer can go to work at once, almost as soon as his fields are free of snow. In the Territories westward from Manitoba, farming operations are even earlier than in the Province. Plowing was reported from some far-Western points in February. Indeed, plowing could have been done in any month during the past winter at certain periods, in the western portion of the Territories. It is also a noticeable fact that at Edmonton, 1,000 miles northward of Winnipeg, and the most distant agricultural settlement in the prairie region, the spring sets in as early as in Manitoba, and sometimes even earlier. Some here claim that spring weather comes from the northwest. At any rate, the far northwestern sections of this great prairie region seem to be favored with as early springs as in Manitoba, and the southern portions of the country. This early spring is by no means unusual either. Last year the spring was later than usual, but the year before, seeding was earlier than this year, quite a number of fields of wheat having been sown in February.

With the favorable start already secured this year, it may be concluded that our farmers are enthusiastic over the prospects of a fine crop. In this country it is said that with an early and favorable spring, the crop is three-fourths ensured, and there is doubtless a great deal of truth in the assertion. Hence there is good reason to be sanguine of a fine harvest. The early spring will also enable the farmers to get in a large acreage of crop. Last fall was a favorable one for fall plowing, and a great deal of land was prepared for crop, though the very late harvest of last year delayed plowing in some sections. Those who were thus delayed, will be able to get their full complement of acreage sown. In a dry season, however, spring plowing is not regarded with favor here, as the ground dries out more quickly than on fall plowing, sometimes causing a light yield. With an average of rainfall, however, fine crops can be raised on spring plowing. Of course it is impossible to foretell the nature of the season, and it is therefore best to be on the safe side and have all the plowing done in the fall that it is possible to handle.

Estimates are already being made on the acreage which will be sown to wheat in Manitoba this year. Figures of course differ widely, but all agree that there will be an unusual large percentage of increase over other years. Last season was a favorable one for summer plowing, being a fairly wet summer, and on this account a great deal of new land was broken. The immense crop of 1887 also stimulated the farmers to extend their operations. It is certainly very greatly within the mark to say that more new land was broken in Manitoba last summer, than in any previous year in the history of the Province. In the older settled districts, farmers who had not increased their acreage for years, nearly all broke up from ten to fifty acres of new land last summer. Then there is the steady increase in population by immigration, causing an annual increase in the acreage. All this new land broken last season, will be sown to wheat this spring. Stimulated by the high prices which have ruled for wheat this winter past, farmers will also put a larger portion of their old land into wheat. During the past winter, wheat has brought nearly, and at times, fully double the price it was worth here in any years since Manitoba began to export wheat in quantities, while barley and oats have been unsatisfactory in prices paid here this winter. All this will tend to increase the wheat acreage. Estimates of the probable increase in the area vary from 20 to 50 per cent. Taking into consideration the amount of new land broken last summer, the early spring, and the influence of prices, it would seem safe to place the increase in the area for 1889 at 30 per cent., against an increase of 20 per cent. for 1888, under rather unfavorable circumstances for the latter year. Last year the area sown to wheat in Manitoba was about 518,400 acres. An in-

crease of 30 per cent. on this acreage would give us a total of 673,920 acres. These figures serve as a basis for calculating the possible wheat crop of Manitoba for 1889, thought it may be that this is counting the chickens before they are hatched. However, we will put it as a possible crop, and not call it an estimate. In 1887, the last year for which full returns of the crop are at hand, there were 432,000 acres sown to wheat in Manitoba, which it is claimed produced nearly 14,000,000 bushels of wheat. At any rate, it is certain that exports from the province were over 10,000,000 bushels, wheat and flour. Now, at the same average yield as in 1887, Manitoba will this year produce, from the increased acreage, about 21,590,000 bushels of wheat. Of course it may be several years before as large an average yield is returned as in 1887, but it is within the possibilities that it may be reached this year. Then the allowance made for the increase in the acreage is much smaller than a majority of estimates, and possibly may be considerably within the mark. To the crop of Manitoba would be added the wheat production in the Territories to the west of the province, so that with a real good crop this year in this prairie region of Canada, it is clear that exports will not be far from 20,000,000 bushels. This may be looked upon as an extraordinary estimate, but it is quite within the possibilities that the figures may be reached this year. When our exports get up to 20,000,000 bushels and upwards, yearly, as they very soon will, this country will be given a standing as a wheat country which it has hardly yet attained.

The movement of wheat from first hand has dwindled away to almost nothing during the last few weeks, and it is considered that the crop of 1888 has now about all passed into the hands of dealers. Spring farming operations now going on, would prevent the marketing of grain, even should there be any quantity still held by farmers. Usually a little wheat is carried over by farmers for summer marketing, after spring seeding is finished, but this year it is believed by those best informed, that scarcely any wheat is being held by farmers for summer marketing. The reasons for this belief are first, that the weather and roads were very favorable for marketing grain through the winter, and secondly, that the high prices paid would have the effect of drawing out all the surplus wheat held. There was a great rush delivering wheat for a week or ten days following the first indications of spring, and as just at this time prices were at the top, it is concluded that farmers hauled in about all their surplus wheat during this rush, so as to get through to commence seeding and plowing. Prices have ruled pretty firm and high here for some weeks, and there has been keen competition among buyers, as it was evident that the quantity of wheat in the province would fall short of earlier estimates. Millers were therefore anxious to get hold of what they could while it was going. During the earlier part of March, prices paid farmers for best samples of wheat, throughout Manitoba, averaged \$1 per bushel. This would be equal to \$1.15 to \$1.20 per bushel on track at Port Arthur, or \$1.30 to \$1.35 at Montreal or Toronto according to rates from the different shipping points. At some Manitoba points as high as \$1.05 was paid to farmers. This is a big price in comparison with former years, as heretofore 60 cents to 75 cents has been considered good average prices for No. 1 hard wheat here. The prices paid here through March have been higher than Duluth, as for instance when Manitoba wheat was worth \$1.15 to \$1.20 laid down at Port Arthur, cash, No. 1 hard at Duluth ranged from \$1.13 to \$1.15. Earlier in the season, however, the opposite was the case, as prices here during a portion of the winter were from 5 to 15 cents under Duluth. This was owing to the low quotations ruling at Montreal and Toronto, as compared with Duluth, Minneapolis and other western markets in the United States. Now, however, eastern markets have been more equalized with western markets for Montreal, Toronto, etc., have advanced or held their own, while Duluth, Chicago, and Minneapolis have settled down in prices. The result of this is, that Manitoba wheat is now proportionately higher, in comparison with the United States western markets, than it has been at any time this season. Altogether the course of prices this season has been very erratic and uncertain, and the season's operations does not promise to prove a good one for dealers and millers, though an excellent year for the wheat producers. Dealers who loaded up at the commencement of the season, when prices to farmers here ranged as high as \$1.20, do not feel enthusiastic over the outlook. There was not much wheat purchased as high as \$1.20, but a good deal was bought at from \$1 to \$1.10 during the early part of the season, which with carrying charges and expenses would make it cost now from \$1.10 to \$1.20 on track at the point of purchase, or say \$1.37 to \$1.47 laid down at Toronto, on

a basis of all rail rates. These high prices were paid at the commencement of the season, while the boom fever lasted at Chicago. Later and during most of the winter, prices to farmers here ruled from 80 to 90 cents, for best samples, until recently, when they have been again advanced.

A good deal of interest is taken here in the agitation to have the duty on flour advanced. It is considered that the importation of flour from the United States works directly against Manitoba, as high grades of flour such as are produced from our hard wheat, are more likely to be imported than low grades, made from soft wheats. We are also strongly opposed here to the grinding-in-bond privileges, as applied to grinding imported wheat, believing that it is detrimental to our interests.

### HOW TO MAKE MONEY WITH A MILL.

THE reason that flour mills have not made the money that they should in the last few years is because millers, as a rule, do not know how to figure the cost per barrel of making flour. We submit the following remarks, which we hope may prove of benefit to you. If you do not already know these things, ask your miller or manager.

How much wheat does it take to make a barrel of flour? Prove the answer by your books for the last six months.

What is your capacity, and how many barrels of flour have you averaged per day since July 1st, 1887?

What per cent. of each grade do you make? Prove the answer by your last six months' run.

How much money does it cost to make and sell a barrel of flour?

What profit do you make on each barrel of flour? Prove the answer by your books.

HOW TO FINE COST PER BARREL.—Calculate interest on plant and money invested. Add to this, insurance account; taxes; expense account, which should include fuel, oil, light, labor, stamps, and incidentals; repair account; salary of manager, if a stock company, or if mill is owned by miller, add to this account what his time is worth if he worked for some other mill. Then divide this amount by the actual number of barrels of flour made, and you will have the true cost of a barrel of flour. Divide by the actual number of barrels made, and not by estimated capacity. Figure on six months' or a year's run, and not on a week's.

### INTERNATIONAL CONGRESS OF APPLIED MECHANICS.

THERE will be held at Paris at the Conservatoire des Arts et Metiers, an International Congress of Applied Mechanics, under the patronage of a Committee of Honor, comprising savants and engineers of renown both from France and from other countries, who will give the work of the Congress the benefit of their influence and the weight of their authority. The President of the Committee on organization is Monsieur Phillips, ex-inspector general of mines (retired). The five members appointed from the United States are, in the order of their mention on the official bulletin, Messrs. Robert Grimshaw, (Pres. Polytechnic Section Am. Institute, N. Y.); R. H. Thurston, (Director, Sibley College of Cornell University, Ithaca); Prof. Egleston, (Columbia College School of Mines, N. Y.); and the Presidents of the American Societies of Civil and of Mechanical Engineers.

At this Congress, among the important subjects submitted for discussion are the unification of the horse power; the choice of materials in machine construction; the mechanical production and utilization of artificial cold; transmission to a distance, and distribution of work, by other means than electricity, (water, air, steam, cables, etc.); automatic cut-off engines with several successive cylinders; thermo-motors other than the steam engine.

Other topics, treated by papers, will be improvements in steam engines since 1878; progress among associations of owners of steam appliances; and improvements in apparatus for the generation of steam, (more particularly sectional boilers).

### PERSONALS.

Mr. Robert Finck, late head miller for Mrs. Bonfield, Eganville, Ont., has accepted a similar position with Mr. Alex. McLaren, of Osceola, Ont.

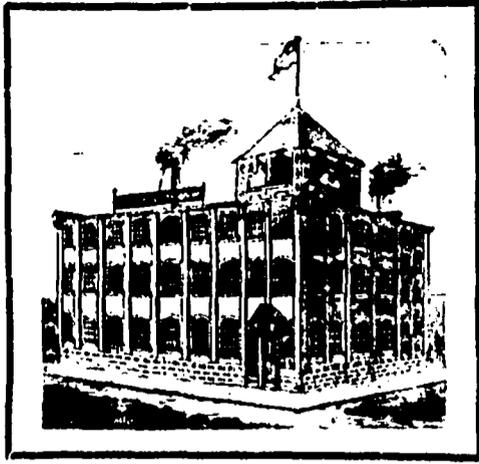
Mr. F. C. Smith, engineer for the Gale Manufacturing Company, Toronto, was presented with a handsome dinner service by his fellow employees, on the occasion of his 45th birthday.

Sawdust thrown on a circular saw table will render the hauling of heavy planks quite easy. The grains act as small rollers and reduce friction.

# THE BAG AND HESSIAN FACTORY OF CANADA.

## BAGS

Of every quality and size.



A Special Feature is the MACHINERY FOR MANUFACTURING HESSIAN CLOTH. Every quality and every width can be supplied same day as ordered.

### BAG PRINTING IN COLOURS

We are now printing 5,000 to 10,000 Bags daily, and are turning out the BEST WORK in the country, at the LOWEST PRICES.

WRITE FOR SAMPLES OF OUR BAG PRINTING IN COLOURS.

THE OLDEST, MOST COMPLETE AND BEST EQUIPPED Bag Factory in the Dominion.

WE MAKE EVERY DAY THIRTY THOUSAND BAGS  
THE CANADA JUTE COMPANY, Limited,  
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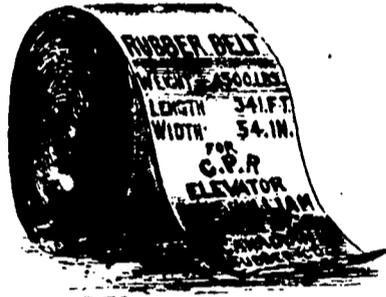
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IS UNEQUALLED IN AMERICA.

ALL KINDS OF RUBBER PACKINGS. RUBBER, ENGINE, HYDRANT, SUCTION, STEAM, BREWERS' AND FIRE HOSE. RUBBER VALVES, CAR SPRINGS, WRINGER ROLLS, CARRIAGE CLOTHS, BLANKETS, ETC. MOULD GOODS OF EVERY DESCRIPTION.



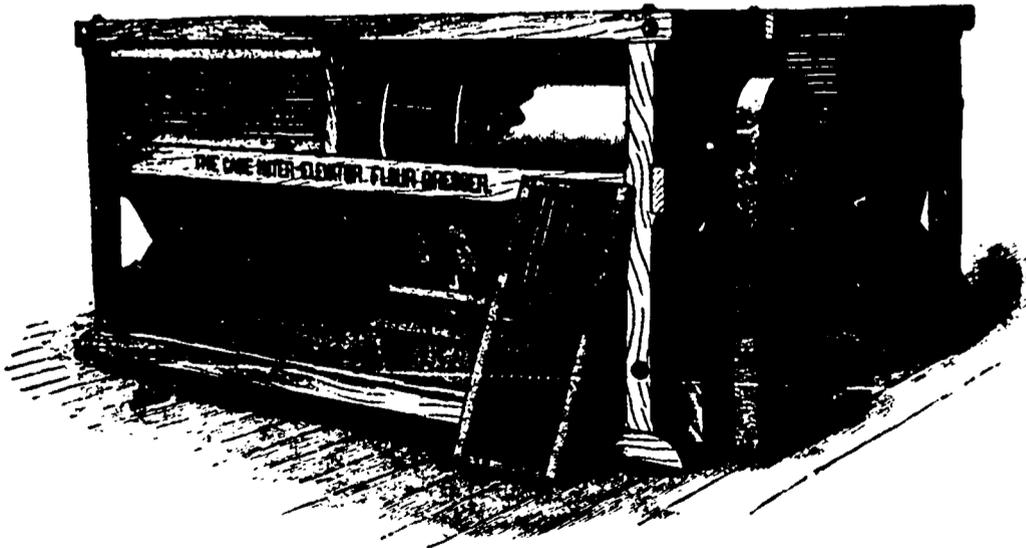
Western Branch, Cor. Yonge & Front Sts., Toronto  
J. H. WALKER, Manager.

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John Inglis & Sons,

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## SOMETHING NEW THE "CASE" INTER-ELEVATOR BOLT



The principle of this Reel can be applied to the old style Hexagon Reel at a small cost. If you are limited in bolting capacity, or have trouble in dusting your middlings properly, or desire to redress your flour, you can make very great improvements on the results of your mill by changing your Hexagon to our INTER-ELEVATOR BOLTS.

WRITE FOR PRICES AND DESCRIPTIVE CIRCULAR.

A FULL LINE OF MILL MACHINERY AND SUPPLIES, ENGINES, BOILERS ETC.

JOHN INGLIS & SONS,  
MACHINISTS, ETC.

NO. 6 STRACHAN AVENUE - TORONTO.

**METHODS OF MAKING AND CORRUGATING ROLLS.\***

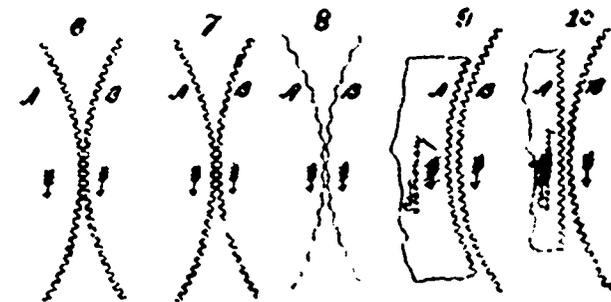
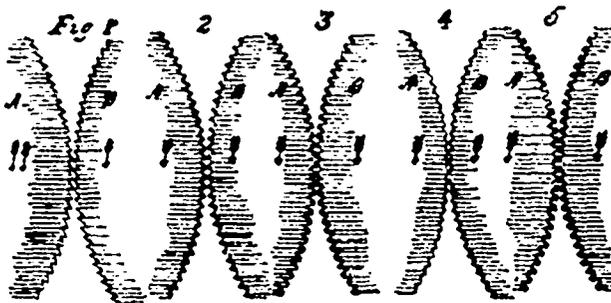
By J. L. LEASK.

In treating of this subject the writer will first give a brief description of how the rolls are made and prepared for corrugation, also a simple device used for corrugating rolls and then compare the different styles of corrugations, stating some of the advantages and defects of each. The shafts to be used in the rolls are cut from round bars of iron or steel, as the case may require. They should be of good quality, and of such size as not to bend under any unusual pressure that may be brought to bear upon them, during the operation of grinding. The roll bodies for flour mill rolls, are at the present time mostly all of chilled cast iron, and are fastened to the shaft by being cast on to it. Each shaft is centred and straightened on the lathe, and then ground on the stone at the places where the molten iron is to adhere to it. The grinding removes any rust or scale that may be on the shaft in these places, and puts the surface in a better condition for receiving the hot iron, and allowing it to form a close contact. When the moulds for casting are ready, each shaft is laid in its proper place in the mould. The mould is closed, (i. e., the halves are put together) melted iron is poured in, left to cool and become fast to the shaft. After the rolls are cleaned of the sand from the moulds with a steel wire brush or other means, they are taken to the lathe, put in and turned true at the surface and ends. Journals and places for the gearing and pulleys are turned to the proper size and finished. Porcelain rolls were at one time very extensively used in Europe, but there were also many smooth chilled iron rolls, perhaps more than porcelain, in use. The porcelain was in the form of a cylindrical shell, and the mode of fastening it to the shaft, was to key on shaft a ribbed cast core, half an inch smaller than the inner diameter of the shell, then fastening the latter to the cast core by pouring melted sulphur in between the roller shell and core. Now when the boxes got hot and the shaft with the cast core expanded, the sulphur and porcelain did not expand and consequently would burst. Another source of breakage, was the loosening of the shell, and the sulphur becoming broken by the constant jarring and trembling. This mode was superseded by one in which the rolls were fastened merely by friction, and the air was allowed to circulate between the shaft and the shell. Two faced off flanges are keyed on the shaft, and the porcelain shell is put between them, and by means of three strong bolts, the flanges are pulled together on the shell, as much as the bolts will stand. The surface of the porcelain roll is finely turned off by means of diamonds. The condition of the roller surface has greater influence on the work than the speed of the rolls. The roll is made either smooth or grooved, and in the latter case the grooves can be either parallel to the roller shaft or put in the shape of very steep screw lines, both rolls having a right or left hand thread, so that the corrugations cross each other at the point of contact, effecting the shearing of the particles to be cut or reduced in size. The latter method has also the advantage of making the machine run more quietly and evenly. The amount of spiral twist given the grooves should vary with the character of the material being broken. Soft grain takes more twist than hard, because it is more sticky, and more twist gives more shearing action, which frees the corrugation from the sticky matter. The size, depth and width of the grooved rolls are determined by the work the rolls have to do, as coarsely grooved rolls cannot be used, if particles fed to the rolls are already fine. Special machines built in the most recent and modern style, and supplied with all the arrangement and conveniences for corrugating rolls, are now in use where special attention is paid to the manufacture of rolls. To describe one of these would be rather lengthy for this paper, but a brief description of a very simple device which can be used on any common iron planer, may serve to give an idea of how rolls can be corrugated.

It is not meant to be set forth as a rival to the more modern machine, which is of course preferable where it can be had, but only as a simple, easily-made, cheap and effective device within certain limits—a device which can be made by any manufacturer requiring one. The construction is briefly as follows:

The roll to be corrugated, is supported by means of two standards of cast iron, of the form of angle plates, bolted on to the table of the planer. The roll is placed lengthwise in a horizontal position between them; one of the supports has a centrepin passing through it at the

top, against which one end of the shaft of the roll butts; the other is supplied with a bearing, in which one of the journals of the rolls is placed and secured by a cap. The roll is thus held in position by means of the centrepin at one end, and the bearing at the other. The end of the roller shaft which projects towards the rear of the planer, is connected to the end of a larger shaft, which has a square groove running in a steep screw line on it. The spiral twist on the shaft, produces a similar one on the roll as it is being cut. This shaft is made to slide through a wormwheel, which is supported by means of two standards and a cross piece. These connecting their upper ends are fastened to the side of the planer bed, one on each side, behind the main standards of the planer. On the hub of the wormwheel is a journal, which works in a bearing in the cross piece connecting the upper ends of the standards. A short key is stationed in the bore of the wormwheel, and operates in the groove of the shaft as it slides through. The wormwheel is of course kept from turning by means of the worm, until another groove is about to be cut in the roll. The grooves are cut one by one. The shaft on which the worm is keyed is turned by a ratchet wheel and lever. The end of the lever drops on the rear end of the table, and receives its due amount of stroke, as the table moves backwards and forwards. Care must be taken to have the axis of the roll in line with the direction of the motion of the planer table. The cutting tool is sharpened and set accordingly to the shape of the corrugation required. In order to avoid much trouble in lining up again when the supports for the rolls have been shifted,



a shallow groove is made along the centre of the table, and a projection to fit this groove is cut on the bottom of each support and set in it. As to the style of the groove the saw tooth as represented in Fig. 1 seems to be a favorite for first break. Fig. 2 represents the dress of the Sulzer rolls used about thirty-five years ago. Fig. 3 is seldom used. Its form is like Fig. 2, with its points turned off. Fig. 4 is a very shallow corrugation, the space between points is greater than the depth. Figs. 5, 6, 7 represent corrugations that were used on very old rolls. Fig. 8 shows round grooves, but very shallow and wave like. Figs. 9, 10 show deep round grooves, but in Fig. 9, B is the roll and A is the stationary concave shoe. In Fig. 10 B is the roll and A a stationary straight shoe. In the system of breaking wheat on corrugated rolls the aim of the miller is to reduce to middlings which are purifiable, and to make as little flour as possible during the breaking process, as it cannot be purified and will be mixed, more or less, with bran particles and dust having adhered to the wheat berry. The dress as shown in Fig. 1 gives the best results. Roll A is the fast roll and runs two or three times as fast as roll B. The wheat if well graded will be split open lengthwise, almost every berry. Only a small quantity of flour is made in the first break, which flour is chiefly the dust, lodging in the crease of the kernels, and therefore only fit to go into low grade flour. By the splitting of the berries a greater portion of the germ is got rid of. If the ratio of the speed of the rolls be reduced, the conditions are changed, and more flour will be made, owing to the increase of the squeezing action. If the rolls be run at an even speed, the conditions are entirely changed, as there will then be only a squeezing action. Again, if B is made the fast roll and A the slow one, the conditions are entirely changed, as the work is

then done on the back of one tooth passing the back of the other, producing a rubbing or bruising action, which of course will again make more flour in the reduction which it is desired to avoid. If B is the fast roll, the pair of rolls must run about twice as fast to get capacity, and this of course means loss of power. The corrugations as shown in Figs. 2, 3, 5, 6 are very apt to clog between the teeth, nevertheless they produce a good many middlings owing to the sharpness of the teeth. The corrugations shown in Figs. 7, 9, 10, are rounded corrugations which give trouble on account of their filling up soon, and will do their work best on hard wheat. Two rolls working together, have been found by experience to give better results than rolls and shoes as the latter make too much flour, and the shoes wear off very fast. Dull rolls also require a great deal more power than the sharp ones, as it has been experimented upon and found that it takes twice the power to squeeze wheat as it takes to cut it. It is claimed that the rolls corrugated as shown in Fig. 1 are capable of doing any kind of work that can be done with the sharp or dull rolls. All depends upon what the operator desires to do, if he understands the principle of the roller action. For a higher percentage of middlings, he may run the roll A fastest, for low grinding, more flour, and fewer middlings, he may run B fastest.

**NEW TABLE OF PISTON SPEEDS.**

THE following table, prepared to aid me in rapidly calculating the horse power of engines, shows the piston speeds in feet per minute, of engines of various strokes in inches, and at different rotation speeds. While the manner of its use should need little or no explanation, a few examples are added. It is assumed that every one who handles an engine knows that the piston speed in feet per minute is got by multiplying the stroke in feet by the number of single strokes (twice the number of revolutions) per minute; but it may sometimes be handier to look in a table than to reduce inch strokes to feet and then double and multiply by the revolutions per minute.

Engine 18 inch stroke, 200 turns a minute, look in horizontal column opposite 18, and in vertical column under 200; there we find the piston speed in feet per minute, 600.

Engine 60 inch stroke, 50 turns; piston speed 550.

Stk.	1n	50	75	100	150	200	250	300	350	400
1/2	6							300	350	400
3/4	8							400	466.7	533.3
1	10							500	583.3	666.7
1 1/4	12					400		600	700	800
1 1/2	14					466.5		700	816.7	933.3
1 3/4	16				400	533.4		800	933.3	1066.7
2	18			300	450	600		900	1050	1200
2 1/4	20	166.7	250	300	400	500		1000	1166.7	1333.3
2 1/2	22	183.3	275	333.4	450	550		1100	1233.3	1400
2 3/4	24	200	300	366.7	500	600		1200	1333.3	1500
3	26	250	375	450	550	700		1300	1500	1700
3 1/4	28	300	450	500	600	750		1400	1600	1800
3 1/2	30	350	500	600	700	800		1500	1700	1900
3 3/4	32	400	550	650	750	850		1600	1800	2000
4	34	450	625	750	850	950		1700	1900	2100
4 1/4	36	500	700	800	900	1000		1800	2000	2200
4 1/2	38	550	775	900	1000	1100		1900	2100	2300
4 3/4	40	600	850	1000	1100	1200		2000	2200	2400
5	42	650	925	1100	1200	1300		2100	2300	2500
5 1/4	44	700	1000	1200	1300	1400		2200	2400	2600
5 1/2	46	750	1075	1300	1400	1500		2300	2500	2700
5 3/4	48	800	1150	1400	1500	1600		2400	2600	2800
6	50	850	1225	1500	1600	1700		2500	2700	2900

—Robt. Grimshaw in Power and Transmission.

**THE GREAT MACHINERY GALLERY OF THE PARIS EXHIBITION.**

THE really big thing in connection with the Paris Exhibition is said to be the machinery gallery and its great roof, a vivid description of which is given by the *Daily News* correspondent. This writer says: "We think a good deal in London of the span of the roof of St. Pancras Station, and of the size of Olympia. Neither will bear comparison with this vast rectangular building, in which the machinery in motion will be placed. I heard a gentleman boast that you might carry the London monument or the Vendome column about in it any way you choose—perpendicularly or horizontally. It is an interior which seems big enough even for a military review and sham fight. Olympia could be stowed away quite snugly in a portion of it. As one looks at the vast empty space it doubtless strikes one as more extensive than in reality it is. To correct this impression I will give a few figures. The Palace of Machinery is 1390 feet long, 150 feet high, and has a roof of iron, glass, and wood of one magnificent span of 360 feet. Of its kind it is the biggest thing hitherto accomplished in the world. There are 6000 tons of iron in it, and it cost £120,000. The Gallery, as for convenience I will now term it, is traversed from end to end by four lines of shafting for distributing the motive power, which is given to the exhibitors by the French government, together with gas and electricity. Above, a great upper gallery runs round the whole length for exhibit of the lighter machinery."

\* Paper read before the Engineering Society, School of Practical Science Toronto.

# The Geo. T. Smith Middlings Purifier Co.

Offer for sale the following Second-Hand Machinery :

1 No. 2 Smutter, manufactured by W. & J. G. Greev,	- - -	\$ 50
1 No. 2 Smutter, manufactured by Howes & Babcock,	- - -	70
1 Run Chop Stones, against sun, four feet six inches,	- - -	60
1 Run Chop Stones, with sun, four feet,	- - -	50
1 Four Break Machine, rolls 6 in. x 20 in., Goldie & McCulloch,	- - -	300
2 Garden City Purifiers, each	- - -	50
5 Barter Purifiers, each	- - -	100
8 9x14 Porcelain Rolls, (new), each	- - -	30
5 Single 9x30 Roller Mills, Gear Drive, manufactured by John T. Noye Co., each	- - -	125
2 Single 9x24 Roller Mills, Gear Drive, manufactured by John T. Noye Co., each	- - -	110
2 Single 12x24 Roller Mills, Gear Drive, manufactured by Goldie & McCulloch, each	- - -	100
1 Single 12x24 Roller Mill, Belt Drive, manufactured by Goldie & McCulloch,	- - -	100
1 Single 9x18 Roller Mill, Gear Drive, manufactured by Jones & Co.,	- - -	75
1 Single Jones' Stone for Middlings,	- - -	50
1 Becker Brush, capacity 60 to 80 bushels, manufactured by Goldie & McCulloch,	- - -	75
1 Double 9x14 Style B Roller Mill, manufactured by Miller Bros. & Mitchell,	- - -	200

*These Roller Mills are in perfect order, with new cabinets, rolls re-ground, journal boxes re-babbitted, and the machines guaranteed practically new.*

*We have for sale a full line of special machines of our own manufacture, which includes a full line of*

**Upright and Horizontal Cleaning Machinery,**

**and Upright and Horizontal Bran Dusters.**

*We are Canadian Agents for the Knickerbocker Co., of Jackson, Mich., for the manufacture and sale of the Celebrated*

## CYCLONE DUST COLLECTOR,

*And are placing eight of these machines in the 300 bbl. mill we are building for Jas. Norris, at St. Catharines, and eleven in Robert Noble's mill at Norval, which we are changing to our Short Centrifugal System, with a capacity of 300 bbls.*

# THE GEO. T. SMITH MIDLINGS PURIFIER CO.

United States Shops: JACKSON, MICH.

STRATFORD, ONT.



Mr. Marsh will erect a large saw mill at Maple, Ont.  
 Mr. J. O'Donohue is having his mill at Bad Throat River, Lake  
 Winipic, repaired.  
 Thos. A. Appleyard, owner of a saw mill at Flora, Ont. is re-  
 ported to have failed.  
 The Parry Sound Lumber Company are having their water mill  
 and tramway overhauled.

Messrs. Sidler, Dundas & Co., Lindsay, Ont., have added a  
 matching and planing machine to their saw-mill.  
 Mr. S. Rogers of Cedarville, Ont., has purchased machinery in  
 Toronto for his saw mill, which he is about to rebuild.

The Collins Bay Rafting Company have completed preparations  
 for timber rafting on an extensive scale at Belleville this season.  
 The C. P. R. has reduced the rate of freights on lumber shipped  
 from British Columbia to points in Manitoba and the North-west.

Mr. Firmin Dugas, ex-M. P. for the County of Montcalm, Que.,  
 and the owner of several extensive saw mills, died suddenly a week  
 ago.

Messrs. Gillies Bros., of Braeside and Carleton Place, Ont.,  
 have purchased Mr. Thos. Kearns' lumber business at Morris-town,  
 Ont.

Mr. Wm. Coon's saw mill at Beaumont, Ont., was destroyed by  
 fire recently. The engine house was saved. Loss about \$800, no  
 insurance.

Spruce trees in Quebec are being killed in large number by a  
 small fly, said to be about 1/4 of an inch long, brownish in color  
 and bearing four wings.

The Lakefield Lumber Company have cut about 80,000 logs  
 during the winter. Their lumber cut during the season they  
 expect will amount to ten million feet.

It is estimated that 100,000,000 feet of pine timber was destroyed  
 by fire in Thunder Bay district, Lake Superior, between the Cana-  
 dian Pacific Railway and the Minnesota boundary.

It is said to have been ascertained beyond doubt that lumber  
 can be sawed cheaper and more profitably at Montreal by steam  
 mills than it is now at Ottawa with all their water privileges.

The capacity of the Vancouver Lumber Company's new mill at  
 Vancouver, B. C., will be from fifty to sixty thousand feet per day  
 of lumber, and 20,000 laths. Thirty-five to forty men will be em-  
 ployed.

The Dominion Government has paid out \$10,172 to cover costs  
 in the suit for the possession of lumber limits carried on with the  
 Province of Ontario in the name of the St. Catharines Milling  
 Company.

It is reported that McCauley & Co., the new owners of the  
 Chemunus saw mill, B. C., have purchased the mill site at the  
 head of Esquimault harbor, near Victoria, and will erect a large  
 mill there.

The amount of export duty collected on saw logs and other lum-  
 ber last year was as follows: Ontario, \$125,499; Quebec, \$21,337;  
 Nova Scotia, \$1,772; New Brunswick, \$493; British Columbia,  
 \$3; total, \$128,007.

The sale of the Shelburne, Ont., planing mills and factory ad-  
 vertised to be sold on April 1st under mortgage from Thos. Jennings,  
 will not take place. The present owners have paid up the amount  
 due and the sale is withdrawn.

The Canadian Lumber Cutting Company, Belleville, established  
 a year ago, are largely increasing their capacity. Engines and  
 boilers are being put in. A large hot blast dryer and a quantity of  
 other new machinery is also being added.

It is said that there is not enough pork produced in Canada  
 in a year to supply one ordinary gang of lumbermen, hence  
 thousands of barrels are imported from Chicago every year by the  
 Ottawa valley lumbermen and sent to the shanties.

The Royal City Mills, Westminster, B. C., have cut a sample  
 order of 25,000 feet of whitewood for the C. P. R. carshops at  
 Vancouver. It will be used as an experiment for car finishing  
 purposes, and if satisfactory, a large quantity will be manufactured.

Official reports from the Icelandic settlement in the Northwest  
 Territories state that these settlers have sawed about 3,000,000 feet  
 of lumber during the past year. They have two sawmills, two  
 steamboats and a number of barges, which they are working in  
 connection with their mills.

The following are the wages paid in British Columbia for work-  
 ing in the woods and saw mills: Mill hands, \$35 to \$45 per  
 month, axemen and swampers, \$35 to \$45; axemen and swamp-  
 ers, green hand, \$30 to \$40; teamsters at mills, \$2 to \$2.50 per  
 day; teamsters in the woods, \$50 to \$65 per month; board is  
 from \$8 to \$10 per week.

Messrs. J. R. Booth and John McLaren, the millionaire lum-  
 bermen, accompanied by Mr. Charlton, M. P., had an interview with  
 Hon. Mr. Foster a few days ago in regard to the export duty on  
 logs. They expressed the hope that the Government, before  
 coming to a final decision on the tariff changes, would carefully  
 consider this duty, with a view to its repeal. Failing that, they  
 hoped the old rate of \$2 a thousand would be reverted to.

A late invention for the use of sawmills, called the rosser, or log  
 siding machine, removes the bark and the outer slab from a log,  
 forming a cant of the required dimension without the use of a cir-  
 cular, and is regarded by those who have used it as a valuable  
 device. The log is passed through a set of revolving wheels with  
 a series of knives which grind off the outer slab upon the log, and  
 it passes thence directly to the gang or circular to be cut as re-  
 quired. It leaves no slabs, as the entire amount which would in  
 the old process form slabs and thin boards, is ground by these  
 knives.

An Ottawa despatch states that a few days ago a terrific explo-  
 sion took place on one of the sawdust deposits on the Ottawa river,  
 shattering the heavy ice to atoms and precipitating a number of  
 gentlemen, who were skating in the vicinity, into the water from  
 which they were rescued in a drowning condition. Owing to the  
 frequency with which these explosions from spontaneous combus-  
 tion have taken place during the past year, it has become danger-  
 ous for small boats to cross the river.

The bill introduced into the Dominion Parliament by Hon. Mr.  
 Cosgigan imposing fees on timbermen sufficient to cover cost of  
 culling and increasing the number of cullers, has met with such  
 strong opposition that its withdrawal may almost be considered  
 certain. Mr. Perley, the well-known Ottawa lumberman, pointed  
 out that as the timber is all inspected when it reaches its destina-  
 tion, the proposed measure would serve no purpose.

It is reported that eight hundred men have been thrown out of  
 employment in Lunenburg county, Nova Scotia, within the past  
 year, by the closing down of three of the large mills on the La  
 Have River, the law prohibiting the depositing of sawdust in  
 navigable waters having been put into force there. The firms  
 mentioned were fined several times and finding that the law was  
 to be enforced, chose to shut down their mills rather than run  
 them by steam.

The announcement of the failure of the old-established firm of  
 Christie, Kerr & Co., of this city, caused feelings of widespread  
 regret. At a meeting of creditors a statement was submitted  
 showing liabilities amounting to \$155,000. A correct valuation of  
 the assets has not yet been arrived at. Mr. Tennant made an offer  
 to the meeting to purchase the assets for \$20,000. Mr. W. H.  
 Howland, who represented the Central Bank, objected to the ac-  
 ceptance of the offer. The meeting subsequently adjourned, to re-  
 assemble after the estate has been fully inspected and valued.

Mr. Fred Robinson, of Donald, B. C., who has been on a trip  
 to Toronto, is reported to have disposed of his mill business to an  
 incorporated company, known as the Columbia River Lumber  
 Company, Limited, with a capital of \$30,000. Messrs. Ross &  
 McKenzie, and Mr. Robinson, who will be general manager, are  
 the principal stockholders. They will commence at once the erec-  
 tion of a new gang and circular mill, which they expect to have in  
 running order by 1st May. The machinery has been purchased.  
 The mill will have a capacity of 80,000 feet per day, besides shin-  
 gles and lath.



Elmvale, Ont., wants a factory and machine shop.  
 Geo. P. Phillips is erecting a foundry at Selkirk, Man.  
 Stuart & Monro's moulding shop at Thorold, Ont., was dam-  
 aged to the extent of \$700 recently.

A natural gas company offers to supply gas for fuel to the peo-  
 ple of Windsor at 10 cents per 1,000 feet.

The rolling mills at Portland, N. B., were burned recently.  
 Estimated loss about \$125,000. Eighty hands will be thrown out  
 of employment.

Mr. Adam Austin, of the Listowel, Ont., foundry has taken his  
 son, Mr. John Austin, into partnership. The business will be  
 carried on under the name of Austin & Son.

Mr. Adolphe Patrick of Maskinonge, P. Q., engineer and ma-  
 chinist, has purchased the foundry and machine shop of Messrs.  
 Day Bros., on St. John street, St. Johns, P. Q.

The London and Petrolia Barrel Company's Works at London,  
 Ont., and the machinery contained therein, were partially destroyed  
 by fire on March 18th. Loss, \$12,500, insurance \$10,500.

The Doherty Co., of Sarnia, have secured contracts for the  
 supply of their water boxes for water-works from Charlotte-  
 town, P. E. I., Quebec City, St. Hyacinthe and Three Rivers,  
 Quebec.

The city of St. John, N. B., has been encouraged by the success  
 of the Toronto Industrial Exhibition to attempt something in the  
 same line. A company has been incorporated to carry out the  
 project.

An English paper states that the modern labor-saving machinery  
 introduced into foundries and machine shops has resulted in fifty  
 men producing as many castings as were formerly turned out by  
 200 men.

The bid of \$10,000 made by John Woodison & Co. for the land,  
 plant, and machinery of the Sarnia Agricultural Implement Manu-  
 facturing Co. has been accepted. The new proprietors will set it  
 at work at once.

Mr. R. McKechnie of Dundas, Ont., has purchased four acres  
 of land near Hamilton, on which he will erect large machine shops,  
 for the manufacture of iron and wood working machinery. Em-  
 ployment will be given to 400 men.

The C. P. R. are building ten new powerful locomotives with  
 cylinders 20 by 22 inches and the boilers 84 inches in diameter.  
 They are built to stand a pressure of 150 lbs. and weigh 100 tons.  
 A trial of speed has elicited most satisfactory results.

Messrs. John Inglis & Sons of this city are to be congratulated  
 upon the escape from destruction of their works on the occa-  
 sion of the fire which a few evenings ago destroyed Messrs. Hess  
 Bros. chain factory a few yards away. Fortunately the wind  
 carried the sparks in the direction opposite to Messrs. Inglis & Sons  
 works.

Mr. R. T. Miles, of Cleveland, Ohio, accompanied by Mr.  
 Walker, M. P., had an interview with the Minister of Customs re-  
 cently in reference to the establishment of a factory in Toronto for  
 the manufacture of carbons for electric lighting purposes. A  
 United States company is going to start the factory and they are  
 anxious to secure protection on their product.

A correspondent sends us an account of the explosion of a  
 battery of boilers at the West Point Boiler Works, Pittsburg, Pa.  
 Four men were instantly killed and a dozen seriously, if not fatally  
 injured. The explosion occurred a few minutes after the noon  
 whistle had blown, otherwise the loss of life would have been even  
 more serious. When boilers are not properly cared for and ex-  
 plore in a boiler manufactory, where may we look for safety?

At East Baton Rouge, La., a Mr. Storer has on exhibition a  
 machine of his invention which cuts all sizes of tubs and buckets  
 out of Tupelo Gum trees, without staves. He makes eight tubs of  
 a single block. Bottoms are forced into the chime with a press,  
 Hoops are needed for ware made of the soft woods, although  
 the Tupelo does pretty well without. Twelve bowls are cut from  
 one block. It is claimed that a ten-horse power engine runs one  
 bowl machine, and two for tubs and buckets, each machines  
 making from 25 to 40 vessels per hour.

The new industry of making paper from sawdust at Ottawa has  
 proved to be a success. The paper made wholly of sawdust forms  
 admirable sheeting and is fit for building after leaving the mill,  
 being tarred and dried. In the production of the better quality  
 of paper one quarter of waste paper is used, the remainder being  
 sawdust. The supplying of the mill with machinery has cost  
 somewhere in the neighborhood of \$15,000. This mill is the only  
 one in Canada where paper is made from sawdust.

Having put a pivot in a pinton wheel, on attempting to drill,  
 I found no drill I could make would cut it, says a writer in the  
*Manufacturing Jeweler*. I thought of trying the same lubricator  
 as for cutting or drilling glass, viz., turpentine, and to my great  
 surprise I found the same drills cut freely and enabled me to get  
 over the difficulty. In a long experience and with many men, I  
 never heard of it being used before, and if not generally known, if  
 tried I am sure will remove a difficulty that I know has existed  
 with many repairers.

There is said to be a water wheel in use at Bowdoinham, Me.,  
 which is probably the only one of the kind in existence. This is  
 set in the stream so as to form a right angle with the current, and  
 at high tide about a foot of the rim is above the water. The wheel  
 is 27 feet in diameter; its spokes are wide and set diagonally, like  
 the vanes of a windmill. When the tide comes in it runs one way  
 and when it goes out it runs in the opposite direction, being run  
 18 hours a day by tide power. With one foot fall of the tide it  
 gives about 50-horse power.

It is a common remark says the *Milling Engineer*, that a fan is  
 taking a great deal of power because it is choked up so that it  
 cannot discharge the air freely. The reverse is true. The freer  
 the discharge the more power the fan will require to drive it, be-  
 cause it will be doing more work and moving a larger body of air.  
 With the discharge entirely closed, the only work done will be to  
 overcome the friction of the moving parts. A recent test at a  
 large planing mill in this city gave the following results:

Condition of Discharge.	Power Required.
Discharging into open air.....	193.23 horse-power.
.. through pipes.....	181.11 ..
.. into dust catcher.....	187.51 ..

The first concern to manufacture pig iron in Canada will prob-  
 ably be the New York and Nova Scotia Iron and Railway Com-  
 pany, which proposes to erect two furnaces at New Glasgow, N. S.,  
 one for Bessemer and one for foundry pig iron, one of which will  
 have a capacity of 25,000 tons per annum, employing several hun-  
 dred men in mining the required 50,000 tons of ore, 50,000 tons of  
 coal and 25,000 tons of limestone. Tunnelling will be commenced  
 this month to analyze and ascertain the extent of the deposits but  
 the outcrop gives good indications. A staff of ten engineers have  
 been surveying railroad routes from the mines to New Glasgow  
 and the Intercolonial railway since December 22, and the citizens  
 have offered 100 acres within the town limits to any company  
 working the mines. Bessemer pig iron is made from non phos-  
 phoric ore, of which there are several veins along the East river.

Mr. Andrew Tolton, Guelph, Ont., has obtained a patent for a  
 steam valve, which in the patent claim is described as follows: 1st.  
 A cylindrical valve, having ports as described, and fitted into a  
 correspondingly-formed chamber having a steam-space surrounding  
 it, and steam-ports leading to the ends of the cylinder, substantially  
 as and for the purpose specified. 2d. A cylindrical valve having  
 ports communicating through the other parts, with the steam-chest  
 and with the exhaust-chamber through the exhaust ports, in com-  
 munication with the cut-off sleeve having ports to correspond with the  
 ports first mentioned, the said sleeve being operated by a governor  
 or lever, substantially as and for the purpose specified. 3d. A  
 tapered cylindrical valve, fitted into a correspondingly-shaped  
 chamber, and provided with ports, as described, in combination  
 with a set-screw arranged substantially as and for the purpose  
 specified. 4th. The combination, with a revolving cylindrical  
 valve having suitable steam and exhaust ports, to communicate  
 with the engine-cylinder parts, of an adjustable sleeve fitted on to  
 the said cylindrical valve, and having ports to communicate with  
 the ports of the latter.

We hear a great deal said about more teeth, theories being set  
 forth claiming the more teeth the saw has, the more feed it can  
 stand, and make better lumber, says a writer in the *Northwestern  
 Mechanic*. To show how a great many are thus deceived when  
 certain conditions are not considered, I know of a man who has a  
 good mill, making good lumber, running on four-inch feed in pine.  
 This idea of teeth struck him and he concluded to increase his  
 capacity by adding more teeth. He made due allowance in his  
 estimation of how much more he could cut, and so he cut his  
 allowance in half. He was running 50 teeth in his saw, but con-  
 cluded to order 90 teeth. He ordered of the same saw maker, and  
 the saw came, hammered to speed. He tried it and it wouldn't go  
 straight. Several trials were made, but the saw heated so badly  
 on the rim that it was impossible to run it. So it was sent back to  
 the saw maker, and he couldn't tell why the saw did not go. The  
 trouble was the saw had too many teeth, and the feed (four-inch)  
 was not sufficient for each tooth to cut a chip, but cut, or rather  
 scraped the dust so fine that it escaped on each side of the throat  
 of the teeth, and binding between saw and board, heated the saw.  
 If this saw could have had the feed increased to eight inches it  
 would have worked well.

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## THE OBJECTS AND ADVANTAGES OF ASSOCIATION.\*

GENTLEMEN: I feel deeply impressed with the honor that you have shown me in electing me your chairman and I thank you very much indeed. I have prepared a few thoughts for the convention, and that I might be thoroughly understood, and not misunderstood, I have reduced them to writing. I therefore beg your patience.

To foster and perpetuate the mill interests of this country is a subject of great gravity and importance to a large number and to a large capital. The realization of the danger to the milling interests of America has awakened the mill-owners to the necessity of some remedy to correct the evils and stay the rapid destruction of their property and their vocation. This necessity is felt everywhere. I am fresh from a meeting held at Nashville, Tenn., where 44 mills were represented, with an aggregate capacity of 13,000 barrels a day. Gentlemen, we were surprised that so many responded to the call; many came who were not invited. We became acquainted with each other; told our experiences; harmonized and extended each other confidence, and the general good feeling was never excelled in any assembly of gentlemen, and this should be the sentiment here to-day. We organized upon the basis of the Central Millers' Association a society called the Southern Millers' Association. It is the purpose of the Central Association to make such rules and system of business as will protect and smooth the machinery of your transactions.

While it is the purpose of this association to maintain uniform prices, it is not its purpose to sustain high prices. To attempt to sustain high prices would be ruinous and demoralizing to the members of the association. If prices were held high, members of the association, being undersold by outside mills, would become restless, and the inducement would be strong to break the articles of agreement, but when prices are held in accordance with the intrinsic value of flour, there can be but little inducement for the weaker members of the association to violate their obligation. Therefore, gentlemen, it is important that prices rule low. It is the fear of many mills in the country that the purpose of our association to keep prices so high that their competitors will find it profitable to make concessions and take from them their business. It is likewise the fear of the general public that our object is extortion, and it becomes our duty to announce our purpose in unmistakable language, and let this language be action rather than words. I hold that the strength of this organization lies in making low prices. This will do much to induce mills that are now standing out of this association to join us. It is not apparent gentlemen, if we hold our prices too high, that we make an inducement for mills to stay outside of this association? If we make them low, do we not remove, to a great degree, the objection and fear they now have of this association on this point, and are not the benefits which we offer inducement sufficient to make almost every one join us? It is true that we cannot be governed by the prices that a few mills of small capacity may make, whose product would not affect the market, because they could not supply the demand. We can afford, if a few mills are disposed to sacrifice their product, or by virtue of a peculiar location have such advantage that they are enabled to undersell, to permit them to dispose of their flour rather than have the vast amount of flour represented by the association brought to their level, which would be a ruinous sacrifice of your property, and herein lies the strength and value of uniform prices. I do not believe that it is the will of the people, that mills should contend with each other in the strife to sell, and keep up a continual war until the whole milling property of the country had been destroyed. It is necessary for the general public that the mill interest should prosper, that millers should make money. How can they progress in the art of milling, how can they give the people a better article, unless they have money to induce the brains of our country to work and advance the interests in which you are engaged? The newspapers would have the people believe that we are antagonistic to their interest, but in truth we are the friends of the people. We are here to seek protection against the flagrant outrages that have been perpetrated upon the mill interests of the country. We are here to make such rules and regulations as will lessen the expense of manufacturing flour, and thereby benefit both the consumer and the producer. It is not necessary to argue that large profits can never be the rule in milling. There is too much money seeking investment that would raise up competition which would level the profits to where it would soon

become a legitimate business. Then, gentlemen, if by a systematic manner of doing business, by curtailing the expenses of the travelling men and the broker, and in other ways lessening the expense of making flour, have we not benefited the people, and are we not here for the general good of all?

Gentlemen, I think it unnecessary to engage your time by reciting the many evils that beset you in your business. You all know them well. Have you ever sold through a broker? If you have, I think you must know him. Have you ever sold goods and had the market decline? If you have, I think you must know the treachery of men that money will induce to do wrong. Have you not had your goods rejected for no other cause than that the market was weak? Have you not sold your goods and made allowance for cash and had your drafts returned, at a loss of 10 to 15 days interest, for no other reason than that the buyer wanted to save exchange, though he had contracted to honor your draft on presentation, forced you to lose the interest, perhaps double the amount he gained? Have you not had unjust and most infamous demands made upon you for reclamation? Have you not had the grossest misrepresentation of the prices made by your competitors, which forced you to sell your good for less money than they cost you? Have you ever had any lawsuits away from home and had justice? If there is one here, let him speak. If you gain you suit, the rule is that you have gained a loss. I never gained any; they all went against me.

We can, by associating ourselves under articles of agreement, and by standing by these articles as gentlemen should, correct the evils in the trade. It should be the duty of every member of the association to report to the secretary all his grievances, and these grievances should have prompt and thorough attention. When parties have been guilty of treating a member badly, it should be the duty of the secretary to keep a list of such merchants and notify every member of the association that these are unworthy for him to deal with, and it should be obligatory upon every member to decline any transaction whatever, directly or indirectly, with these offending customers, until they have been reinstated, and are notified by the secretary of the association. This, gentlemen, is what I call blacklisting. You would need to do this to but a very few. I think a dozen examples would correct the entire trade of this country. It would be heralded by the traveling salesmen and brokers throughout the land, and would be known that it were not well to be in disfavor with this association. I venture to say they would be very guarded in their action. Gentlemen, the manner in which our business has been conducted has manufactured these offending parties by the thousands. A different course would correct the evil and would encourage those that are not very bad to be good, and those who enter the field of business from this on, would not think of doing us badly.

I will give you a sample of the workings of the blacklist. In Nashville a certain merchant bought bran from one of the mills. Bran declined and he refused to take it. The mills in Nashville had decided that it was better to be friends than to be opposing each other as we had been doing, and that we would exchange ideas and converse about our business more freely; that we would tell each other of parties who had treated us badly, and we agreed that we would not sell those parties again until they made amends; so when the bran case came up, it was related to each of the mills, and when the merchant who declined the bran offered to buy from one mill, they were oversold; when he offered to buy from me, I invited him to my office, and told him the reason why he could not buy bran from the American Mill Co. I stated to him emphatically that unless he took this bran and satisfied my competitors that I would never sell him anything else. It worked like a charm. He took the bran, and from that day he has been a most delightful customer. Gentlemen, the one example had its influence upon every merchant in the whole city of Nashville, and I have never heard from that day a single complaint made against any merchant in the city—not one. If we could do this in our feeble way, how much more could we accomplish when we are under the strong arm of the Central Association. We can do nothing without organization. There are several hundred mills competing for the same trade. One mill is badly treated, and another and another, and so on all along the line, and before a voracious merchant can exhaust the list, he would be as gray as the rats of Norway, if the mills of the country should last so long, which, gentlemen, I doubt very much, under the existing circumstances.

The smaller mills of the country are more benefited by the uniformity of prices and by the regulations of our organization than the larger mills. They are the prey

of the broker and the dishonest merchant. As members of this association, they would not dare to hurt the least of these. Some smaller mills think they must undersell the larger mills, who have established brands and grades, in order to dispose of their product, but this is not necessarily the case. The larger mills seek a larger trade; they cannot afford to handle the smaller trade, and in turn the small mill cannot afford to handle the larger trade. So, gentlemen, there seems, in my mind, to be a place for all mills under this organization. The dissemination of knowledge to these small mills is invaluable, and they can never enjoy this benefit outside of this organization. It becomes our duty to take them by the hand, and to legislate for their benefit when they are in jeopardy, and I shall feel it my duty, as a member of this association, to assist in helping them in their business. The larger mills can do without them better than they can do without the larger mills, but they are each necessary, the one to the other, in the formation and crystallization and the success of this great movement, that has for its object the protection of the whole milling interest of the country.

Gentlemen, we must not neglect to make some provision for the benefit of the jobber of flour. He can afford to sell such merchants as no mill, however small, would be justified in cultivating. There is a vast amount of flour sold to interior points, where there are no banking facilities, not even railroads, and to merchants, oftentimes, who have no commercial rating, and are, in fact, very bad business risks. I will not undertake to point out what should be done, but bring this to your attention as one of the many subjects for your consideration. We would have the merchants understand that we are their friends, that we feel how necessary they are to us, and that their interest shall be duly considered in our deliberations. We want them to know that this is no war on them, only an effort to correct the abuses that gravely threaten our destruction. When they are familiar with the rules and the system which we will establish and know the true object of our association, they will turn to us and endorse our efforts. By our systematic methods, by uniform prices, by adhering strictly to the rules of our association, by treating them all alike and by our honorable and fair dealing, we will command their confidence. They will know that their competitors cannot buy for less, for the association has but one price to all. Good, reliable, fair-dealing merchants will like this, and these facts will establish higher values for our flours, and if we pursue the policy, which we must, of keeping flours always as low as the markets will permit, the outside mill, to sell, will have to make a concession of 25 cents per barrel. This means how many days they can stand the drain of such continual loss. They will see their only way from this certain annihilation and come into the fold.

Gentlemen, we must have confidence in each other. Surely we are entitled to as much of each other's faith as those through whom we sell. You all know that every man who buys flour from the mills and every man who sells for the mills is your detective on your competitor, and it is utterly impossible for any member of this association to break faith with you without your knowledge; you will even know an attempt to violate the spirit of our agreement. Then you can be at rest on this point and afford to have faith in each other. Do not act rashly; if you have cause to suspect, await investigation, and you will be surprised to find, in the great majority of cases, your competitor has been grossly misrepresented to you. A little patience will strengthen your faith wonderfully in your brother millers. We are powerless to accomplish any of these reforms without organization and combined effort. Individually an appeal to railroads amounts to nothing, but with an association representing a daily capacity of 100,000 to 200,000 barrels of flour, with its wealth, business and political influence, don't you think we would get the ear of the railroads of the country? Yes, gentlemen, I can vouchsafe to you their greatest respect and most polite consideration. A new era will dawn upon us when we are once thoroughly organized and in successful operation. We will be a power, and a power is accorded justice without aggression. Seeing the benefits, will you not, for your own pecuniary interest, each and every one of you, join the Central Millers' Association and help to save your own property? It is in your behalf, gentlemen, that I make this appeal.

Regard the fees and assessments made upon you to sustain your organization as you do your insurance, interest you pay the bank, salaries to your employees, repairs to your property, as fuel to your engine, for I say to you, it is the heart, the governing principle of your business, and more valuable than all these; it is so essential that your business cannot prosper without it.

There is no class so wholly dependent upon us for ex-

\*Address of Dr. E. T. Noel, chairman, at the meeting of the winter wheat millers, Indianapolis, February 3.

istence as the mill furnishers, and I believe they are deeply interested in the success of this movement. Our success is their success, and they will be great mediums through which the millers everywhere may learn the true objects and benefits of our association, and I trust they will lend earnest assistance to this great cause.

HINTS TO WOOD-WORKERS.

There is no doubt but the proprietors of many wood-working establishments make a mistake in overestimating the value of the machinery composing their plant, says the *Timberman*. In taking an account of stock at the close of the year, a fictitious value is often given to the machinery in their mill. The original cost of the various machines, together with the cost of keeping them in repair is generally put down among the assets which enter into their balance sheets. After a few years they find that, notwithstanding they are using the same stock and employing the same class of labor, yet their neighbor in the same line of business is able to undersell them in the same market. The reason is very obvious: while they are spending large sums of money every year in keeping up their old machines, they lose sight of one important fact, that although some of the machines may be kept in first-class order, in fact, practically as good as they were when first purchased, yet at their best they have depreciated in value from the fact that they are not capable of turning out the same quantity and quality of work as some of the new and later improved machines which have come into the market and should have superseded them.

Their neighbor, who is able to put the same class of work into the market at a less price, has pursued a different policy. As soon as he finds that a machine is becoming old and is superseded by one that will do more and better work in the same time, he loses no time in useless repairs upon the old machine, but replaces it at once with the new one, and by this means his plant never becomes old. It is unreasonable to suppose in this age of improvement and competition in every branch of business, that the machinery purchased to-day with all its improvements will in every case be able to meet the requirements five or ten years hence. Take the planing machine for example, the best machines that were in the market ten or twelve years ago were thought to be as near perfect as possible, but compare the amount of work turned out by them as well as the price obtained for planing, with the amount of work turned out by the planer of the present time, and the present price of planing, and it will be evident to any one that the old planers at the present prices would not turn out work enough to pay expenses.

What is true of planing mills is also true of sawmills, sash and door factories and every other branch of wood-working where machinery is used. The article of furniture is a striking illustration of this fact. It does not require a very old person to remember the time when nearly all of the furniture was made by hand, and to furnish a house in a respectable manner required a small fortune. Then the village cabinet-maker, who in most cases was the undertaker also, was one of the most important personages in the town. The young couple when married must apply to him for the necessary furniture to commence housekeeping, and when baby was born, the cabinet maker must furnish him a crib, and when death closed the earthly career of one of their number, he was called upon for a casket and to assist in committing his body to the bosom of mother earth. So it would appear in those days that no one in the village could be married, born, or die without his assistance.

But now all is changed. The furniture manufacturer or dealer makes this his specialty, and the cheap and elegant furniture that is now within the reach of persons of very limited means, is the result of improved and special machinery that was unknown at that time. Furniture manufacturers are fully aware of this fact, and, as a rule, avail themselves of the latest and most improved machinery for that purpose. In visiting the several factories, not only for the manufacture of furniture but every other class of wood-working, it would seem that perfection was nearly or quite arrived at in the construction of the various machines in use, but there is no doubt but ten years hence in visiting these same factories other and more improved machines, that are not now thought of, will be met with that will facilitate the work and still have a tendency to further reduce the cost of production.

A first-class plant then should never be allowed to become old, but should be supplied with new and improved machines from time to time, as fast as the old ones begin to depreciate in quantity and quality of work. In this way only can the manufacturer expect to maintain his place in the front ranks of his business.

ROLL ADJUSTMENT FOR GRINDING.

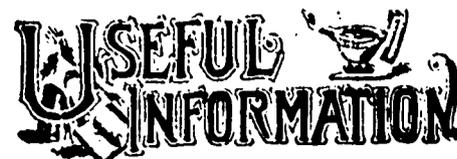
As now built, all roller mills, no matter how widely they may differ in design in other respects, says the *Milling Engineer*, have one feature in common, viz: A stop adjustment to prevent the rolls coming too close together and to hold them at the proper distance apart to suit the required degree of fineness of the material being ground, and a spring adjustment to hold the movable roll up to its work, yet capable of yielding in case of the passage of nails, screws or other foreign bodies that by accident get into the material being ground. It is the practice of some millers to regulate the fineness of the grinding by adjusting the pressure of the springs, instead of the fixed or stop adjustment. This is all wrong. The distance between the rolls, which governs the fineness of the grinding, should be fixed by the stop adjustment. If the springs depended upon for this regulation, it can be easily understood that any irregularity in the feed will produce irregularity in the grinding. With belted roller mills, and nearly all roller mills are now of this class, there is another evil which arises from the use of the springs to regulate the fineness of the grinding. If the rolls be set as closely together as possible, without coming into actual contact, if the material is not sufficiently fine, the miller is naturally tempted to remedy the trouble by increasing the pressure on the springs, which makes matters worse, instead of better, because by increasing the friction between the rolls themselves it lessens the differential between the rolls, owing to the increased slippage of the belts on the slow roll pulleys. If the rolls be set at the right distance apart by the stop adjustment, and the pressure of the springs be made no more than is required to hold the movable roll up to its work, the only friction between the roll surfaces is that incident to the work of reducing the material, and the friction or holding power of the belts on the pulleys is sufficient to more than overcome it, thus maintaining the differential. On break rolls and sizing rolls it is especially important that the grinding adjustment be made by the stop, and not by the springs, otherwise it is impossible to tell just what the rolls are doing. As the distance between the rolls for fine grinding is very small, and may be more than balanced by lost motion in the journals and spring in the adjusting devices, it is essential to good work, not only that the adjustments be very rigid and unyielding, but that the journals be very nicely fitted. Weak adjusting mechanism and poorly fitted journals will prevent good work in any machine, no matter what merit it may have otherwise in its design and construction.

SPEED OF ELEVATORS.

The elevator was invented by Oliver Evans, a century ago, and from his day to ours its speed has been a subject of discussion among millers. The general speed is for six-inch pulley 125 revolutions per minute; a 22-inch pulley 180; and a 20-inch pulley 250 revolutions per minute. The outer edge of the cup travels faster than the pulley in passing over it, and a greater speed especially in the case of larger pulleys will throw the grain from the head and catch it in the points of the cups. The following table of speeds will be found to be nearly correct in practice, but the speed can be increased or reduced to suit, this table being a fair average:

Table with 4 columns: Size Pulley, Ins., No. Rev., and No. Rev. (rotations). It lists speeds for pulleys ranging from 6 inches to 48 inches.

This speed can be varied to 15 per cent. either way, as may be necessary through any change of motion of machinery, and as a fair average it will be found to give general satisfaction.—*Milling World*.



Oil does not wear out nor lose its lubricating qualities by being used. Keep it free from dirt and it can be used over and over again.

The slightest vein of iron or steel can readily be detected by the application of aqua-fortis to the surface. On steel it leaves a black mark, on iron the metal remains clean.

Copper may be hardened by melting with it and thoroughly stirring into it 1 to 6 per cent. of manganese oxide. The other ingredients for bronze may then be added.

A single plate of perforated zinc about a foot square, suspended over a gas jet, is said to retain the noxious emanations from burning gas, which it is well known destroys the binding of books, tarnishes the gilding and vitiates the atmosphere for breathing.

According to Hon. Carroll D. Wright, U. S. Commissioner of Labor, strikes and lockouts from 1881-6 inclusive have cost employers \$34,163,814. \$4,430,595 were during this time paid to strikers by those sympathizing with them. \$43.34 was the average loss of each employee. The turning point, Mr. Wright thinks, was reached in 1886, and they are now decidedly on the decline.

A late novelty in the application of electric motors to the movement of machinery is found in the new factory of an electric motor company in New York City. Each machine is run by a separate motor, thus doing away with a line of shafting and all the belts running to it. The vibration is very much reduced, and the machine shop is far less noisy than the average. A dynamo in the basement furnishes the electricity.

Electric heat indicators, consisting of thermometers incased and protected by iron tubes, provided with platinum wires and connected to a system of electric bells and indicators on deck, are the latest invention for detecting spontaneous combustion among ship cargoes. Should any undue heat arise in any part of the cargo, the mercury in the thermometer will rise, make contact with the platinum wire and give an instantaneous alarm on deck, indicating at the same time the exact spot where the heat exists.

Scraps of tinned iron, says the *American Manufacturer*, have long been a waste product, whose application, for any purpose worthy of the intrinsic value of the metals contained in them, has been an unsolved problem until its recent use in this country for nails, window weights, etc. For nails, scraps of tin are cut by dies into rectangular bits, with a length of about three times their width. These scraps are then fed from an automatic hopper between dies, where they are squeezed first to square form, like a nail, then headed. Nails of this kind are well fitted for many purposes, being free from tendency to rust, also light, very rigid, and capable of being driven into the hardest wood without buckling.

ELECTRICAL APPLIANCES IN THE UNITED STATES.—According to authentic records there are now in the United States 3,351 electric plants and stations, operating every night 192,500 arc and 1,922,000 incandescent lights. There are also 459,495 horse-power of steam-engines devoted to electric lighting. The capital invested in the electric lighting companies during the past half year has been increased to the extent of \$42,210,100. In February there were 34 electric railways, with 138 miles of track, operating 223 motor cars and utilizing 4,180 horse-power for stationary engines. Forty-nine new roads are now being built, having a total of 18 miles of track and to use 244 motor cars. There are also several motor factories, some of them employing as many as 1,200 men.

In regard to the use of alum in boilers, *Steam Power* thus replies to a correspondent: "Alum of all kinds is a solvent for iron, dissolving it in appreciable amounts. Ammonia alum is probably the most active, but potash alum is quite ready to attack iron. The chance of any accumulation of alum in a boiler is therefore very undesirable, and cases are not infrequent where the action is quite marked. In the case of a water containing such organic matter, as slaughter-house refuse or animal sewage, if alum was used in only just the right amount, the advantage might be marked in purifying the water, but the danger is that an excess will be used. Alum is itself a slightly acid salt, but the probability is that in the boiler it decomposes, the sulphuric acid in it removing the scale, and eventually attacking the iron."

MODERATING THE LIGHT OF INCANDESCENT LAMPS.—The simplest way to moderate the glare of the light of incandescent lamps without losing too much of its lighting power is said to be to give the globes a thin coating of collodion. With a little practice the uniform distribution of the collodion coating over the whole surface is soon achieved. Besides simplicity and cheapness, this method presents the additional advantage, that the coat is easy to remove with water. In this connection it is well to paint the lamps over with a solution of a salt, whereby they are covered by a coat of fine crystals. These innumerable crystals effect a diffusion of the light without materially diminishing its intensity. Salts of lead and tin are thought to be the most suitable for this purpose, but other materials may be found more convenient.

TO PREVENT IRON FROM RUSTING.—John Heald, proprietor of the machine works at Crockett, Cal. has discovered that rust may be prevented by painting the work with turpentine and white lead. "It is found that when surfaces are coated with finely ground white lead thinned with spirits of turpentine no corrosive action or scaling takes place, even when heavy coats of paint are afterwards put on the outside. Mr. Heald says that common paint mixed with oil is too thick to penetrate or close the imperfections of the surface and penetrate the scale where it exists, thus leaving places for corrosion to begin beneath the paint. With turpentine and white lead mixed thus, the very pores of the iron are closed. The interstices, so to call them, are too minute to receive the body which oil gives but are closed by the thinner compound. This is the theory, but that is a matter of no consequence so long as the fact is known.

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### Factories at Montreal, Que., and Port Hope, Ont.

HEAD OFFICE, - MONTREAL.

BRANDS, ELECTROTYPES

— AND —

NOVEL DESIGNS

FOR

PRINTING

SUPPLIED GRATIS.

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OUR Bags Works have only been in operation a few months, but nevertheless we are pleased to be able to state that our daily sales exceed those of any similar concern in the country. This is accounted for by the fact that our plant and facilities are vastly ahead of what are ordinarily in operation, and the goods turned off cannot help but be superior in workmanship, appearance, and general uniformity. The Finest Bag Printing Press on the American Continent is running in our works.

Full stock of our Manufactures at all branches.

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## GOLDIE & McCULLOCH, GALT, - ONTARIO.

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# BUILDING OR RE-BUILDING FLOUR MILLS,

On the full or combined roller system, we are prepared to furnish estimates or specifications, using a full line of our machines---NONE IMPORTED---manufactured under Canadian Patents controlled by us.

ALL WHO INTEND TO MAKE CHANGES WILL DO WELL TO SEE US BEFORE DOING SO.

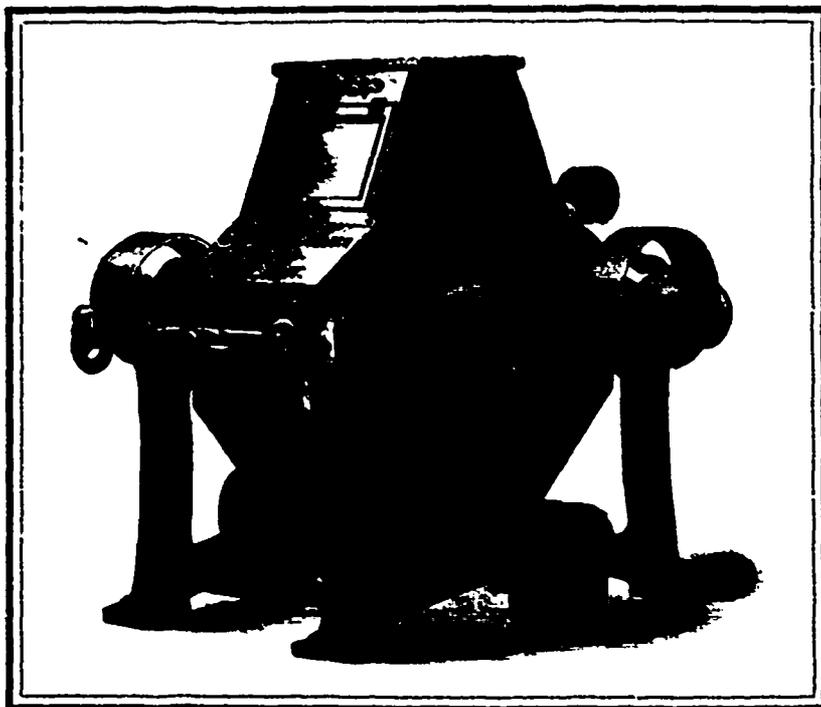
Wheelock Automatic Engine,

TURBINE WATER WHEELS,

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Special Price Lists furnished on application



Correspondence solicited and orders promptly attended to.

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# SAFES,

FIRE AND BURGLAR PROOF

## GOLDIE & McCULLOCH ROLLER MILL

Our machines, as shown above, contain important improvements covered by Canadian Patents which we control. Parties purchasing elsewhere will do well to look out for infringements. All our machines are made under our own supervision, of the best materials and workmanship. Satisfaction guaranteed.

## GOLDIE & McCULLOCH.



### LIFE IS A MILL.

Life is a mill, but whether  
A treadmill for a slave  
Or a mill of God, for grinding  
The precious gift He gave,  
Depends on us, and only  
By grinding with our might  
With faith and love for millstones,  
Grinding by day and night,  
Can we ever know the triumph.  
The riches and beauty of work,  
Or escape the weary treadmill  
And the famine of soul that lurk  
In the hearts of those who fail  
To accept the promise sweet,  
That the busy mills of God  
"Shall be filled with the finest wheat."

—Rural New Yorker.

Elmvale, Ont., wants an oatmeal mill.

Collingwood, Ont., is to have another elevator.

There is a good opening at Wappella, N. W. T., for a grist mill and elevator.

Geo. Goodfellow, of Fort la Corne, N. W. T., will establish a grist mill there.

Mr. J. M. Horn of Hornings Mills, Ont., lessee of the Daisy Roller Mills, has failed.

R. Crane, miller, Carboro, Ont., is reported as having assigned for the benefit of creditors.

There is at present 154,000 bushels of grain stored in the C. P. R. elevator at Owen Sound.

Peter Milne, who operated an oatmeal mill at Victoria in partnership with a brother, is dead.

It is proposed to form a Joint Stock Co., to erect a 45,000 bushel elevator at Pickering, Ont.

Inducements will be offered to any one establishing a roller process mill at Broadview, N. W. T.

Mr. McLeod will improve his mill at High Bluff, Man., so as to make it a 50 barrel roller process mill.

Mr. Cochrane, of the Crystal City, Man., roller mill, will erect a mill of greater capacity at the station.

The Shelburne Roller mills have been leased by Mr. Wm. Jelly to Mr. A. J. Turner, of Wingham, Ont.

Griffins Mill at Mount Vernon, Ont., which was seriously damaged by fire recently, is again in operation.

The death of Mr. George Carter, the well known miller and grain buyer of St. Mary's, Ont., is announced.

Mr. Wm. Brown, lessee of the Cadmus, Ont., grist mill, has purchased the mill from James Fluke, of Toronto.

One hundred and fifty cords of stone will be required in the foundation of Hastings Bros. mill at Port Arthur.

Mr. Jacob Z. Detwiler an old and highly respected citizen of Berlin, Ont., for many years proprietor of the Doon Mills, is dead.

Negotiations are being carried on with parties in Fergus, Ont., for the erection of a hundred barrel steam flour and oatmeal mill at Birtle, Man.

It has been proposed to use an electric discharge to dissipate dust particles in flour and other mills, and so lessen the danger of explosions.

Messrs. Campbell, Stevens & Co., of Chatham, bid \$10,100 for the Goodfellow Mills at Aylmer, Ont., the other day which was the highest offer made.

It has been decided that the canal tolls shall be reduced the coming season, the same as has been done for the past two seasons, viz: two cents a ton.

Mrs. Bonfield of Eganville, Ont., has commenced the rebuilding of her mill. It will cost about \$20,000 and when completed will be the best mill in the county.

Rorison's elevator at Carberry, Man., was destroyed by fire on the morning of March 19th, together with 12,000 bushels of wheat. The total loss is about \$20,000.

A writer in *La Meunerie Française* estimates that there are some 60,000 flour mills at work in France, and that this industry affords a livelihood to at least 600,000 persons.

The British Columbia Board of Trade telegraphed the Dominion Government that in its opinion it is not desirable to increase the duty on flour, as requested by the Ontario millers.

A waxed paper bag, with a thin film of fine paraffine on the inside surface is being manufactured, and is said to make a superior package for mill products, keeping out air and moisture.

A comparison between the weights of the Manitoba and United States crops of 1887, made on the American basis—the Winchester bushel—is said to have shown the former to have been 60 lbs. to the bushel and the latter 58.5.

N. C. Sinclair, of Iona Station, and W. H. Stevens, of St. Thomas, have purchased the Goodfellow mill at Aylmer, Ont., from Campbell, Stevens & Co., and will put it in operation at once.

The Winnipeg *Commercial* sarcastically remarks: "It is reported that agents of the C. P. R. milling concern are objecting seriously to the prices being paid for wheat in Manitoba. The prices, they say, are altogether too high. This seems peculiar, when it was understood this combination was formed purely for the benefit of the Manitoba farmers, rather than as a money-making scheme for the projectors."

The Chicago, Burlington and Northern railroad recently cut the rate on flour to 7½ cents a hundred from Minneapolis to Chicago on seaboard business, to meet the competition of the Soo line and Canadian Pacific.

Mr. P. R. Hoover, has been using a combination of rolls and stones in his mill at Green River, Ont., but has decided upon having a complete roller plant. The changes were commenced on March 18th. The daily capacity will be 50 barrels.

Mr. D. Plewes, the well-known miller of Brantford, Ont., has issued an open letter to the farmers of Western Ontario, in which he recommends them not to sow so much barley the forth-coming season. He recommends the sowing of early spring wheat, avoiding the hard variety.

The Toronto *World* remarks that mill dust is as perverse as an Irish pig on its way to a fair. When a scientist tries to make a useful explosive out of it he succeeds in making a gas that not only will not ignite but which actually puts out a flame. Then suddenly the other day mill dust goes off at St. Louis and kills two men.

The visible supply of grain in the United States and Canada, and in transit by water, as compiled by the secretary of the Chicago Board of Trade, was as follows on the dates named:

	Mich. 16, '89, bus.	Mich. 9, '89, bus.	Mich. 17, '88, bus.
Wheat	31,182,430	31,774,383	36,753,024
Corn	16,647,222	16,955,876	9,898,280
Oats	7,510,953	7,740,580	4,297,510
Rye	1,582,015	1,634,564	367,931
Barley	1,723,098	1,670,568	2,029,933

The figures for the year 1888 show that England produced a wheat crop of 68,150,216 bushels, or 3.83 per cent. less than in 1887, at an estimated average rate in 1888 of 28.18 bushels per acre, against 32.25 in 1887, being a decrease of 4.07 bushels per acre. The acreage of wheat in 1888 in England was larger as compared with 1887 by 10.06 per cent. The estimated average rate of production in 1888 in England shows a falling off from the estimated ordinary average yield, as obtained in the enquiry of 1885, of 0.76 of a bushel per acre, or 2.63 per cent.

The burden of protective-tariff talk is now—heaven be praised—on the Canadian side of the border, where the millers are endeavoring to make it clear to "the powers that be" that they should be granted an increased duty against United States flour. There is no doubt that the competition of our millers in the markets of the Dominion is no creation of a distempered fancy, but an actual and serious evil—from a Canadian point of view, and that in seeking relief our neighbors are doing a natural and reasonable thing. Indeed, we believe they are entitled to all the protection they ask for.—*Roller Mill*.

Duluth has heretofore made no pretensions to being a corn market, being entirely above the corn belt, but in the past few months receipts of corn at that point have been large and other markets have wondered at the sudden change. The secret of the whole matter lies in the fact that rates east of the Mississippi river have been held so high for more than two months that very little of the vast amount of corn in the country was being moved by the old routes to the eastern seaboard, and the railroads and the grain men of Duluth, who have ample storage room, have made a successful effort to turn the corn in that direction, and will either hold it until lake navigation opens or ship by the Canadian or other lines to the east.—*Modern Miller*.

We are given to understand says the *London Miller*, that the scheme for bringing the flour mills between the Humber and the Tweed into one company, to be entitled the "North-Eastern Milling Company, Limited," has practically fallen through. Such an enterprise was too large to be accomplished without the aid of the investing public, and it appears that the scheme has found so little favor with capitalists and financiers that it has been decided to abandon it, at any rate for the present. We have already expressed our own opinion on the project, and there is no necessity to repeat it. No doubt the proposal to federate the entire milling industry of a whole district had a certain grandeur about it, but unfortunately it was impossible of realization even in its very first stage. To have carried out the scheme would have required, in the first instance, not only the adhesion of every individual miller, but the assistance of the co-operative mills as well, and that was plainly impossible from what is not inaptly termed the "force of circumstances." Failure was, therefore, a foregone conclusion.

Dr. Frean, a well known British agricultural writer, who has recently visited the Canadian Northwest, and is now publishing the results of his observations in the *Canadian Gazette* of London, says, relative to the wheat growing prospects of the country: "We may find strong evidence of the faith which Manitobans themselves have in the future of their country, in the steady increase in the number of mills and elevators along the lines of railways. Seven distinct lines of railway in operation converge at Winnipeg, as follows: Canadian Pacific main line east; West Selkirk branch, 23 miles; Emerson branch, 66 miles, 5 main elevators; Gretna branch, 79 miles, 5 main elevators; Pembina branch, 202 miles, 23 main elevators; Southwestern branch, 2.4 miles, 5 main elevators; Canadian Pacific main line west, 55 main elevators in Manitoba. In addition there is the Manitoba & Northwestern railway, with 24 main elevators, which leaves the Canadian Pacific at Portage la Prairie. That the railway companies and others should build so many elevators is eloquent testimony to the wheat growing capacity of the country; while no account is taken of the great wheat depots at Winnipeg, Keewatin, Fort William and Port Arthur.

W. D. Hess writes as follows to the *Roller Mill* on the subject of flat surface bolting:—"I have made frequent tests, with results very satisfactory, and even beyond my expectations, which confirms me in the opinion that at some day not very distant the flat surface will be in general use for bolting. I went to considerable expense in making my tests, and also wrote to a well-known mill-furnishing firm, asking them whether in their opinion flat-surface bolting could be made a success. They replied that the mills were already overrun with new-fangled bolts, and that it would be of no use to attempt the introduction of a new one. To-day they

are making a flat-surface scalper which they maintain is the best on the market, while their inventive genius is at work, I understand, on a flat-surface flour bolt, which, if it proves successful, will enable small mills to adopt the roller system at less expense than at present, since the cost of building such a bolt is much below that of the centrifugal or any other bolting reel. I believe that three yards of cloth on a flat-surface mill, with proper construction and handling, bolt quite as much as a 14 or 16-foot reel. If any miller doubts this, let him get out his testing sieves and note their capacity. Let him take, for example, his finished flour and put it on a testing sieve having cloth one or two numbers coarser; the result will astonish him. As a general thing our mills are using too much fine cloth. Coarser cloth, sharper flour, and fewer returns would help to improve their output.

### A PLAN TO HARNESS NIAGARA.

C. B. BARTLETT, an engineer and contractor, of Chicago, who has been at work for some time upon a plan to harness Niagara, has at last hit upon a way which seems very feasible, says a contemporary published in that city. His scheme has received the approval of a number of capitalists, and is protected by letters patent. The bed of Niagara at the foot of the falls is 160 feet below the bed at the brink of cataract. Mr. Bartlett proposes to first tunnel a series of tail races from the river bed at the foot of the Falls a distance of from 200 to 600 feet up the river, on either the American or Canadian side. These completed, he will commence excavating on a direct line to the upper bed of the river. When the work has reached a given point between the upper and lower beds, coffer-dams 100x600 feet in dimensions will be employed for the purpose of obtaining space in the former to continue the excavation from the upper bed of the river, and the same will be prosecuted until a junction is made with the excavation from below. The same course of operations will be continued until a tunnel, so to speak, of a parallel width of forty-two feet has been excavated from the American to the Canadian shore. Ten feet below these girders a water-tight reservoir will be constructed, of durable material, extending longitudinally from shore to shore. It will be forty feet in width, and otherwise sufficient in size for the service. It will be supported in the centre by the bottom of the excavation, and securely held in place. Six feet below the reservoir the workroom of the hands will be built on another set of girders, all morticed into the rocky sides of the passage. From the working floor a double row of iron pipes five feet in diameter will be located at a distance of sixteen feet apart throughout the entire length of the tunnel, extending from top to bottom. The interior of each will be equipped with a turbine wheel of the latest improved pattern, and each of the pipes will connect with the reservoir by means of ten inch pipes supplied with valves to regulate the flow of water. Dynamos to the number of 100 will be placed at the bottom of the shaft. By opening the valves a flow of water of incalculable force will pass through the ten-inch pipes, starting the turbine wheels, and the power thus applied to the dynamos is transmitted over wires to any given point within a radius of fifty miles.

### RULES TO MEASURE BOILERS.

At the solicitation of several correspondents we append the rules for determining the heating surface of steam boilers, which by dividing the amount of heating surface allowable per horse power will give the boiler horse power.

**Tubular Boilers:** Multiply  $\frac{2}{3}$  the circumference of the shell in inches by the length in inches. Multiply the combined circumference of all the tube in inches by their length in inches. To the sum of these products add  $\frac{2}{3}$  of the area of both tube sheets, from this sum subtract the combined area of all the tubes, divide the remainder by 144, the result will be the heating surface of the boiler, this quotient divided by 15 the number of square feet to a horse power in tubular boilers, will give the nominal horse power.

**Flue Boilers:** Multiply  $\frac{3}{5}$  circumference of shell in inches by the length in inches. Multiply the combined circumference of the flues in inches by their length in inches. Divide the sum of the products by 144, the result will be the heating surface in square feet divide this by 12 for the nominal horse power.

**Cylinder Boilers:** Multiply  $\frac{3}{5}$  the circumference in inches by the length in inches, and divide by 144, the result is the heating surface this divided by 10 will give the nominal horse power.

**Vertical Boilers:** Multiply the circumference of the fire-box by its height above the grate, all in inches, multiply the combined circumference of all the tubes in inches by their length in inches, add to these two sums the area of the lower tube sheet, less the combined area of all the tubes, divide the whole sum by 144, the result is the heating surface in square feet.

**BUSINESS MANAGEMENT OF THE MILL.**

THERE was a time when the all-absorbing question to the average miller was, how soon and at what cost can I arrange my mill to make the flour the trade wants? This question has been answered for the majority, and has consequently lost its meaning and interest. Another, and a more difficult question, confronts the miller to-day. It is, what can I do to make my mill pay? New mills have been built and old ones remodeled, and the larger number are just making the flour which is demanded, but that does not ensure a profit. It seems that few thought of the time when the line would be drawn, or rather when the line would be reached, where competition would reduce the margin until it disappeared entirely. That time is here now. A combination of circumstances have ushered in this melancholy day sooner than it would have come under normal conditions, but it was coming any how, and would therefore, have made its appearance sooner or later.

Writers who years ago took cognizance of the drift of the industry and read the inevitable results of unhealthy progress, and who philosophized upon the condition of affairs, were hooted at and denominated whiners and mortals with a bad liver. To-day the owners of bad livers are numerous and conspicuous. The millers are sick and the editors are sick, who never lost an opportunity to tell the miller that he was all right and that still better times were in store for him. And even to-day some journalists insist on discouraging certain millers from taking concerted action in an effort to remove the burden from the industry. "Don't help the other fellows to pull their chestnuts out of the fire," somebody remarked but a short time ago. My dear friend, tell me the miller who has no chestnuts in the fire. Some millers imagine they have none, but they will wake up some morning and get into such a hurry to rake their chestnuts out that they will not stand on the order of how to do it.

The situation is simply this: The country is dammed up because the outlet is closed. The eastern miller is generally the first to get flooded, but fortunately this time the embankment of high prices kept the rushing tide back in the interior. Leave the ports closed against our flour as they are now, and restore the country to its former level in point and prices, and where I oh, where I is the little miller in the east. Whether he recognizes it or not, every miller in the United States is dependent upon the export business, in a greater or less degree, for his profit. The export trade is the hope of the future. If this hope withers, as some symptoms seem to show, the millers' war in this country will only be fully inaugurated. Employment for our mill machinery must come from abroad, for the flour demand in this country will not keep the wheels going 'round half the time. Whose machinery will make the flour of the United States when twice as many mills are bidding for it as are required to make it, and when, at the same time, every mill must be idle that fail to get some of this business? Wipe out our exports and this is the shape in which the question is before the millers of the country.

The truth of the matter is, no one is exempt from responsibility in the present situation. There is not a merchant mill in the United States which is isolated from the rest. There is a strain of sympathy and a line of connection between all. Let no one lose sight of this fact, and instead of wasting our resources in a warfare between each other, let us husband them and use them against the opponent from without.—Harry S. Klingler, in *Milling Engineer*.

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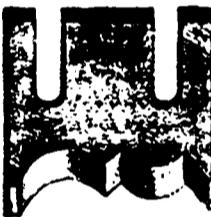
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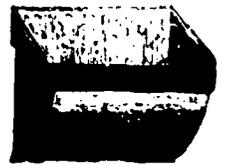
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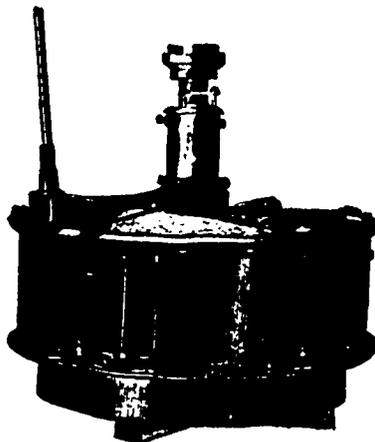
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Yours truly,

E. HERWICK & Co.

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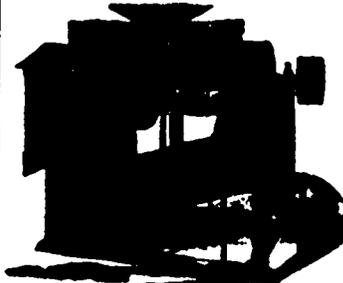
Yours very truly,

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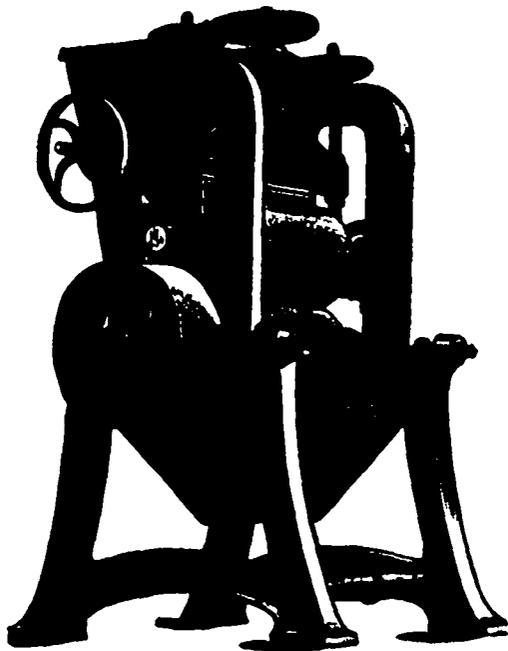
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THEY CANNOT BE BEAT ON ANY STOCK, AND

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— OFFICE OF —  
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Dear Sir,—In reply to yours asking a report of how we were satisfied with the Cochrane Rolls placed in our mill by your firm, we would say that, after fifteen months' trial, running night and day, we feel that we cannot speak too highly of them, either for light driving or in their operating on the grain in such a way as to get the very best results, financially or otherwise.

As you are aware, we have same roll surface and number of rolls as our former belted mill. Saving in power in Cochrane Mill, fully ONE-THIRD, or an INCREASE IN OUTPUT, using same power, of FROM FORTY TO FIFTY BARRELS PER DAY. This has been clearly substantiated. Its advantage does not stop here, but through the uniformity in speed of both grinding rolls and feed rolls, together with the fact that there are no belts or anything else to put the rolls out of train, the WHOLE STOCK IS MORE GRANULAR and a much LARGER PERCENTAGE OF "MIDDINGS" is the result, which means a LARGER PERCENTAGE OF FIRST PATENT FLOUR. Any practical miller cannot help but be satisfied of this by examining into the merits of the two mills.

It is a MUCH LESS EXPENSIVE mill to keep up, from the fact that there are neither belts nor gears to keep up and repair, except the main driving belt and a pair of gears at the head end.

We are satisfied the mill HAS ADDED LARGELY TO OUR PROFITS since putting it in—which is the best recommendation we can offer—and consider that Mr. W. F. Cochrane deserves the thanks of the milling public for giving a new idea of such practical value to millers. Hoping you may be as successful as you deserve,

We are, yours truly,  
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WM. PARTLO.

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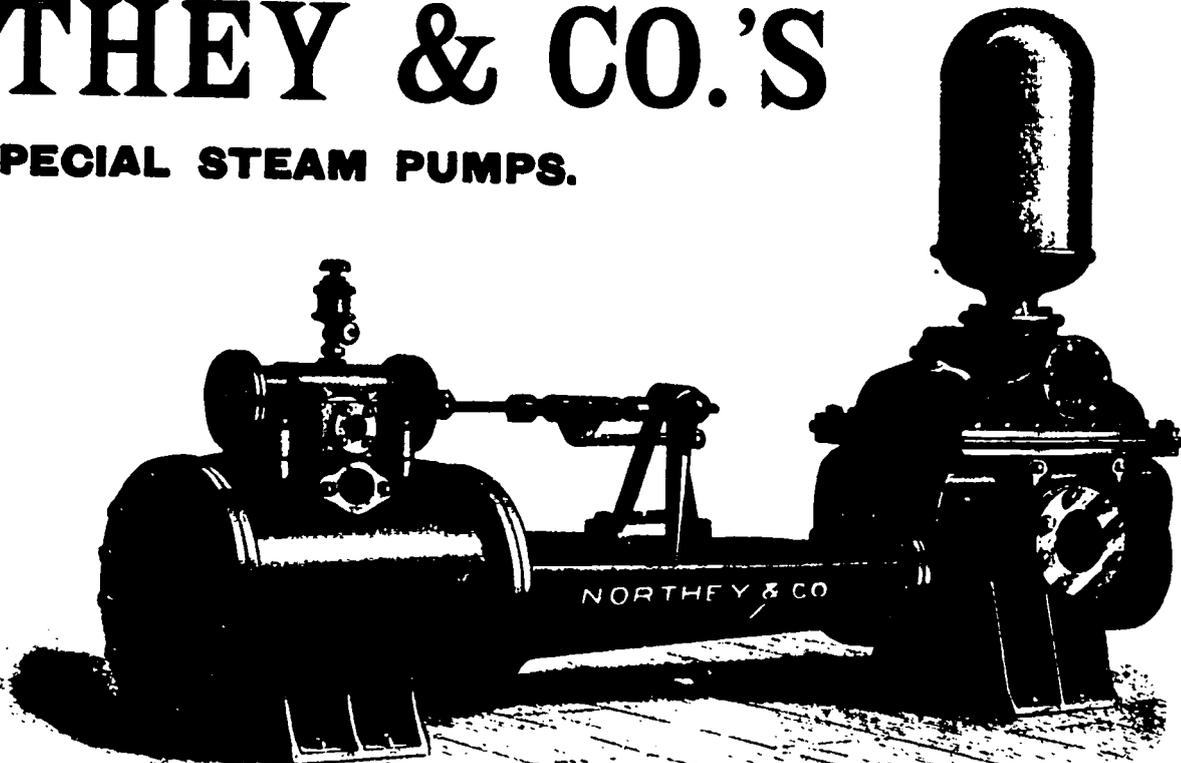
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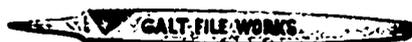
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