

**Pages Missing**

# JAMES JONES & SON'S

## Short System of Milling

IN the next issue of this paper, this page will contain a description of a new machine for the reduction of wheat. It will make more middlings and broader bran at one reduction than any machine yet introduced. Just the machine for hard Manitoba wheat.



*Send for samples, if interested.*

### JAMES JONES & SON,

THOROLD, ONT.

Jute and Cotton **BAGS AND SACKS** of every quality and size

MANUFACTURED AT

### TORONTO BAG WORKS

*The Pioneer Factory in Canada for Printing*

**JUTE AND COTTON BAGS IN COLORS.**

*Original Designs for Brands Prepared Free of Cost. Send for samples and price lists.*

Winnipeg Branch: GRANT & HORN, Agents, who carry a complete stock of our goods.

### DICK, RIDOUT & CO.,

11 and 13 Front Street East,

TORONTO

## F. E. DIXON & CO.

MANUFACTURERS OF

- PURE -

OAK-TANNED

### LEATHER



### BELTING

Guaranteed in every respect equal to the best American or English Belting.

*Send for Latest Discounts and our Pamphlet on Belting.*

OFFICE AND FACTORY:

70 KING STREET EAST,

TORONTO.

## SPECIAL ANNOUNCEMENT.

---

**T**HE HERCULES MANUFACTURING CO. are now prepared to give estimates and contract for the construction or remodelling of Flour Mills. Something entirely new for the millers of Canada—the most simple, complete, effective and economical system of mill furnishing to be found in this country. Since starting to manufacture the world-renowned Hercules grain cleaning machinery, we have made it a point to always be at the front and lead the market. We are now extending our operations, and purpose still keeping ahead. We contract for mills of any size, style and capacity, using a full line of the Hercules Grain Cleaning Machinery, Hercules Improved Flour Dressers, Hercules Scalpers, Bran Dusters, Shorts Dusters, etc.

We also control the manufacture and sale of Dobson's Improved Inter-Elevating Bolt. Our machines stand unequaled, unrivalled, unexcelled, the most perfect, latest and best. Small power, large capacity, and for durability and style of finish cannot be surpassed. Our staff of experts are the best and most experienced practical millers that money can employ.

We guarantee results as to quality of production and clean up on each and every contract we undertake. Write for prices and particulars, also see this page next month. Correspondence promptly answered.

**Hercules Mfg. Co.,**

Petrolia, Ont.

# ELECTRICAL MECHANICAL AND MILLING NEWS

Vol. XII.—No. V.

TORONTO, CANADA, JULY, 1889.

Price, 10 Cents  
\$1.00 PER YEAR.

**ELECTRICAL,  
Mechanical and Milling News,**  
PUBLISHED MONTHLY BY  
**CHAS. H. MORTIMER,**  
Office, 14 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 25th day of the month.

#### SUBSCRIPTIONS.

The ELECTRICAL, MECHANICAL AND MILLING NEWS will be mailed to subscribers in the Dominion, or the United States, post free, for \$1.00 per annum, or cents for six months. The price of subscription may be remitted in 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. The Publisher should be notified of the failure of subscribers to receive their papers promptly and regularly.

#### EDITOR'S ANNOUNCEMENTS.

Correspondence is invited upon all topics pertinent to the electrical, mechanical and milling interests.

#### NOTICE OF REMOVAL.

The ELECTRICAL, MECHANICAL AND MILLING NEWS has removed to new offices at No. 14 King Street West where subscribers and friends of the paper will always receive a hearty welcome.

CANADIAN millers are invited to attend a meeting to be held in Toronto on July 9th and 10th, for the purpose of taking into consideration the present condition and the future prospects of milling, and to adopt such measures as may seem to be fitted to remedy the existing disabilities under which this industry is suffering. The arrangements for this meeting are in the hands of the following gentlemen: Messrs. Chas. Whitlaw, E. W. B. Snider, W. M. Stark, D. Plewes, M. M. Laughlin, A. McFall, John Brown, J. C. Hay, W. F. Howland, T. Todd, sr., W. Galbraith, S. A. Lazier, J. E. Edmondson, W. Hutchinson, H. S. Howland, J. D. Flavelle, Jas. Goldie, David Goldie, E. W. Rathbun, C. Hunt, R. J. Stark, J. D. Saunby, I. Warcup, R. Noble, J. L. Spink, E. Peplow, A. Campbell, Geo. Esterbrook, H. N. Baird, J. A. Moody and James Cumming.

We trust this meeting will prove to be a "mass meeting" in fact, as well as in name. Interests of great importance hinge upon its success. It is to the individual interest of every miller to do his utmost to make it a success. The first and foremost duty in this direction is to attend the meeting yourself and bring as many others with you as possible. Come prepared to say or do something that will assist the meeting to arrive at wise conclusions, and help to secure the objects sought to be attained. Don't stay away and then grumble because things were not done to suit you.

We repeat what we said on this subject last month—this movement to secure justice for the millers under what is known as the National Policy, cannot succeed unless the millers throughout Ontario are aroused to

spontaneous action. Whatever has been done in the past has been done by a mere handful of millers, and almost entirely at their own expense. The great majority have been content to sit as idle spectators of the efforts of a few to lift the burden of tariff injustice from the shoulders of the milling fraternity. Again and again has the effort been made, but as might have been expected, the burden proved too heavy. Nothing short of "a long pull, a strong pull and a pull all together," will effect its removal.

How can united effort be brought to bear for the desired purpose? Only by means of organization. There will be required first of all a live, vigorous, aggressive central association. Occasionally since this agitation began we have seen and heard references to the "Dominion Millers' Association." We are aware that such an association was formed some years ago, and that it served the millers to good purpose in their patent infringement fights. For four or five years past, however, the association has been to all intents and purposes dead, although having a name to live. A Dominion Millers' Association should be something possessing more life and tangibility. Its officers should be on the look-out to serve the millers' interests, especially in circumstances like those which at present exist in the Dominion. The membership of this Central or Dominion Association should be truly representative of the whole Dominion.

In addition to a central organization such as we have described, there should be Local Associations, each composed of the millers of two or three adjoining counties. The only active working association of millers existing in Canada to-day, is the local association of western millers under whose auspices such a successful meeting was held at Listowel recently. These local associations should work in conjunction with the Central Association in carrying out a well-matured and comprehensive scheme for the amelioration of the disabilities from which the millers of Canada are suffering.

The forthcoming millers' mass meeting should accomplish: (1) The attendance of every Canadian miller who feels that the milling interests of Canada demand a readjustment of the present flour duties. (2) The formation of a workable and well-considered plan for the purpose of securing such readjustment. (3) The formation of a Dominion or Central Millers' Association, representing the milling interests of the whole Dominion. (4) The appointment of representative millers from the different sections of the country to assist the Secretary of the Dominion Association to organize Local Associations in their several localities. (5) The intelligent, systematic working together of Central and Local Associations along the lines which shall be laid down for the accomplishment of the purpose in view.

Without some systematic organized effort such as we have outlined above, the present movement will come to nothing; with it, the objects sought can certainly be attained. Let every miller feel his individual responsibility, and come to the meeting on July 9th and 10th prepared to join hands in a movement to place the great milling industry of Canada on equal footing with other branches of manufacture.

PRESIDENT S. E. Dawson, of the Council of Arts and Manufactures of the Province of Quebec, expresses wonder at the slight notice which the work of the Council has excited from the press and people of Montreal. There are in Montreal alone 570 students pursuing a course of technical training, and in the schools throughout the Province last year the number of such students was 1346.

THE W. F. Cochrane Roller Mill Supply Company, of Hamilton, have made an assignment to Mr. Alexander Bruce, of that city. A meeting of creditors has been called for July 2nd, at 3 o'clock. If we have been correctly informed, the estate should be able to pay creditors' claims in full. The machinery plant at Dundas has been purchased by the Cochrane Company, of Escanaba, Mich., who have had it removed to their works across the line.

THE terrible destruction of life and property resulting from the breaking away of the dam at Johnstown, Pa., should lead to Governmental inspection of such structures and the compelling of means to ensure the safety of the lives of persons residing in the neighborhood of such dams or reservoirs. The immense jam of saw logs at present existing at the Cascades on the Gatineau, is giving rise to serious apprehension. The Johnstown disaster would be repeated on a smaller scale should this mighty log jam suddenly give way. The whole country to the Ottawa river, including the village of Gatineau, would be swept by the flood.

THE box shoo manufacturers of Michigan, about twenty in number, finding the competition of Mr. E. B. Eddy, of Hull, Que., detrimental to their business in the Eastern States, combined their efforts and succeeded in getting the appraisement on Canadian box shooks entering the U. S., increased to an extent which will probably make their exportation in future impossible. The United States Government is quick to move for the protection of the American manufacturer. The influence of twenty manufacturers is sufficient to secure action on the part of the United States authorities. The interest of two thousand mill owners has so far failed to receive recognition at the hands of our Canadian legislators.

THE action of the Dominion Government in issuing an Order-in-Council providing that all logs found to measure, inside the bark, eleven inches or less diameter at the butt end thereof, irrespective of length, when exported for piling purposes, or as piling, be not subject to the export duty of \$1 per 1,000 feet board measure, is generally regarded as a preliminary step towards the removal of the recently imposed additional export duty. No good object can be served by continuing the duty in the face of the strong disapproval which it has met with from lumbermen on both sides of the line. Since the above was written we learn from a despatch to the Empire from its Ottawa correspondent, that a most important proposition has been made by the Dominion Government to the United States Government through the medium of the Foreign Office, viz., that both Governments should consider the propriety of removing the import and export duties on lumber of all kinds, or in other words, that the Canadian Government will abolish the import and export duties on lumber providing the Washington authorities reciprocate. As an earnest of good faith, the Dominion authorities have meanwhile reduced the export duty on pine logs from \$3 to \$2 per thousand feet board measure, the figure at which it stood in November last, previous to the representations of the lumbermen asking for an increase. This reduction in the export duty takes place on July 1.

IT is difficult to understand the reasons actuating the City Council of Toronto in refusing to allow the Consumers' Gas Co., to compete with other companies for the privilege of lighting the streets by electricity. The Gas Company should be in an advantageous position to supply cheap electric light. Furthermore, in

return for the privilege of wiring the streets of the city it has offered to reduce the price of gas to the citizens to an extent aggregating \$50,000 a year. The Council should be interested in securing light for the citizens at the cheapest possible rate, and no hindrance should be placed in the way of a responsible company which offers to supply this requirement.

THE country has of late been flooded with funnel-shaped contrivances called "whisperphones." The vendors of these articles claim that when the whisperphone is placed over the mouthpiece of a telephone transmitter it greatly improves the powers of the instrument and renders it possible to converse easily in a whisper. It has been found, however, that the use of these same whisperphones impairs the adjustment of the transmitter to such an extent that in a short time it is almost impossible to use the telephone with anything like satisfaction, and considering the fact that the whisperphone is at its best but of very little, if any benefit, we think it would be to the interest of the telephone company to forbid its use.

MR. PILLSBURY, the great Minneapolis miller, told the United States Senatorial Committee appointed to investigate trade relations with Canada, that considerable Minneapolis flour was sold in Canada, and if the duty could be removed by annexation or any other plan, more would be sold there. We are not so sure that annexation would confer much additional advantage upon the Minneapolis miller. So long as the Canadian tariff and the Canadian Pacific Railway continue their discrimination in favor of the Minneapolis miller, he stands about as good a chance of capturing the Canadian market, as though all duties were removed. In the latter event, too, it must be remembered, Canadian millers would be free to compete for the trade of the New England States, whereas under present circumstances their hands are tied from so doing.

AS pointed out in Mr. Brown's letter published in the ELECTRICAL, MECHANICAL AND MILLING NEWS, the people of Nova Scotia are bitterly opposed to any protection being granted the Ontario milling industry, notwithstanding that Ontarians are cheerfully paying a very considerable sum each year for the benefit of the Nova Scotia coal mining industry. Our friends by the sea act in such a way as to convey the impression that they are protectionists "for revenue only." They are now praying the Government to impose a duty on importations of meat from Chicago. If it is wicked to "tax the people's bread" or to speak more correctly, secure the home market for the Canadian miller, would it not be equally sinful to "tax the people's meat," in order to give the home market to the Canadian meat producer? It strikes us that the people of Nova Scotia are inclined to be neither generous nor consistent.

MR. JOHN FORBES, a prominent Scottish miller, addressing the Council of the National Association of British and Irish Millers recently, on the subject of fire insurance, suggests that insurance companies should offer a premium to millowners on whose premises a fire has not occurred for a number of years. The amount of the premium should be in proportion to the length of the period during which the premises have been free from attack of fires. "This would be an encouragement," Mr. Forbes says, "to a millowner to take extra precautions against fire, because it would be clearly his interest to do so. Mills which have good management and escaped fire for a long period should surely be entitled to a liberal discount from the fire offices. The longer the care has been exercised, the greater the inducement to the millowner to continue this anxious care, so as to get increased discount and not forfeit the past. I have spoken of the scheme to several officials connected with companies, and they admit its force, but it has never been pressed."

THE efficiency of the fire protection secured by the use of the automatic sprinkler system in mills and factories appears to be of a very satisfactory character, in view of the fact that the associated factory insurance companies in the United States are urging a wider adoption of the system by manufacturers, and threaten an advance in rates where the recommendation is not complied with. It is recommended that wherever a sprinkler can be placed over each hundred square feet of floor space within the building to be protected, a sprinkler should be put, if the purpose of the owner or representative of the risk is complete protection and immunity from interruption in the conduct of his work. The New Orleans Fire Underwriters' Association re-

quires that sprinkler heads must thoroughly cover every portion of the building, including stairways, elevators, closets and blind attics; no one sprinkler head to cover more than 100 square feet of area, and that an adequate supply and constant pressure of water shall be in the pipes at all times, with valves open and in working order. Manufacturers adopting a system of automatic sprinklers should be careful to satisfy themselves of the efficiency of the apparatus, as there are said to be many worthless contrivances of the kind in the market.

THE best remedy for the smoke nuisance which the Local Board of Health of Toronto is calling upon the manufacturers of the city to abate, would probably be the employment by the owners of steam plants of properly qualified men to manage them. One of the manufacturers who was present at the consultation with the Health Board stated, that in addition to a smoke consuming apparatus his firm employed a skilled engineer. As a result, there were no complaints about the smoke from people residing in proximity to their establishment. A writer on this subject in an American contemporary, says: "It is a fact that a steam generator with properly proportioned grate and heating surfaces and combustion chamber, with all these parts large enough to perform the work without forcing, may be fired continuously and regularly, allowing the fuel to heat gradually and give off its gases slowly, and admitting air in sufficient quantity, and as the fuel heats, forcing it regularly forward on the fire without producing smoke. This process is also the most economical of fuel. The same result in a less degree may be obtained by firing with small charges evenly spread over the fire. On the contrary, a hot fire with a heavy charge of coal thrown directly upon it, evolves so large a quantity of gas that its volume prevents the proper admixture of air and the hot gas thrown against the cooler boiler precipitates its carbon, or in other words, makes smoke; on the other hand, a low fire suddenly forced and charged with fresh fuel, gives off gases at too low a temperature for full combustion and smoke is again produced. The production of smoke by either process means waste of fuel."

CANADIAN millers should be quick to investigate and act upon any suggestion having for its object an increase of the present meagre profits derivable from the manufacture of flour in this country. So long as the present tariff injustice is allowed to be perpetuated, and Canada is made as laughter market for American low-grade flour, it will be impossible for our millers to realize more than an infinitesimal profit on the sale of their flour. It may be possible, however, to so increase the demand for bran and shorts for feeding purposes, as to maintain a reasonable profit on the sale of these products. Experiments have been made by horsemen in Western Ontario and the city of Toronto with bran and shorts as a substitute for oats, and the results are said to be of a most satisfactory character. Bran and shorts are fed to the horses dry, instead of being mixed into a "mash" as has hitherto been the custom in this country. This necessitates proper mastication on the part of the horse, so that the food when taken into the stomach is in the best condition to supply the greatest amount of nourishment. Horse-owners in Toronto who have tried this system of feeding, inform us that under it an improvement soon became noticeable in the general condition of their horses. To such excellence did a well-known horseman in Western Ontario bring the condition of his animals under this treatment, that their fame spread abroad through the Province, and interested persons from Toronto visited his stables to enquire into his method of feeding. We publish these facts for the purpose of inducing millers in their respective localities to pay some attention to this matter. If the farmers and horsemen of your district are not aware of the superiority of bran and shorts for feeding purposes, enlighten them on the subject, and get them to prove the value of your statements by experimenting personally. The result will be an increased demand and consequently better prices for your offal. Try it.

IN many of our Canadian towns it has become quite a common thing to see electric light wires carrying high tension currents strung along the streets on the poles of the telegraph companies, and in many cases quite close to the telegraph wires. It is a matter of surprise and regret that this state of things should be permitted by the inspectors of the Underwriters' Association, especially as it is now an accepted fact that a cross between a telegraph and an electric light wire of high tension is extremely likely to result in a fire, except (as in some instances) the trouble is discovered and removed

in time. A number of fires occurred at London a few nights since from this very source, and we certainly think that the time has come when some definite steps should be taken towards the removal of this new danger.

It appears that the wiring of the new C. P. R. station at Montreal has been done in such an unsafe manner that it has been condemned by the Underwriters. It is a pity that the wiring of buildings of this kind should be entrusted to such incompetent workmen as evidently had charge of the work in this case. There are several first class electrical firms in Canada whose experts are fully competent to take charge of work of this kind, and we think it will pay the owners of buildings generally to pay a fair price and have their electric light wiring done in a thoroughly safe and reliable manner.

Although there are many electricians in the Dominion who are thoroughly competent to superintend the installation of arc lighting plants, it is nevertheless to be deplored that there are only a very select few who can be depended upon to take intelligent charge of the installation of incandescent plants. The causes which lead to this state of things may be found in the fact that there is not a single publication in the English language from which the average electrician can gain a clear and comprehensive view of general incandescent work. The need of a thorough and practical work on incandescent installation has been keenly felt by the electrical fraternity for some time, and we bespeak for the first edition of such a work a large and profitable circulation.

THE *Canadian Manufacturer* says:—"We do not think that the Ontario millers at their Listowel convention, on May 21, showed any large amount of wisdom in passing a resolution to petition the Dominion Government to remove the duty on soft coal, as a means of forcing the Maritime Provinces to consent to an increase of the duty on flour. Two wrongs cannot make a right. If it is right that the coal industry of the Maritime Provinces should be protected by a duty, that industry should be thus protected. If the duty on flour is not sufficiently high it should be raised, and the millers should urge their claim on this ground. Canadian millers should be very slow in entering into any movement looking to the breaking down of the National Policy. They have always claimed, and claim now, that the maintenance of the National Policy is essential to their existence; and they ought to know that the Policy of the opponents of Protection is to attack it in detail and to weaken it in every possible manner. Do the millers want to lend themselves to such efforts? Viewing Protection as essential to their interests, do they desire to ally themselves with the enemies of Protection, and help drive the entering wedge which would eventually destroy Protection, in retaliation upon the Government, who do not see their way clear to accede to their demands for a higher duty upon flour, and upon a great interest in neighboring Provinces because the representatives in Parliament from those provinces oppose the higher duty on flour? Such action as the resolution suggests is not wise. The ground upon which the millers propose to do this fighting is not sufficiently elevated. They should stand upon the higher ground of right, and demand that their interests should receive due attention." We may say in reply to the above, that the successful operation of a National Policy of Protection such as ours was designed to be, depends largely upon two things—willingness on the part of the people of the various Provinces, engaged in dissimilar industries, to co-operate with each other, and make mutual sacrifices if necessary for the sake of the upbuilding of the interests of the nation as a whole; and equal privileges under the tariff to all the industries of the country. The people of the Maritime Provinces appear to want all the benefits which may accrue to them locally from the operation of the tariff, but are unwilling to make any sacrifice in order that a great industry in the other Provinces may also be benefited. The millers want no exclusive privileges, but only reasonable protection such as is afforded under the tariff to every other important industry of the country. They are willing to pay the duty necessary to develop the Nova Scotia coal industry, provided the people of Nova Scotia are prepared to do as much to secure the home market to the Canadian miller. They believe in the principle of give and take. They don't believe in being compelled to do all the giving. Further than this, while the majority of Canadian millers are believers in a protective tariff for Canada, situated as she is alongside a highly protected and developed country like the United States, they do not believe in protection which leaves unprotected one of the chief industries of the country.

**WHAT EVERY FIREMAN SHOULD KNOW.**

**A** MAN may become a good fireman without having any knowledge of the laws of nature which control combustion, say the *American Engineer*, but he attains his skill by long practice and groping in the dark for the right way.

The fireman who has learned his calling in this manner is not, however, perfect master of the art of firing, for any change of furnace arrangement is likely to bewilder him, and he finds himself compelled to repeat his first experience in experimenting until he happens to hit the best method. This entails a waste of fuel and repeated delays for want of steam.

The nature of fuel, the composition of the air that fans the fire, the character of the gases formed by the burning fuel, and the proper proportions of air and fuel required to produce the greatest degree of heat, are the principal points in the laws of combustion which should be studied in this connection. Oxygen and carbon are the two most important elements of combustion in the fire box.

These elements unite freely and combine very rapidly, when heated to a high temperature, producing violent evolutions of light and heat. Oxygen is the vital part of the atmosphere, and carbon is the fundamental ingredient in all fuel used for making steam, anthracite containing the larger per cent. of pure carbon.

When the fireman has learned to combine these two elements in proportions which shall produce the greatest amount of heat, he will have solved the problem of making steam with the greatest economy of fuel and manual labor. Take a locomotive fire box for example; a common form of locomotive fire box is 72x35 inches, which gives about 17 square feet of grate area with the only draught through the ash pan. If an engine of this kind is required to draw a fairly heavy train at a running speed of forty miles per hour, it will be necessary to burn sixty pounds of coal per mile, or 2400 pounds per hour, to maintain steam for this work. This would require the burning of about 141 pounds of coal on each square foot of grate surface every hour. In this case the supply of air must be liberal and the oxygen will be separated from the air and combine with the carbon in the proportion of twelve parts of carbon, by weight, to thirty-two parts of oxygen, by weight, which produces carbonic acid gas. If, however, the supply of air is restricted the carbon takes up a smaller proportion of oxygen, giving us carbonic oxide gas, which produces much less heat than carbonic acid gas.

One pound of carbon uniting with oxygen to form carbonic acid gas generates 14,500 units of heat; or, sufficient to raise eighty-five pounds of water from the tank temperature to the boiling point.

On the other hand, when one pound of carbon unites with oxygen to produce carbonic oxide gas, only 4,500 units of heat are generated; or, sufficient to raise twenty-six and a half pounds of water from the temperature of the tank to the boiling point. In both cases, the same quantity of fuel being used, the difference is that less oxygen occurs in the mixture.

The combining proportions of carbon and oxygen to produce carbonic acid gas being twelve to thirty-two, the combustion of each pound of carbon requires two and two-thirds pounds of oxygen. It takes 435 pounds of air to supply one pound of oxygen; therefore it will require eleven and a half pounds of air to provide the gas essential to the economical combustion of one pound of coal.

So far the problem seems simple enough, the solution being to give the fire plenty of draught; but there are several practical objections to having the air blow through the grates like a hurricane.

The fuel should be kept saturated with the air containing oxygen; a large volume of air is required, but it should not be forced through the furnace and tubes at too great a velocity, the result of which is to send the gases into the flues and through the stack without being ignited. Further, the heat in passing through too fast is not given time to impart itself to the water. From these statements it will be seen that loss of heat is threatened from two opposite directions. If there is not enough air admitted, a gas of inferior heating quality will be generated; if too much air is allowed, heat will be wasted.

It is a matter of common observation that fuel will not burn until it has attained a certain heat, and different materials require different degrees of heat to ignite them. Hence unless the fire in a fire box be kept up to a condition to impart the necessary igniting temperature to its various parts as well to new fuel passed into it, a large amount of waste will occur in the distillation of the combustible gases and the passing away of these gases before ignition. This takes place proportionately to the power of the draught, both in the stationary and

the locomotive fire box, and requires constant watchfulness, so that sufficient intensity of heat be maintained at all points in the fire box, and that, withal, the fire be not allowed to become so thin as to permit of the passage of a greater volume of cold air than the capacity of the fire to impart the required temperature.

**SPUR GEARS.**

**I**N a recently issued circular of the Brown & Sharpe Mfg. Co., of Providence, R. I., they gave the following on Spur Gears:

Having the number of teeth and the diametral pitch, to obtain the pitch diameter, divide the number of teeth by the diametral pitch.

If the number of teeth is 40 and the diametral pitch is 4, divide 40 by 4 and the quotient, 10, is the pitch diameter.

Having the number of teeth and the diametral pitch, to obtain the whole diameter or size of blank add 2 to the number of teeth, and divide by the diametral pitch.

If the number of teeth is 40, and the diametral pitch is 4, add 2 to the 40, making 42, and divide by 4; the quotient, 10½, is the whole diameter of the gear or blank.

Having the number of teeth and the diameter of the blank, to obtain the diametral pitch, add 2 to the number of teeth and divide by the diameter of the blank.

If the number of teeth is 40, and the diameter of the blank is 10½ inches, add 2 to the number of teeth, making 42, and divide by 10½; the quotient, 4, is the diametral pitch.

Having the pitch diameter and the diametral pitch, to obtain the number of teeth, multiply the pitch diameter by the diametral pitch.

If the diameter of the pitch circle is 10 inches, and the diametral pitch is 4, multiply 10 by 4 and the product, 40, will be the number of teeth in the gear.

Having the whole diameter of the blank and the diametral pitch, to obtain the number of teeth in the gear, multiply the diameter by the diametral pitch and subtract 2.

If the whole diameter is 10½ and the diametral pitch is 4, multiply 10½ by 4 and the product, 42, less 2, or 40, is the number of teeth.

To obtain the distance between the centres of two gears, add the number of teeth together and divide half the sum by the diametral pitch.

If two gears have 50 and 30 teeth, respectively, and are 5 pitch, add 50 and 30 making 80, divide by 2, and then divide this quotient, 40, by the diametral pitch, 5, and the result, 8 inches, is the centre distance.

**COMPARATIVE COST OF STEAM AND WATER POWER.**

**T**HE circumstances under which steam and water come into competition as motive powers vary so widely with geographical situation, purpose to which the power is to be put, and other conditions too numerous to be mentioned in a short paper, that I shall confine myself pretty closely to the condition of things in cotton and woolen manufacturing along the valley of the Merrimack River.

Along this stream are situated Lawrence, Lowell and Manchester, three of the leading textile manufacturing cities of New England, and cities, too, which were created by their water powers; so that, if we can show that steam can compete successfully with water here, it surely can elsewhere in the same lines of production.

The history of the development of the cotton and wool industries of this country includes with it the development of the great water powers; for when these industries commenced to assume large proportions, the stationary steam engine was in its infancy, so there was at that time no question as to what motive power it was best to adopt.

To get a fair understanding of the cost of the water power we must remember, first, that where a large power is improved and made available, the cost per unit of power is decreased proportionately, as well in maintenance as in first cost. Again, these large water powers, more especially those at Lawrence and Manchester, were developed by companies owning large extents of lands made valuable by the sale of water powers at low figures, the companies making their profits by the sale of lands rather than by the water power.

The system at Lowell differs somewhat from the other two, in that the water power is owned and controlled by a stock company made up of the manufacturing companies themselves in proportion to their water rights, therefore, as they buy from themselves, their prices which, as a general thing, are lower than Law-

rence, may be taken as a pretty good guide as to the cost, as there is little object in their making themselves pay much of a profit.

The water power at Lawrence is owned and controlled by the Essex Company, and has been sold in mill powers, together with mill sites to the extent of about 130 mill powers. This unit of water power varies slightly in the different places, that in Lawrence being 30 cubic feet of water per second on a fall of 25 feet, while at Manchester it is 38 cubic feet per second on a fall of 20 feet, the first being equivalent to 85.23 horse power gross, and the latter to 86.36 horse power gross.

At Lowell there are three different falls, but the average mill power there is about the same as at Lawrence.

The original cost of a mill at Lawrence was ten thousand dollars, subject to an annual rental of three hundred dollars more, bringing the real cost to fifteen thousand dollars.

These tenants have also the right, under certain restrictions, to draw surplus water, paying for the first 20 per cent. additional, four dollars per day mill power; for the next 30 per cent., or from 20 per cent. to 50 per cent., eight dollars per mill power per day; above 50 per cent., it drops back to four dollars per day again. At the present time the Essex Company leases mill at twelve hundred dollars per annum, instead of the former method of a cash payment and rent. To summarize the foregoing:

Cost, per gross horse power per annum, of water at Lawrence:

Under original leases.....	\$10.55
Surplus water up to 20/.....	14.51
“ “ from 20/ up to 50/.....	29.02
Under recent leases.....	14.08

At Lowell, "The Proprietors of The Locks and Canals" continue to charge themselves three hundred dollars per annum rent on all mill powers granted in the original leases, and charge five dollars per day per mill power for surplus water up to 40 per cent.; exceeding 40 and up to 50 per cent., 10 dollars per day; from 50 to 60 per cent., twenty dollars per day; and when any one exceeds 60 per cent., they must pay \$20 per day per mill power for the entire surplus.

On the original leases cash payments of ten thousand dollars per mill power were made, so that on original leases the cost per gross horse power is the same as at Lawrence, or, summarizing as before;

Cost, per gross horse power per annum, of water at Lowell:

Under original leases.....	\$10.55
Surplus water up to 40/.....	18.14
Surplus water up to 40% to 50%.....	36.28
Surplus water from 50 to 60%.....	72.56

At this latter price water becomes an expensive luxury. The original leases amount to about one hundred and forty mill powers, or nearly twelve thousand gross horse power, which at the present time is supplemented by about eighteen thousand horse power of steam.

At Manchester the water power is owned by the Amoskeag Manufacturing Company, who made original grants at about the same terms as Lowell and Lawrence, except that, as the mill power is a trifle greater, it makes the cost per gross horse power a few cents less. For some years tenants were allowed to use surplus water without charge, but when the capacity of the power at low stages of the river was reached, a charge of five dollars per mill power for surplus water was made. This was the means of causing several of the mills to substitute auxiliary steam power for surplus water; but still later, the Amoskeag Company having reduced the charge to two dollars per day per mill power, tenants who are equipped to do so use surplus water whenever allowed.

We will summarize now for Manchester.

Cost per gross horse power per annum at Manchester:	
Under original leases.....	\$10.42
Surplus water.....	7.15

It is usual in computing water powers to subtract one foot from the head as measured from still water, which is an allowance for loss of head in the water entering and leaving the wheel.

The efficiency of a first-class turbine should be about 85 per cent. of the net fall, so that, if we consider that the average wheel that would be put in to-day will deliver to the shaft 75 per cent. of the gross power paid for, we shall not be far wrong. Under these circumstances the net horse power would cost  $\frac{10.50}{.75} = 14.00$  for water under the original leases.

The cost of the plant will vary largely per horse power inversely with the head under which it is used, as the greater the head the smaller the wheel for a given amount of power; but under a head of about thirty feet,

\*A paper presented at the Erie Meeting of Mechanical Engineers, by Chas. H. Manning, Manchester, N. H.



**THE ELECTRICAL EXHIBITION.**

**T**HE Electrical Exhibition at St. John, N. B., referred to last month, opens on the 22nd inst., and gives promise of being a novel and interesting event in the line of public exhibitions in this country. Mr. Ira Cornwall, the courteous Secretary of the Summer Carnival Association writes concerning it as follows: "Nearly all the leading electric companies are going to help us. Mr. Edison is giving us a great list of attractions, and with the electric pianos, organs and other great novelties, we will have a good bill of fare." On this page we present an illustration of the buildings which are to contain the Electrical Exhibition. A representative of this journal will be present at the Exhibition and furnish readers of the August number with full particulars concerning it.

**LET US HAVE TRUSTWORTHY MARKET REPORTS.**

FROM ELECTRICAL, MECHANICAL AND MILLING NEWS.

**I**n my last letter I dealt at length with the question of the tariff on flour and wheat, and if you will allow me, I would like to draw the attention of the millers in convention next month to another almost equally important question. That the millers have been paying from 10 to 15 cents per bushel more than export price for their wheat, and selling their product in a slaughter market for American low grade flour, is a fact that no sensible miller can for a moment deny. That this is not done uniformly is also well known, for markets at points where freights are the same have been known to range from \$1.05 to \$1.20 for the same grades of wheat on the same day. This trouble arises principally from two causes—ignorance and folly—if our friends will allow us to speak the plain, unvarnished truth.

What is No. 2 white wheat worth in Liverpool to-day? A reference to the daily report shows that 97 cents is all that our No. 2 white is worth delivered in Liverpool. Deducting cost of cartage, etc., say 11 cents, which is if anything too small, the balance here would be 86 cents. What are you paying at your mill? I see by to-day's quotations that this grade is selling to Ontario millers at \$1.00, or 14 cents per bushel too high.

Now, the most charitable view we can take of the actions of those responsible for this state of affairs, is to attribute it to ignorance of the market value. The daily press have also contributed not a little to this general result, for the quotations, wherever obtained, I am sorry to say are generally unreliable and often palpably false. It is easy, I know, to find fault, but not quite so easy to get a remedy. However, we have several of more or less merit offered, and almost any change would be welcome where the whole situation is so bad.

Mr. Plewes' scheme has held a prominent place before the trade for some months past, but it does not seem to grow in favor on account of the amount of machinery necessary to carry it out successfully. In fact, many have pronounced it impracticable.

At the risk of a similar judgment let me propose:—

That the Secretary of the proposed Association of Millers issue a daily market report, quoting the value at each buying station, having due regard to the rate of freight.

That such report should also contain the names of stations where the buyers are paying in excess of quoted values, and where possible, the names of such buyers.

The English market quotations to be daily given in Canadian currency, and also the export value.

That this report be forwarded only to members of the Association.

That the Secretary should take such oath of office, and give such bonds as would ensure authentic and faithful reports.

This, of course, is only a rude sketch and subject to a great many improvements, but if such a scheme were adopted, there is not a doubt but great good would come of it, for no member of the Association could then plead that he did not know what was the real value of his raw material, and if he should then deliberately choose to pay more than value, he would only have himself to blame for the consequences.

The cost of such a report would be as nothing compared with the gain which would result. The trade would be no longer at the mercy of the wire-pulling and quotation-fixing which is daily done by parties interested in getting exorbitant prices for their stuff. Such a sheet would be a bond of union between the milling fraternity which has long been needed.

Many other good reasons might be given why the

Association should adopt the scheme, but enough for the present.

To millers I would say: if you like the idea, come to Toronto and support it; if you do not, come and vote it down, and propose another. In any case, we want your opinion at the convention July 9 and 10.

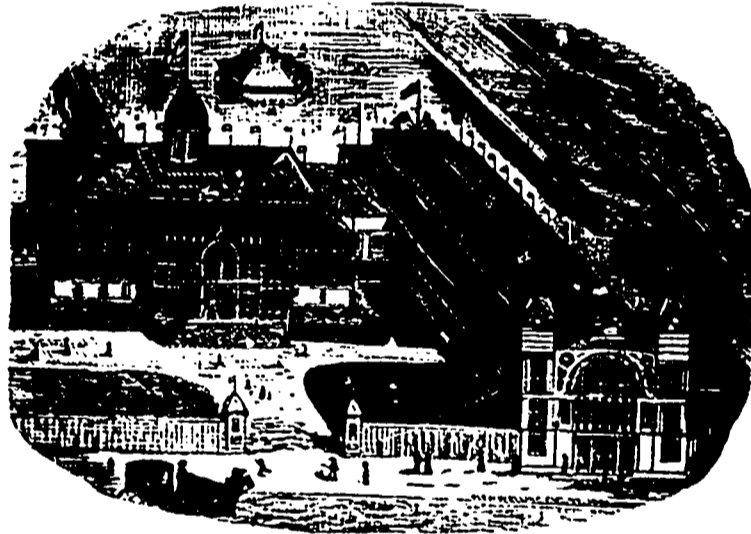
Yours truly,  
JOHN BROWN.

**MOTORS AND DYNAMOS.**

BY C. O. MAILLOUX.

**I**T is often stated that an electric motor is merely a dynamo reversed in its functions, that is to say, a dynamo which, instead of being set in motion by power to produce electrical energy, is set in motion by electricity to produce motive power. This duality of function of the same machine is indeed a peculiarity which has been again and again demonstrated. Added to this is the remarkable circumstance, shown quite conclusively by the practical experience of designers and experimenters, namely, that the same principles of construction underlie the efficiency of the machine in both cases, and that as a rule a machine which gives good efficiency as a dynamo or generator is found to be equally good efficiency as a motor, and *vice versa*.

To the uninitiated it might appear, therefore, inasmuch as the same machine by virtue of its reversibility can be made to perform either of the two functions at will and equally well, that the distinction between dynamos and motors must be a more or less useless one. In reality, however, such is far from being the case. The fact is that the conditions and requirements which are to be met are usually so different in the motor and generator or dynamo, that the design and construction are almost of necessity made divergent from each other. One of the fundamental reasons for this divergency is



ELECTRICAL EXHIBITION BUILDINGS, ST. JOHN, N. B.

that in the case of the motor the efficiency may sometimes be sacrificed to other considerations, such as lightness, compactness, shape, etc., while in the dynamo the efficiency remains the foremost consideration, with very few exceptions.

While the quantity and weight of material are not usually limited in the dynamo, they are generally restricted in the motor by the considerations of lightness, adaptability, etc. On the other hand, while the speed of dynamos is generally placed at as low a limit as possible, the speed of electric motors is allowed a much greater range. The ends attained by regulation in both cases may also influence the design. In the electric motor the prime consideration is usually the control of the speed. Thus we see plainly that the problems which are to be encountered in designing dynamos are not necessarily the same as those met in designing motors. This justifies the distinction that is usually made between the two things, and explains why the theoretical property of reversibility is not more frequently utilized to make the one perform the functions of the other. There are analogous examples of reversibility in many other forms of apparatus for utilizing energy by converting one of its forms into another, and these illustrate the same divergency as the result of practical requirements.

Thus the air compressor and the steam engine are theoretically reversible: nevertheless the practical requirements they have to meet in their respective "stations," make them practically quite different, and the one is never used for the other.

These distinctions between dynamos and motors, or between distinct types of each, are not, as a rule, so clearly perceptible to the ordinary observer as to experienced persons. In truth, they all appear to represent very much the sameness and repetition of type or form which steam engines seem to present to the uned-

ucated eye. But just as the engineer sees an important difference between engines, even in such details as the proportions of the cylinder, the amount of clearance, the kind of valve, the mechanism controlling it, the governor, etc., so the electrician ascribes like importance to the proportions of the armature, the form and arrangement of the field magnet, the mode of winding, even the very size of wire used, or the weight of iron, for a given purpose. In both steam and electrical engineering certain principles of construction have become fixed standards, so to speak, because they have been confirmed and sanctioned by practice; and the types of engines or motors are bound to exhibit convergence towards each other, in so far as they conform to these standards. In the dynamo and motor, this process of standardization has been directed, apparently, more toward the armature than to any other part.

It is interesting to note that, in spite of inventors and patents, the great Darwinian principle of the "survival of the fittest" has remained in control, and that practice has gradually gravitated down to but two types of armatures, and these, strictly speaking, modifications of the same principle. This principle is that of closed circuit winding, first invented and applied by the Italian physicist, Antonio Pacinotti, in 1860, but re-discovered and made public ten years later by Gramme, whose name it has retained. In this case the coils or sections are wound around a ring or annular band of finely divided iron, and so connected as to constitute a continuous circuit just as if made of one length of wire. Shortly after, this was modified by Siemens, who wound the wire coils entirely around the outside of the core, which now took the form of a cylinder instead of a ring, the same principle of connection of the coils to each other and to the commutator being retained. These are the two forms of armature, the Gramme and the Siemens, which have stood the test of time, to the exclusion of all, or nearly all, others. However, even within the apparently narrow boundaries of these standards, there remains ample scope for ingenuity and inventive ability, not to say technical knowledge and skill. The mechanical structure of the armature, the kind of iron and the form it should present to utilize the field magnetism to the highest advantage, the prevention of parasite currents and consequent heat in its mass, the easiest mode of winding the commutator, are to-day topics of even greater interest and importance than ever. It may be said, moreover, that there is no more dangerous customer to judge of by its "shape and appearance" than an armature, so great yet so little apparent may be the differences.

With regard to the magnets, or that portion which serves at once as the foundation or framework, and at the same time as the "field" in which the armature performs its functions, a much greater variety of types and forms has continued to exist; and it is here that the divergency in forms between motors and dynamos is more striking. In the electric motor the considerations we have referred to already, often impose as to weight, size or from certain limitations on restrictions, which do not, as a rule, apply to dynamos. These and other requirements, such as, for instance, speed regulation, may even react upon the design of the armature itself.

Even here, however, one can perceive a tendency towards standardization of types and forms. As between the two principles of magnet construction in dynamos and motors, the single magnetic circuit has quite evidently made more progress in practice, of late, than the double magnetic circuit field with "consequent" poles. There is, however, an interesting struggle which has just about begun, between magnetic fields with a single pair of poles and those with more pairs than one, "multipolar" machines. It is not impossible that they may divide the field and the honors between them. It is nothing less than remarkable that so much progress can have taken place inside of three or four years in the evolution of the circuit motor. It is certainly a promise of a brilliant future that in so short a time it should have reached the same plane of perfection on which the steam engine itself now stands to-day, and which admits of no better excuse than ignorance for those who fail to accomplish results. In both there is still considerable room for inventive talent, but far more for engineering skill and ability.—*Power Steam.*

There should be a good market for dictionaries in the vicinity of the Buffalo *Milling World* office. The editor's weekly hunt for such conglomerations as "excerebrose hebeticulous rhombocephalic micromentality" must be very destructive of dictionaries.



## JOTTINGS OF A TRIP OVER THE MARITIME PROVINCES.

By L. A. MORRISON.

I HAD gathered in my newspaper gleanings, during the last ten years, the impression that a certain amount of discontent with the condition of things anent Confederation existed in these Provinces. I also understood that quite a strong feeling in favor of reciprocal commercial relations with the United States amounting almost to annexation with some individuals was pretty generally prevalent, and I was therefore anxious to understand just how much truth there was in these impressions, at least in so far as they related to the manufacturing and milling interests. I did not have to look far or search deeply for the causes that produced them.

Nearly all the important lumber and shingle manufacturing interests of the Province of New Brunswick, have their headquarters at or near St. John, and I found that a large portion of the proprietors were either Maine Yankees or sons of Maine Yankees, or men who had all their life-time been doing business and making their money by selling their lumber, deals, shingles, etc., to New England purchasers—their raw material going outward in that direction, and their money coming back from there. Having close connection both by rail and water with all the important centres of the New England States, it was scarcely to be wondered at that an occasional trip from a quiet New Brunswick town to the busy bustling thrift of Boston, impressed them strongly with the thought that if only political barriers were out of the way, somehow or other a sort of commercial "Vale of Cashmere" would be the result for their Province by having free and untrammelled facilities for the interchange of materials and manufactures.

Then, on the other hand, while all their products went outward and their money came back from the New England States, very little products went outward from this class of the community, and therefore very little money came back from the other Provinces, and this too fostered a desire for closer and freer international trade. At the same time, with all this class of the population, a growing feeling that in all the important conditions of provincial commercial life, Confederation was a burden grievous to be borne, and bringing with it very little compensations to atone for the apparent losses, seems to have been taking deeper root.

I mentioned that a good number of the millmen were Maine Yankees. Some of these having built mills exclusively for the cutting and handling of the timber from their own limits in the State of Maine on the upper branches of the St. John river, which they floated down the stream out of the State of Maine into New Brunswick from year to year, as the easiest method of reaching the world's markets, and having all their interests abroad, and they themselves practically foreigners, continually talking about the losses to New Brunswickers who were living outside of annexation, and pointing in very brilliant colors the benefits to be derived from it, have done not a little to perpetuate and increase the dissatisfaction existing in men's minds in relation to Confederation.

It was really very amusing to get in contact with a coterie of mill men, half of whom were Maine Yankees, and the remainder Americanized New Brunswickers, and begin to discuss saw-mill and shingle-mill machinery. The mere mention of any machine that was not manufactured or used to a very great extent in the State of Maine, or that had not been brought in Boston, seemed to settle *without the shadow of a doubt in their minds its utter worthlessness*. Some of their methods of operating these classes of machinery are not up to the advanced methods of westerners in Ontario, Michigan, Wisconsin, etc., but it was a total waste of time to try and explain this to them, because the invariable reply was that "Mr. So and So" in the State of Maine did not do things that way, and *that settled it*. To illustrate this point: the shingle machines and jointers in use over the Province of New Brunswick, are a sort of combined machine, in which the one man attends to the setting of the block in the automatic machine that drops about twenty-six shingles a minute, and which he joints on a saw jointer as they drop, and in fairly good cedar, a diligent man can cut and joint about fifteen thousand shingles per day. Now, I will give a medal, quite as good as the *Mail's* Anti-Jesuit medal, to any person who can persuade any of these mill men that this is not the most complete way of handling shingle stock adopted by the mill men of any country. It was

a waste of time to call their attention to the fact that the man could not attend to the shingle machine and the jointer at the same time "*they do it this way in Maine, and that settled it*."

Most of these mill men were Commercial Unionists, and if I had time I would just like to give your readers the opinions of about a dozen of them, expressing their idea of "Commercial Union." It would astonish even Erastus Wiman, and perhaps help convince a good many people that Commercial Union is about the most visionary fad that ever occupied the minds of an intelligent people, and about as likely to be realized in even its mildest form, as Senator Blair's scheme, promulgated last December in the Senate at Washington, for the annexation of Canada.

I was in the Province to pick up information and get acquainted with the people, and not solely for the purpose of a flying trip to make a little money; I therefore took occasion about once a day, for three or four weeks, to ask some of the disciples of Commercial Union, who did not hesitate to affirm "*I tell you it would make this country boom if we only had Commercial Union, What are your ideas of Commercial Union?*" My question brought out some queer commercial chimeras, but instead of undertaking to put any of them on record, I would only say this in a general way, and summing up a sort of hopeful (?) interpretation of their thought, as expressed by quite a number of men, "*I am sure we could make more money.*"

There did not seem to be any other point of importance that at all compared with this one of making a little more money, and I was pleased to note as my acquaintance widened so as to include people engaged in a number of other lines of industry and commerce, that I did not find this desire for reciprocity with the United States nearly so strong in any other line of industry or commercial life as among the mill men, and on closer cross-questioning some of the most rabid annexationists had to admit that in all the conditions of educational, social and religious life, our Canadian provinces were quite equal to, and in many respects superior to any of the States of the United States, even including Maine, or cultured Boston.

No doubt before this appears in print, the C. P. R. short line from Sherbrooke in Quebec across the State of Maine to Fredericton, which will bring Montreal and St. John about two hundred and seventy miles nearer each other, or within fourteen hours ride of each other, will be in operation, and I understand also that it is the intention of the Grand Trunk and Intercolonial to so arrange their time tables as to shorten the time from Montreal to Halifax from six to nine hours, or making the trip say in thirty instead of thirty-six hours. This will bring these Eastern Provinces and Ontario nearer together, the people of whom are near enough alike to become thorough good neighbors, political brethren, and warm personal friends.

Inter provincial trade that has gradually been widening and assuming a condition of substantial permanence in some branches of industry is bound to grow, and develop in other lines. The Maine lumbermen will have cut out their limits, and have taken their money for permanent investment in the halcyon fields of Maine. Some of the grumbling New Brunswickers who have the same opinion of Ontario business men as the Scotch shepherd in the foggy glen had of his brother whom, seeing dimly in the distance, through the distortions of the fog, he imagined to be a veritable ogre: will have visited their western countrymen in Ontario, and have learned that they fear God and keep His commandments, and are worthy descendants of the grand old Celtic stock that fought for equal rights and British freedom at Trafalgar and Waterloo, and learn as they come westward and go on over the rolling prairies toward the setting sun, that it was a brighter and better Providential purpose that left them an integral part of so important a nation as Canada may yet become in all the true and permanent conditions that go to make up national life, rather than the lag end of the State of Maine.

But to be a nation we must begin to build national life on a more substantial basis and along more permanent lines than hitherto. This truckling to faction, this pandering to Jesuitism, this morbid desire among politicians to retain, or regain, power at any cost, this unbridled greed for wealth without reference to the increase or stability of the conditions which alone can make wealth useful or safe; all these must give place to a bet-

ter and truer citizenship. I remember as a young man in the backwoods of Ontario, driving 25 miles to hear Dr. Punshon lecture on "Macaulay," and I yet can feel the forceful inspiration that thrilled me as in the reciting of a passage from "Horatius," he said, with more than mortal eloquence:—

"Then none was for the Party,  
Then all was for the State;  
Then the great man helped the poor,  
And the poor man loved the great;  
Then lands were fairly portioned,  
Then spoils were fairly sold,  
The Romans were like brothers  
In the brave days of old."

## LADOGA WHEAT.

A BULLETIN of the Ottawa Experimental Farm gives an interesting account of the experiments made in various provinces of Canada for the purpose of ascertaining the properties of Ladoga wheat as compared with Red Fife. Ladoga wheat comes from the Ladoga lake region in Northern Russia where the summer is short. It is claimed for this variety that it ripens early and attains a high degree of hardness and a heavy weight. The experiments have been continued through several seasons, and hence the results may be looked upon as reliable. It is shown that Red Fife is about ten days later in ripening than the Ladoga wheat.

The average yield from each three pounds of Ladoga sown was as follows: Manitoba 38 pounds, Northwestern territories 63 pounds, British Columbia 126 pounds, Ontario 44 pounds, Quebec 39 pounds, Nova Scotia 26 pounds, New Brunswick 39 pounds, Prince Edward's Island 46 pounds. In Manitoba the highest weight per bushel was obtained, viz. 65 pounds, the lowest weight was 60 pounds in Nova Scotia. As to quality most experts place the original Ladoga wheat in the grade next below No. 1 hard and the value at some five cents per bushel less than that of the best quality of Red Fife. But it appears that it has adapted itself gradually to the soil and climate conditions of Canada, approaching, and in some respects surpassing the standard of excellence attained by the famous hard wheat of the Northwest. The bulletin gives the following summary of the conclusions reached by a careful analysis of the experiments:

"The Ladoga wheat has been subjected to a searching criticism; tables of the entire results of its growth have been given, the public have been advised of such defects as have been noticed during the progress of the two year's test, and making the most liberal allowance for these defects, it seems not too much to say that the evidence thus far obtained is sufficient to show: That the Ladoga is a productive and variable variety of hard wheat, which has thus far ripened over the whole Dominion ten days earlier on the average than the Red Fife; that the better samples obtained are fully as rich in gluten as the best Red Fife, and while cultivation of the Red Fife should be recommended in every section of the Northwest where it is likely, with early sowing, to escape the autumn frosts, the growth of the Ladoga may be safely encouraged wherever the ripening of Red Fife is uncertain, without incurring the risk of materially lowering the reputation or general quality of Canadian hard wheat."

Considering the immense area of land in Canada which has been regarded as unsuitable for wheat raising on account of the shortness of the season of growth, says the *Minneapolis Tribune*, the satisfactory results of the tests of Ladoga wheat are of great significance. A saving of ten days in the time from sowing to harvesting will add a handsome belt of land to the wheat producing area, enlarge the possibilities of Canada as a producer of the staple, and eventually make itself felt as a potent factor in the markets of the world.

WIRE GAUGE.—The classification of wire cloth differs in different countries, but as a rule the small numbers denote the large, and the higher numbers the smaller sizes of the meshes. In Germany the number on the cloth gives the number of threads found in the space of one Prussian inch; in Austria, to one Viennese inch; in France and Switzerland, to one Parisian inch; in England and the United States, to one English inch. Consequently the numbers of the wire cloth bear the same proportion to each other as that of the length of the various inches; and are best illustrated by their reduction to the metric system. One inch English measure equals 25.40 m.m.; Prussian 26.15; Viennese 26.35; Parisian 27.07. The difference between the Prussian and Viennese measure is so small, that they can be accepted as the same for all practical purposes, and thus generally form the type for the classification of most of the wire cloth in use. Whether round wire is used or square wire, the numbers are the same. The shape is only of importance in the final application: for supporting and sowing of the grain, the round wire is preferred, but for clenching purposes where friction is required, square wires have been found to do better service. Their time of service, however, is short, as the sides of the wire, subject to the constant friction, soon lose their sharp edge and become round.

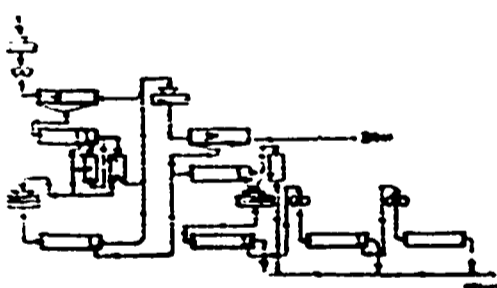
HOW TO CONVERT A STONE MILL.

I HAVE often been asked, says Mr. W. T. Bates in the London Miller, the best way to make flour with a stone mill, and have been unable to give in a few words the necessary reply, simply because the question was the answer necessarily must be, a comprehensive one. I therefore make no apology for the accompanying simple diagram, which I give in answer to my enquirer, hoping it may be of some service to them. It must be understood that this is simply a general arrangement of machinery supposed to be already in the mill, with the exception of probably the pair of grooved rollers and the gravity purifier. Of course it is open to any amount of change to suit circumstances, either by subtraction or addition, as also by the employment of stone alone for the reductions. One thing alone must not be dispensed with, and that is the grooved rolls—these are indispensable to the success of the system.

It is generally conceded that if we can make middling, we can make good flour by bringing the purifier into use. Now the stone miller is limited in the production of middlings. So far as I am aware all attempts have been in the direction, by improvement of millstone dress and otherwise, to finish the wheat grinding in one operation, thus having only one reduction for middlings making. If clean bran is desired, the middlings must be very limited in quantity by this system.

Now my arrangement overcomes this difficulty, and gives the stone miller an almost unlimited quantity of middlings. How is this done? By making practically three breaks, and especially by interposing a pair of grooved rolls, as for third break. It is well known that at least half the middlings of a roller mill are made on the third break; the preceding breaks are merely preparatory for the third and fourth, where the middlings making is practically finished.

According to the diagram, I break first with a pair of stones. Now these stones should not be cracked; they should be kept as smooth as possible, with shallow, smooth-edged furrows; they should be dished out at the eye, leaving only a short face. They would also do better work if driven slowly or slower than for general work. The object is to break the wheat without tearing the bran. It is not necessary to attempt to break the wheat down the crease. Only the inexperienced try to do that, and say they can do it, as it is simply impossible, and if otherwise, there would be no earthly advantage in it. No, break the wheat on the first stones with an object, and that object is to prepare the material for the pair of rollers, where it is necessary to do as much work as possible, for in this lies the secret of the whole system.



FLOW SHEET OF A COMBINED MILL.

With the object of reducing the number of machines, and perhaps elevators, I have spouted the stock direct from first break stone to rollers. It is a fact that the use of natural semolina, &c., mixed with the chop coming from the stone does not materially affect or increase the yield on the roll; but if it is desired to remove the bran from the rolls, and there will be a fair quantity, a wire-bottomed spout, or even a wire-bottomed spout, will do effectively. An improvement would also be made by aspirating the chop after first break; it will remove all that stinking black fibrous dust made there. The chop from the rolls is the most important element, and, as will be seen, is treated somewhat as in a roller mill. The unfinished bran chop is sent on to No. 2, which is dressed as for ordinary work, but not so sharp, and there it is properly finished. I may remark that this bran will be clean and better than any other bran generally is, and far better than average bran. After grinding it can be sent into either a wire dressing machine, a centrifugal or a reel. It is simply a matter of convenience; either will do. It is rolled over No. 30, or a number thereabouts, and the product sent to a finishing machine with some other product, and thence to purifier.

I have not given the clothing numbers of the machines, excepting the scaper, which should be coarse, so as to get as much semolina as possible. Neither have I indicated class of machines. I am merely assuming that a miller has a number of machines in his mill and wishes to use them. However I may as well

say that break material and that ground by stones will dress well in reels, while centrifugals are best for following rolls.

With regard to capacity, that depends almost entirely on the fineness of the silk. All roller millers are conscious of being crippled in production by the difficulty of grinding and finishing fine dust. Now much of this fine dust is practically flour—our fathers knew it by no other name—it therefore stands to reason that if we use fairly coarse silk we get this fine stuff into the flour sack, and it makes our flour feel and look lively; if, however, we use fine silk we get it on to the succeeding rolls or stones and often some of it into the offal sack. I knew of a miller working largely on English wheat who used a No. 8 silk for reduced dust (pure) and called the flour a very high-class patent; and no doubt it made just as good a loaf as if it had been reduced five or six times successively for the purpose of making it look better.

By saying this I am not going to the silly extreme of suggesting that stone-millers should dress their stone flour coarse; or that they should continue to make flour on the old lines. No. If they adopt the above simple arrangement they will have pure material, such as no purely stone system could give, and hence can use coarser silk in some positions. I must say that this is a very short system, but there is no reason why the number of reductions should not be increased; it is only a matter of machines. If there are stones in the mill they could be used, either instead of smooth rolls, or additionally, to prolong the system. In any case the stones should be kept perfectly true, and not run too long without dressing; the less grinding the stock gets the better. I do not think it necessary to give a key to this diagram. As will be seen, there are four pairs of stones, one set of grooved rolls, and two pairs of smooth rolls. There are also two sieve purifiers and one gravity purifier. The other machines are either rolls or centrifugals, the plan part indicating the flow sheets.

As to new machines, where necessary, I may as well repeat what I have before stated, that there is plenty of machinery to be had at a very low price secondhand. In most cases it is sold only for the sake of getting uniformity, and for no inherent fault. Small millers, with limited means, will readily find a use for all their machinery; but they must first make use of their brains, for a mill tacked together without brain cement is but a sorry affair. Unlimited advice and descriptions are of little use if there is no inventive and constructive genius at home.

No doubt roller millers will brand this simple diagram as imperfect, but nobody, perhaps, is more aware of its imperfections than myself. It is, however, easy enough to criticize. I can do that sometimes. All I ask is that the critics will produce a better plan with the same number of machines. My one object is to benefit the small struggling miller. Others, no doubt, are equally anxious; if so, now is the time to show it. My task is done.

THE CANADIAN MILLING SITUATION.

THERE is a tidal wave of interest in the formation of a national association of millers in Ontario. The incentive is mainly because the Dominion government's policy of "protection" is unjustly severe on the miller, discriminating against him with a duty of only 50 cents a barrel on flour, while the duty on wheat is 15 cents a bushel, equal, according to the government standard of 4 1/2 bushels to the barrel, to 71 1/2 cents, which is virtually a bonus of over 20 cents a barrel in favor of the American exporting miller. We do not wonder that the Canadian miller is "sore."—The Millstone.

"Between the flour-makers of the West and the bread-eaters of the East, the Minister of Finance does not just now recline on a bed of roses. The question is one which well illustrates the practical difficulty in adapting a policy of protection to the conflicting wants of localities whose conditions are radically diverse. From the protectionist point of view, or even from any other point of view, the case of the millers is certainly one of real hardship. They do well to be angry. While other industries all round them are protected from foreign competition by tariffs which really protect, the miller finds his product not simply unprotected, but actually discriminated against. It is clearly a sound and wise policy to encourage the importation of raw material with a view to its manufactured product. The tariff which successfully accomplishes this result accomplishes the highest end of protection. But when the miller sets about doing this, he finds himself actually compelled to pay a higher tax on his wheat, which is the raw material of his factory, than that imposed upon the foreign flour which comes into competition with his finished product."—The West.



A correspondent of the Woodworker offers the following recipe for a belt glue that will stand without rivets. First make a solution of cement as follows: One pint of soft water; 18 ounces of Irish glue; one ounce of singlass; quarter ounce sulphuric ether; quarter ounce orange shellac; one gill of per cent. alcohol; two ounces dry white lead. Have druggist put ether, shellac, and alcohol in a bottle and dissolve. Have water in a kettle, hot, then add your glues, thoroughly dissolving them. Then add white lead and contents of bottle. Thin the cement to a proper consistency when you wish to use, and apply it hot. The belt should be properly cut, so as to make a splice whose thickness shall not exceed the thickness of the belt itself.

Millers who complain of specky flour must know, says the Millers' Review, that most of the specks are caused by the improper manner in which the wheat is cleaned. There are a great many millers who make no attempt to clean their wheat further than to pass it through a separator and scouter, and think it is sufficiently cleaned. It should always be borne in mind that wheat can't be too well cleaned, and as long as there is any kind of impurity in the grain, or if the beard is left, the wheat is not fit to be milled, and should not be, as it will be impossible for the bolts and purifiers to take those fine impurities out, for they are mostly as fine as fine middlings, and the beard goes through the silk with the fine flour. No miller can expect to be successful in the manufacture of flour unless he cleans his wheat thoroughly. If wheat is well cleaned, all the machinery kept in order and carefully attended, specky flour is impossible.

ELECTRIC WELDING OF PIPES.—What was certain to follow the invention and development of electric welding of solid bodies by Prof. Elihu Thomson, says the Engineering and Mining Journal, was that either he or some other worker in the same field of research would discover a method of making endless pipes by the adaption of the discovery to that purpose. This has apparently been done by Mr. Elias E. Kies, of Baltimore, and patents have been granted covering the process. The main feature of the first patent is that the smooth interior of the pipe is secured by the use of a removal refractory core, made of some insulating material, while in the second case the same object is attained by subjecting the interior of the pipe while being welded to compress air or fluid pressure. We expect to see this system largely adopted, especially in pipe lines and where the pipes are to be subjected to high pressure, as welded joints must, of their nature and from the tests made of welded bars, be stronger than any ordinary joint and proof against all leakage.

CAST-IRON JOINTS.—A writer in a foreign paper says he is of the opinion that a permanent and durable joint can be made between rough cast-iron plates by the use of mineral asbestos with sufficient mixed white lead to make a very stiff putty. This will resist any amount of heat, and is unaffected by steam or water. My attention was first called to it by a German chemist using it for mending or closing cracks in cast-iron retorts that were used for the distillation of oil and gas from channel coal. The heat being applied to bottom of retorts, and the temperature of iron maintained at a bright red heat, after a time the bottom of the retorts would crack, the larger portion of the crack being downwards towards the fire. The method the chemist employed was to prepare the mixture, and place it on top of a brick; then place the brick on a bar of iron or shovel, and press the cement upward to fill the crack in the iron, holding it for some time until it had penetrated the cavity, and somewhat set. Of course, during this operation the cap was removed from the retort, so that no pressure of gas or oil forced the cement outward until set.

PATENT APPLIED FOR.—Inventors who use the words "patent applied for" on their machines under the impression that it will protect them from infringement if they go on with their manufacture before the patent is granted are liable to be disappointed in a case at law, unless the law, which is supposed to be common sense, is administered by a court which is disposed to recognize rights not distinctly conferred by the statute. In a case at Detroit the United States District Court decided that the words did not protect, and that the injunction against an infringer sued for by the inventor, who had entered into the manufacture of a gasoline stove burner before patent was obtained, could not be granted. The reasons given were that the court could not assume that the patent would be issued at all, that patentees have no rights at common law, the statute limiting the life of a patent to seventeen years, and that to grant such an injunction would be in effect to give the patent more than its statutory life, by the length of time intervening between the granting of the injunction and the granting of the patent, which might be some months.

We learn from the Boston Journal of Commerce that among the interesting and successful of recent inventions is a rolling mill for producing sheet metal direct from the molten state, instead of rolling it from a billet or bar. A machine of this character has been at work for several months at the tin factory in Maywood, near Chicago. It is used for making sheet solder, six or eight inches wide, and 15,000 of an inch thick, which it produces at the rate of 400 feet a minute. The apparatus consists of hollow rolls with cold water running through them. The water is introduced through the axle, and the rolls are of sufficient size to at once change the jet of molten metal into solid form as fast as it is fed. The powerful compression exerted by rolls upon the molten metal in forcing it between the two surfaces, and at the same time changing it to a solid body, tends to give to the sheet an even and highly finished surface. The inventors of the machine believe that the principle could be successfully applied to the rolling of Bessemer steel, as well as to other metals. C. W. Foster and other officers of the North Chicago Rolling Mill Company recently examined the machine, and expressed themselves as being favorably impressed with its work.

### THE "BALL" ARMATURE.

THE accompanying illustration represents the Ball Armature. Its main features are a brass mounting hub, with grease catcher on end to prevent grease getting into interior of armature from the center bearing, an expanding bolt, fitting into a metal shoe, between which and interior surface of armatures is placed the insulating pad. The armature is tied up under heat by means of the expanding bolts, after which the jam nuts are tightened down.

It will be readily seen that there can be no loosening or shifting of the mounting device, and consequently no injury to the insulation of the wires of the armature, either from vibration and consequent breaking of connections, or scraping or crushing the wires out of position.

The great difficulty with which electricians have to contend in the construction and operation of electric current generators, is the electrical heat developed by the current within the coils and armatures of the machines, which chars the material with which the wires are covered, and destroys the insulation. The manufacturers claim that the Ball dynamo does not heat.

### HAS THE RIGHT RING ABOUT IT.

BURLINGTON, June 10, 1889.

DEAR SIR, YOUR MECHANICAL AND MILLING NEWS

to hand and carefully noted. It has the right ring about it, and should be in the hands of every miller in the Dominion. Please put me down on your list of subscribers, for which I enclose one dollar. Let me hear when the next meeting of millers takes place at Toronto. I will try and be on hand.

Yours truly,

W. H. FINNEMORE.

### THE COMPRESSING OF BRAN.

OF the various assortments of offals produced during the process of milling wheat the most important is undoubtedly the bran, since it forms on the average at least 15 per cent of the total weight of the grain. In addition to this, the fact of the bran possessing a high market value enables it to exercise a very great influence upon the success or otherwise of every milling establishment.

While both grain and flour constitute large and increasing articles of commerce, bran, from an international point of view, is practically excluded, owing to the difficulty and heavy cost of transporting it to any great distance, and consequently on its large bulk as compared with its weight when packed in the ordinary manner. In many foreign countries the profitable disposal of bran is impossible and a natural result of this is that the producers are heavily handicapped in their business. This state of things would be entirely reversed were the bran, in place of being as heretofore loosely packed in sacks, etc., capable of being exported in the form of hard and dry cakes, thereby bringing its weight and bulk into so close a ratio that the carriage of the material to long distances could be effected at a reasonable cost.

For years past endeavors have been made to form and press bran into cakes; but these have hitherto proved all more or less unsuccessful and it has been reserved for the Finke-Lesshaft process to demonstrate the fact of the possibility of pressing bran and similar products into cakes of a hard and durable nature by the judicious application of heat and superheated steam to the material before commencing the process of pressing. The object is to produce a firm and properly coherent cake, which shall keep well under various circumstances, and which, even though chipped at the corners and edges, shall not readily fall to pieces, and will at the same time present the advantage of being small in volume, whereby it may conveniently be packed and readily transported.

Attempts have heretofore been made frequently to work the exterior portions, husks, shells or cortex of grain and the cereals, especially bran, into a firm or solid made by simple pressure; but these attempts have not been so far as known productive of good results. As a general thing, the cakes which it was desired to make fell to pieces as soon as pressure was relieved, since the particles out of which it was desired to make the same, especially when these are of bran, will not adhere or cohere of themselves. In order to get greater firmness of the cake it has been proposed to moisten the substance from which it is to be made with water, which would put the glutinous matter into solution, and then to form the cake by pressing the mass in a hot press; but under this procedure only a coherent crust was

formed upon the surface of the cake, so that upon any injury to this crust the cake fell apart. Furthermore, cakes of this kind retain so much water in their interior that decay readily sets in. By the present procedure all those effects are remedied.



J. J. & W. L. Sackett, millmen, Leamington, Ont., have assigned.

Mr. Moyer, of Listowel, Ont., is looking up a suitable site for a mill in Manitoba.

The Virden (Man.) Milling Company have sold out their flour mill to C. Koester.

Up to the 31st May, 917,000 bushels of grain had passed through the Collingwood elevator.

The Outmeal Millers' Association of Canada has kerflummoxed, is the way the *Modern Miller* puts it.

Messrs. H. D. Lovering & Co.'s mill at Coldwater, Ont., is being rapidly converted to the roller process.

Ten per cent. of the capital stock of the Pilot Mound Milling Co. has been paid in, and the whole taken up.

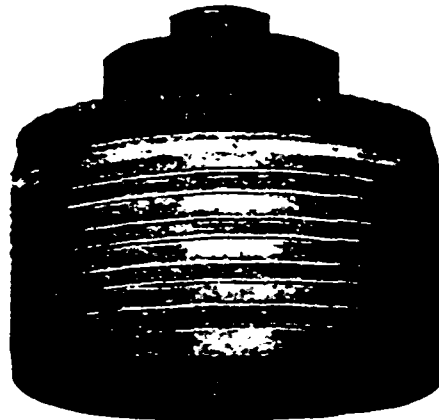
Letters patent have been issued incorporating the Landay Grain Elevator Company, with a capital stock of \$300,000.

The mill at Conway Station, P. E. I., owned by Mr. John R. Larkins, was destroyed by fire recently. No insurance.

Messrs. John Fox and T. Hawkshaw, of Lacan, Ont., have purchased Wm. Hooper's grist mill, and intend fitting it up with rollers.

Bath brick is recommended as a good thing to use for the removal of rust from rolls, which are liable to rust in damp weather if not used.

An electrical watchman has been put into the Trent Valley flouring mills at Campbellford, Ont., and is said to be a marvel of ingenuity.



BALL ARMATURE.

Clemens' grist mill at Fisher's Mills, Ont., will be taken to Berlin, Man., Mr. Clemens having accepted a bonus of \$10,000 from that municipality.

Messrs. Hold & Cullea, of Stratford, Ont., have been doing an extensive trade with the Maritime Provinces this season, shipping over 250 barrels of flour per day.

The quantity of wheat in store at the Fort Arthur elevator, June 15th, was 76,740 bushels. A bonus is offered for the erection of a roller mill at Whitewood, N. W. T.

The recent heavy rains caused a portion of Messrs. A. Watts & Co.'s dam at Bramford, to give way, and consequently a temporary shut down of the mills on the canal bank.

At Buxevain Man., June 1, the Ogilvie Milling Company's elevator and 20,200 bushels of wheat contained therein, were destroyed by fire. Loss, \$20,000, insurance \$12,000.

The C. P. R. elevator at Owen Sound is about full of grain. Large shipments are being made to make room for 20,000 bushels of corn en route from Chicago and 30,000 bushels of wheat from Port Arthur.

A liberal bonus will be paid for the establishing of a roller flouring mill at Fort McLeod, in the Northwest. It is said that flour sells there at \$4.50 per barrel and No. 1 hard wheat can be secured at about one dollar per bushel.

Mr. W. R. McMaster, of Tyndalke, Ont., has purchased Messrs. Gibbs' two grist mills and important water power at Lockhart, and intends to put in a complete set of roller process machinery, with a capacity of 200 barrels per day.

A report reaches us from the Northwest that an effort is being made by parties in Manitoba to organize and secure a charter for a warehousing company, which will devote its efforts entirely to the receiving and storing of grain at points throughout Manitoba and the Northwest.

A miller thinks that if the fall of middlings in a spout was intercepted by wire cages turning in different directions, and a suitable current of air carried up the spout, a separation of light from heavy particles could be obtained far in advance of anything that has previously been accomplished.

Letters of incorporation have been granted the following persons as the Pilot Mound (Man.) Milling Company with a capital of \$500,000. Thomas McKee, James H. Bond, John Herbert, Wm. A. McIsaac, John M. Fraser, John M. Knox, William Carson, James T. Gordon and I. C. Burn, all of the village of Pilot Mound.

Bath brick is recommended as a good thing to use for the removal of rust from rolls, which are liable to rust in damp weather if not used.

Toronto grain men are complaining because the Chicago market reports are not obtainable on the Board of Trade. They claim it is impossible to do business without quotation from C. C. C. and express themselves as quite willing to pay the cost.

Good flour can be made on a hexagon reel, but better on a round reel. The latter, however, requires greater attention on the part of the miller. Care must be taken to keep the cloth clean and in good condition. A considerable saving in power results from the use of round instead of hexagon reels.

Mr. S. Colver, head miller of the Tavistock Milling Co. while trying to slip on a belt, a chain running parallel with a belt caught his left hand and drew it round a cogged wheel, cutting it up badly and severing the cords of the two middle fingers.

The material is being placed on the ground for the erection of the new roller mill at Crystal City North, Man., and it is expected to be ready in time for the first of the incoming crop. After boring to a depth of 25 feet abundance of excellent water for power was secured.

The Northern Pacific and Manitoba Railroad contemplate the establishment at all points along their line of elevators, although they will be nominally the property of an elevator company. It is also reported that the Keewatin Mill Company will erect a number of elevators at various points throughout the Province.

It is the opinion of the *Modern Miller* that neglect to properly clean and scour wheat requires more skill and machines in the attempt to afterwards eradicate impurities which the scouring machine should have separated from it. A mistake made in any stage of milling cannot be properly atoned for afterwards.

The Lynn Valley grist mill and grain storehouse, near Simcoe, Ont., owned by A. McCall, and run by Messrs. Dalrymple & Shrubsole, were burned on May 31. The large quantity of flour and feed destroyed was fully covered by insurance. The mill is worth \$8,000, insured in the Royal Canadian and Canadian Millers' Mutual for \$5,500.

On May 31st, the Lynn Valley grist mills and grain storehouse two miles from the town of Simcoe, Ont., owned by A. McCall, and run by Dalrymple & Shrubsole, were burned. A large quantity of flour and feed was destroyed, but was fully covered by insurance. The mill had been lately rebuilt and was worth \$5,000, insured in the Royal Canadian and Canadian Millers' Mutual for \$2,500.

We learn from an exchange that Senator Ogilvie, the well-known Montreal miller, is descended from the younger brother of George, Earl of Angus, a valiant soldier who in the thirteenth century was rewarded with the lands of Ogilvie in Dunfermline, Scotland. His family is celebrated in history for having long preserved the crown and sceptre of Scotland from the hand of Cromwell.

United States Millers' Canadian millers are becoming somewhat aroused over the tariff question as applied to wheat and flour. It is proposed to call a meeting to consider the matter. If they expect to accomplish anything they will find that simply meeting and passing resolutions will not be all that is required. They must not only be the tough organization, but committees composed of men with energy, brains and power to work with.

We learn from the *Times* that a bonus of \$5,000 is being given, \$2,000 in the form of debentures of the municipality repayable in twenty years by the people in townships 1, 2 and 3, in ranges 20 and 21, to aid the Deloraine (Man.) roller mill. The bonus by law is to be submitted in a short time. Messrs. Preston and McKay, of Stratford, Ontario, are the men interested, and it is intended to put in a 100 barrel a day roller process mill, building to be of stone, and to be run for five years as a flouring and grist mill.

Our attention has recently been called to some samples of milled produce by a new machine just being introduced by James Jones & Son, of Thorold, Ont. The inventors' claim for it better results on hard Manitoba wheat than have yet been produced by any other method. They claim that not more than 10% of flour is waste during the process of grinding except that which is made from middlings; that two breaks is all that is required to do this; that the bran will be as broad as winter wheat bran when properly made; that it has double the capacity of the ordinary reels used for this purpose. They promise a description of the machine for our August issue.

A want long felt by the millers of Canada and the United States has been supplied by Mr. Robert Little, of Cypress River, and the Winnipeg Saw. Last winter and this spring Mr. Little has been engaged perfecting the plans and constructing a machine to sew the mouths of sacks when filled with flour. The machine is now in working order, and Mr. Little has secured the patents in Canada and the States. The bag is sewed with wire instead of twine, thus reducing the cost, and the work done is in every way as perfect. The bag being placed in position, by a single draw of a lever the wire is taken off spindles along the length of the machine in a groove, cut into lengths about an inch long, each length made into a staple, which is driven into the bag and clinched. The mouth of the bag is doubled up, thus the staple is driven through four-ply of cloth. The staples are about an inch apart. The machine is all iron, and occupies a space about two feet and a half. Mr. Little deserves much credit for the amount of ingenuity displayed in the invention, and he will no doubt make considerable money out of such a labor saving machine.

We see accounts in our European exchanges of British manufacturers filling orders for Japan for rice, milling and flour, milling machinery, steam engines, etc. In view of the increasing demand for improved machinery, in the east, and the direct communication with Japan which the Dominion now enjoys, it might be worth while for our machinery makers to seek to obtain a share of this trade.

ELECTRIC SPARKS.

Harrison Bros., foundrymen, Wardsville, Ont., have dissolved their partnership.

The promoters of the Woodstock electric Street Railway, have secured their charter from the Government.

The Manitoba Government has granted the application for incorporation of the Northwest Electric Light Co.

The Welshach Incandescent Gas Light Co., have commenced the manufacture of their burners in Halifax, N. S.

The town of Ingersoll, Ont., is enquiring into the various systems of electric lighting, with a view to putting in a plant.

Mr. E. A. Thomas, representing the Hall Electric Light Co., has commenced operations in Arnprior, Ont., in constructing the electric light system.

Belleville and Madoc Ont., are adopting the Edison Incandescent light, supplied by the Edison Incandescent Electric Light Co. of Montreal.

The Fort Wayne Jenney Electric Company have opened an office in Toronto, with Mr. W. J. Morrison, assisted Mr. Thos. Cooper, in charge.

The Town Council of Port Hope have recommended that tenders for a new street lighting service be asked, to consist of gas and electric lights.

The premises occupied by the Federal Telephone Co., in Montreal, took fire on the morning of the 27th ult. Loss, about \$50,000, covered by insurance.

Montreal, Ont., will vote on a bylaw to borrow \$4,000 for the purpose of purchasing a new engine and boiler for the waterworks, and connecting the electric light system therewith.

Helmholtz has shown that if an invisible jet of steam be electrically heated, it becomes visible with bright tints of different colors according to the potential or the temperature.

The American Steam Boiler Insurance Company of New York, have deposited \$20,000 with the Finance department at Ottawa, and been duly licensed to do business in Canada.

The Hilliard Electric and Manufacturing Company's new factory in Montreal, every floor is to have an electric motor as a source of power, supplied from the engine room on the premises.

Attention is directed to the card in our advertising columns of Messrs. H. S. Thornberry & Co., Electrical Engineers, who have an office located in Toronto, and have already secured a number of electric lighting contracts.

The Meaford Council have accepted W. Moore & Sons' offer to supply the town with electric lights for a year for \$500. The firm guarantee to furnish eight lights of 2,000 candle power and to keep in running order for 12 months.

The Royal Electric Co., of Montreal, propose to supply electric light and power to the citizens of Three Rivers, Que. The electricity will be generated by the aid of an immense water power on the St. Maurice river, sixteen miles distant.

The contract for building the electric tramway at Victoria, B. C., has been signed. T. W. Paterson secured the track construction, and H. H. Osgood, President of the electric road, of Seattle, secured the contract for electrical appliances. The system selected is the Thomson-Houston.

The St. John N. B. Gas and Electric Light Company made a profit on last year's business to enable them to pay a dividend of 8 per cent, besides adding \$14,800 to rest account. The electric light section of the company has paid no dividends, owing to its plant out of the profits.

Application has been made to the York County Council to allow the Metropolitan Street Railway Company to substitute electric power for horses. The Company operate a suburban car line extending Northward from the C. P. R. tracks on Yonge street. Their application was supported by the signatures of a large number of mechanics and farmers.

Messrs. Strickland, the well-known mill owners, of Lakefield, Ont., have adopted the Hall System of electric lighting for their mills. The plant is so arranged as to allow an extension of the system at some future time, and if the success of the system is fully proved the Messrs. Strickland will supply the stores with lights. A great number of the merchants in the village have signified their intention of adopting this system of lighting.

The electrolytic process has been successfully applied for tempering watch springs and other forms of spring steel, whether in the form of wire or rods. The steel is wound on a spool, whence it passes through a bath of oil. An electric current is sent through the wire of such strength as to keep it at the proper redness to the desired requirements of temper. As the heating is not in contact with the air, but is entirely beneath the surface of the oil, there is no trouble from oxidizing, as in the ordinary method. The final temper is drawn in the same manner, and the spring is finished by means of rolls. The process is also applicable to a number of springs besides those for watches, including watch screws. In all cases the process can be controlled to a nicety, and to the exact temper and its uniformity through the wire.

What is electricity? The question is often asked, and has not been answered. "From whence it cometh, and where it goeth," is a puzzle to men of science and the unlearned alike. It is safe to say that electricity is one form of molecular motion, and that it travels along a rod or wire in much the same manner, that heat travels along the same conductor. In other words, electricity is a form of energy, and makes itself visible as work, whenever it is converted into heat. Whenever electricity passes over a good conductor, some form of work is performed, no matter how, or in what shape it may be discerned. If simply passed through a wire, the work becomes visible as heat; no matter how slight, it is only there is very little of it to be discovered, but it is there.

The Atchafalaya, Kan., claims the largest electric railway system in the United States. The plant is owned by the Rapid Transit Railway Co. and has been established at a cost of \$600,000. There are 100 miles of tracks in the system. The Thomson-Houston is the

system employed. Overhead wires are used. The cars are models of convenience and about the size of the ordinary cable car. Underneath the floor of each car are placed two ten-horse-power electric motors. From the roof of each car a trolley, with a strong spring on the end next the roof, and a grooved wheel on the other, which is constantly pressed against the wire, conducts the current to the motors. On each platform is a "cut-off," with a lever not unlike a brake handle. A speed of fifteen miles an hour can easily be attained. The cars are lighted by electricity and are comparatively noiseless. Nine dynamos driven by two engines of 1,200-horse power generate the electricity.

A Victoria, B. C., paper of June 4th, contains the following:—Last night Mr. McAlking took a *Colombia* representative over the engine house from which the electric lights of the city are fed, to show the new arrangements now nearly completed by the Hall Electric Light Company of Toronto. The old Sperry machines that have done good service for two years now lie still and neglected in a corner of the depot, while the latest invention of the Hall Company has taken its place and now spins round in its compact little case with a velocity and volume of sound that almost frightens one unaccustomed to the working of machinery. This generator has a power of thirty-five lights, being equal to the illumination of 2,000 candles. It works a circuit nine miles in length, and thirty-five lamps are fed by it in its course. The instrument has a double armature, which for the benefit of those unversed in electrical terms means that its wires instead of being placed thickly on one wheel are spread narrowly over two, thus preventing a great accumulation of heat and allowing the machine to run much faster than it otherwise could do. The belts run by the engine on all the machines make a speed of five thousand feet a minute. In the power house is a delicate Ammeter or current indicator which moves with the slightest deviation in the strength of the current. On the 8th inst. a second and larger machine than the present new one, but of exactly the same make, will arrive in Victoria. This generator has a power of forty lights, and when it is in running order the city will be able to boast of ninety first-class lamps throughout the streets. The lamps themselves are of fine make, and though made of solid copper and brass are very light in structure and simple in their work. Their principal feature lies in the fact that they have double lengths of carbon with a clock-work movement attached which is regulated by magnets. Each length of carbon burns for eight hours. The total cost of the whole outfit is \$5,800.



Mr. H. Page, Holcaygeon, Ont., is erecting a new planing mill. An additional boiler has been placed in the mill at Thessalon, Ont.

Mr. Jax, Holditch has erected a steam shingle mill at Sturgeon Falls, Ont.

Mr. Gilbert Jardine's saw mill at Hurat River, Ont., has been destroyed by fire.

The machinery in the Rockwood, Ont., shingle machine has been seized for debt.

The Columbia River Lumber Company (limited) has been incorporated by letters patent.

The Royal City Planing Mills are applying for 30,000 acres of timberlands in the Sayward District, B. C.

The log mill at Midland, Ont., is cutting 100,000 feet a day. The season's cut will exceed 15,000,000 feet.

The Vancouver Lumber Co.'s mill has started into work and negotiations are on foot to extend operations.

Owing to a break in the gang of the Conger Lumber Co., Parry Sound, the mill of that Company was shut down last week.

The recent heavy rains have swollen the St. John River sufficiently to release some 30,000,000 feet of lumber hung up along that stream.

Messrs. Gallbraith & Campson, Vancouver, B. C., have recently made a trial shipment of 20,000 feet of square timber to Yokohama, Japan.

The new MacLaren-Ross saw mills at New Westminster, B. C., are expected to cost \$200,000, of which \$60,000 goes for machinery alone.

Mr. Alex. Colman, of Arnprior, Ont., has left for Newfoundland, where he will explore an extensive timber limit for a wealthy lumber concern.

The Vancouver Lumber Co., capital \$50,000 is seeking incorporation. The incorporators are John Wesley Young, Thos. J. Fox, and Jax Anderson.

Reports from the Chaudiere state that business in that locality is in a flourishing condition, and that mill owners will be well satisfied with their season's work.

From the opening of navigation to date, 115 vessels lumber-laden, have cleared from the port of Quebec against 131 for the corresponding period last year.

White ash lumber, sawn but not shaped, planed, or otherwise manufactured, may be imported into Canada free of duty until the end of next session of next Parliament.

The owners of mills on the Lake of the Woods fear that they may be compelled to close down for want of men to operate them if the excitement incident to the discovery of gold in that locality continues.

The quantity carried from Ottawa by the Canadian Pacific and Canadian Atlantic railways during the past two years was as follows:—1887, 100,740,420 feet, in 1888, 110,304,517 feet. Shipments by rail have increased 18,935,097 feet, while by water they declined 15,170,400 feet.

The Canadian Pacific Soo line opened for traffic June 3rd, shortens the distance between Montreal and St. Paul, 130 miles, and will likely be a carrier of considerable high grade lumber to the eastern seaboard.

Arthur Pambrum, while sawing wood at his father's mill, at Cheneville, P. Q., was struck by a log and upset, his neck coming in contact with a circular saw. His head was severed from the body and thrown 20 feet.

The sawlog drive on the Moira River, a Belleville despatch states, will exceed that of any former year. Upwards of 300,000 logs have already been passed through the boom and the head of two drives, which together number 400,000 pieces, is now arriving. Some of these logs have been three years on the way.

Sawdust compressed with coal dust makes a fuel called petrole, from which very satisfactory results are said to have been obtained. A test of it was made on a steamer at Duluth recently, and it was found that 300 pounds of petrole gave as good results as were ordinarily obtained from 500 pounds of soft coal; it gave very little smoke and almost no ashes, and there was a great saving in handling it.

Plug engineers employed in backwoods saw mills are keeping to the front as producers of boiler explosions, says the *North-western Lumberman*. There are at least five times as many saw mill explosions as locomotive boiler explosions, notwithstanding that the former comprises the largest class of boilers to be found in the United States. Poor boilers, incompetent engineers and no insurance make a good combination for turning mill men into paupers or corpses in short order.

The mill of Moiles Bros. which they removed to Spanish river, Ontario, from Detour, has been seized by Customs officials at Sault Ste. Marie for duty amounting to \$5,600. The *Chicago Timberman* says it is reported that the seizure was concocted by the firm, who hid it in, and thereby secured firmer hold on it and a surer title as against the parties who opposed the removal of the mill from Detour. If this scheme will effect the title to the property, it was a pretty slick movement on the part of Moiles Bros.

We learn from a New Westminster, B. C., paper that Mr. W. L. Johnson, who has been with the Royal City Planing Mills for ten years, the last six months of which he has acted in the capacity of foreman, has severed his connection with that establishment, and gone to Gambier Island, Howe Sound, where he, in company with a Mr. Dyker, will erect and run a large shingle mill. A complete plant, with a capacity for turning out 50,000 shingles daily, has been sent up to Gambier Island, and the erection of the mill will be commenced immediately.

The following statement shows the increased quantity of lumber which has passed through cutters' hands at Quebec during the present season, as compared with the corresponding period of 1888.

	1888.	1889.
Waney white pine	737,701	578,452
Waney red pine	24,541	540,031
Red pine	39	74,793
Oak	242,807	335,403
Elm	62,912	183,247
Ash	31,164	104,500
Birch and maple	67,706	218,100

The following particulars reach us from Ottawa, of an important lumber case argued at Aylmer, Que., before Mr. Justice Malliot. Messrs. N. Row and W. G. Hurdman, who purchased certain mill property at Hull, from the Quebec Government, are suing R. Hurdman & Co. to obtain possession. The latter company originally purchased the property from Sherman & Lord, of Albany, and there is said to be a balance of \$134,000 due this firm by Hurdman & Co. Lemon Thompson, of Albany, has acquired the rights of Sherman & Lord to the mill property in question, and has sued R. Hurdman & Co. for the balance of the purchase money. The latter plead that they are troubled in their possession of this mill property, and by a dilatory exception ask that all proceedings be stayed until said Lemon Thompson shall cause such disturbance to cease and prove that when he and his partners undertook to sell such mill property they were owners of the same. Mr. Thompson has moved to reject this plea as being unfounded in law. The case is pretty well mixed up.

OUR thanks are tendered to Col. E. Harrison Cawker, of the *United States Miller and the Milling Engineer*, Milwaukee, for advance proofs of the proceedings of the Millers' National Association, held recently in that city.

"The *Timberman's Vest Pocket Inspection Book*," is the title of a useful little book received from the publisher of the *Timberman*, Chicago. It contains pine and hardwood rules of the Chicago lumber market, adopted by the Lumbermen's Exchange.

The *Baltimore Journal of Commerce* celebrated its 30th birthday on the 15th instant by enlarging its size to sixteen pages, the four additional pages being added in shape of a tinted cover, which is for the display of advertising matter, thus giving its staff the room needed for a thorough review of markets, which this publication promises to keep full and as usual thoroughly reliable.

The President of the Melbourne, Australia, Chamber of Manufacturers, Mr. E. Steinfeld, is at present visiting Canada, with the object of promoting closer trade relations between these two greatest colonies of the Empire. Seeing that in Australia a market exists for lumber, agricultural implements, etc., such as we are in the best position to supply, the Government and people of Canada should give every encouragement to the project.

## THE WIDDIFIELD AND BOWMAN ELECTRIC CAR BRAKE.

AMONG the brakes tried at the Burlington brake tests in 1886, was that invented by Mr. W. P. Widdifield and A. T. Button, of Usbridge, Ont., who had a train of 50 cars equipped with their "independent momentum brake." At those tests it was demonstrated that this brake, in common with all its competitors, developed very objectionable shocks at the rear end of long trains, owing to the fact that the brake-power could not be transmitted to the rear car quickly enough to prevent the concussion of the cars closing together. The inventors have now overcome this difficulty by the use of electricity, which gives simultaneous application or release of the brakes on the longest train.

Referring to the accompanying illustrations, Fig. 1 shows the application of the brake to the truck of the car, and Fig. 2 shows the details of the operating mechanism attached to the different cars. Fig. 3 shows the arrangement of the circuits, switches, and batteries; and Fig. 4, the coupling between the different cars.

A friction-pulley, *c*, about six inches in diameter, composed of fibre and soft metal, is cast on one of the car-axles. To apply the brakes, a momentary current of electricity is passed through conductors *B* and *C* (Fig. 3), causing electro-magnet *F* (Fig. 2), through its connection with spring-lever *h*, to bring the pulley *c* in working contact with the axle-pulley *e*. The pulley *c* immediately rotates, winding on its axle the chain *z*, which, through compound levers, *z* and *y*, brings the large friction wheel *d* in frictional contact with the axle-pulley *e*, and causing it to rotate and wind upon its axle the power brake chain *v*.

Only a momentary impulse of electricity is required to apply the brake by turning the switches *K* or *L*, as the armatures of the brake magnets are provided with a ratchet bar and pawl, *l* and *m*, which catch and hold the pulley in gear, and with a working pressure exactly in proportion to the electro-motive force of the current passed through the magnet *F*, and which can be regulated at the will of the operator. It remains in this condition until released by the operator by closing the circuit through conductors *B* and *P*, and magnet *f*, the armature-core of which, *n*, is thus drawn upward, and trips the ratchet-pawl, and thus releases the brake.

The electrical energy is supplied by a storage-battery of about 12 cells, located on the locomotive; and it is estimated that a battery having a capacity 100 ampere hours will, in ordinary freight-train service, require charging only about once in six months. In addition to the battery on the engine, an auxiliary battery is placed on the rear car, in order that, when circumstances require it, the brakes can be controlled from the rear of the train.

Both brake and release circuits are normally open; but magnets *Q* and *Q'* are in closed circuits with one or two cells, and so located that if the circuit *T B* should be broken by the train accidentally separating, the armatures *P'* and *P''* instantly fall, and automatically close the circuits on the conductors *C* and *B*, thus applying the brake to both sections of the train automatically.

It will be seen that a very small amount of electrical energy is required, by the introduction of the compound

The brake and release magnets being in multiple and the power per car the same, whether the train consist of one or any number of cars.

levers and friction gear, multiplied several hundred times before it reaches the brakebeams.

The inventors claim that this brake will perform all the functions of the air-brakes, and has the very important advantages that the train-men never lose control of it, as is the case with the air-brake, when a train is accidentally separated, and also that it will stop the longest train with no shock whatever.

The engine plant is light and portable, and can at any time be transferred from one locomotive to another by two men in a few minutes' time.

On May 21 a trial of this brake took place on the Lehigh Valley Railway. The train consisted of fourteen

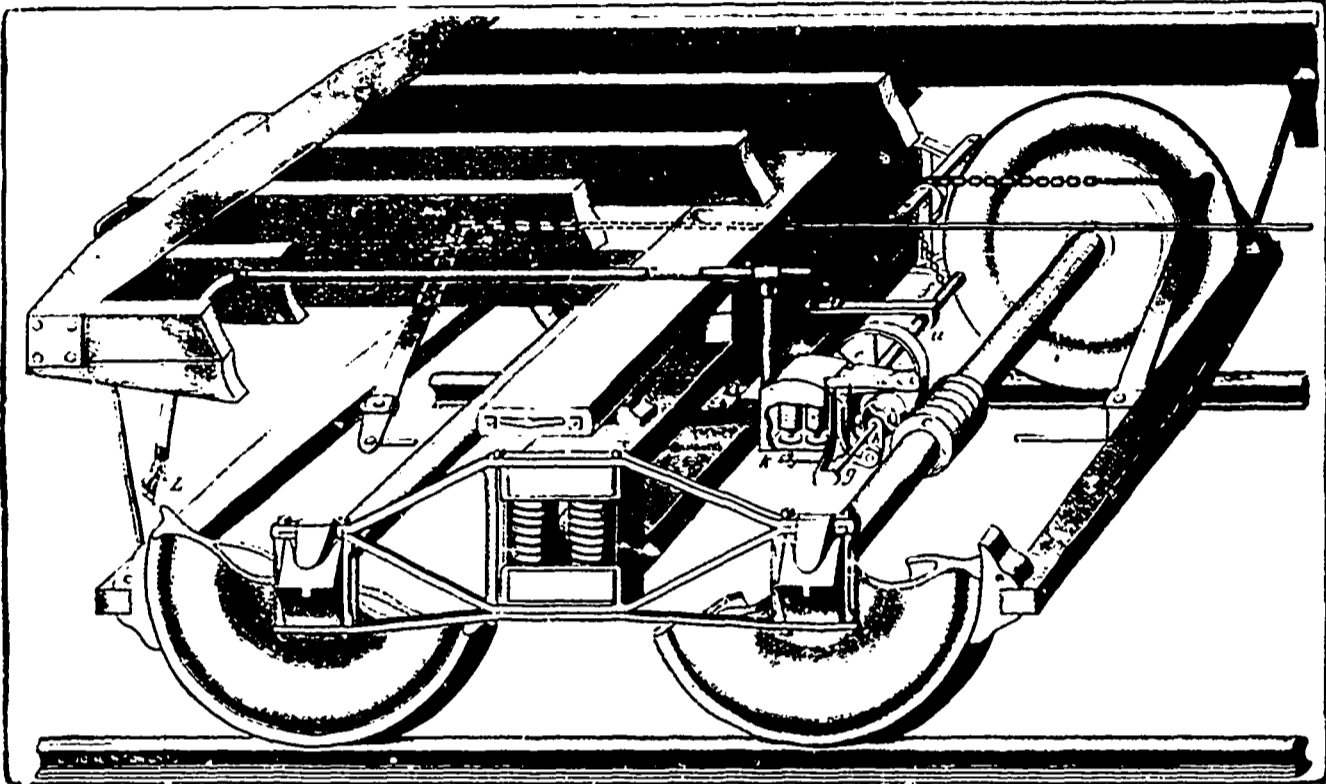


FIG. 1. THE WIDDIFIELD AND BOWMAN ELECTRIC BRAKE.

empty box-cars equipped with the brake, engine, tender, caboose, and one passenger-car without the brake. A run was made from Mauch Chunk to Slatington, a distance of eleven miles, and return. On the down trip twelve stops were made on grades varying from seven feet to forty feet per mile. The results of a number of tests were as follows: the first test, service stop for orders, smooth even stop; second, service stop at Mr. Lentz's office, smooth even stop; third, breakaway, brakes applied automatically (speed 25 miles), stopped in 17 seconds; fourth, brakes applied from the top of the car (speed 25 miles), stopped in 20 seconds; fifth, emergency stop (speed 25 miles), in 17 seconds; sixth, emergency stop, 6 cars in front only, braked (speed 20 miles), in 25 seconds; seventh, long service stop (speed

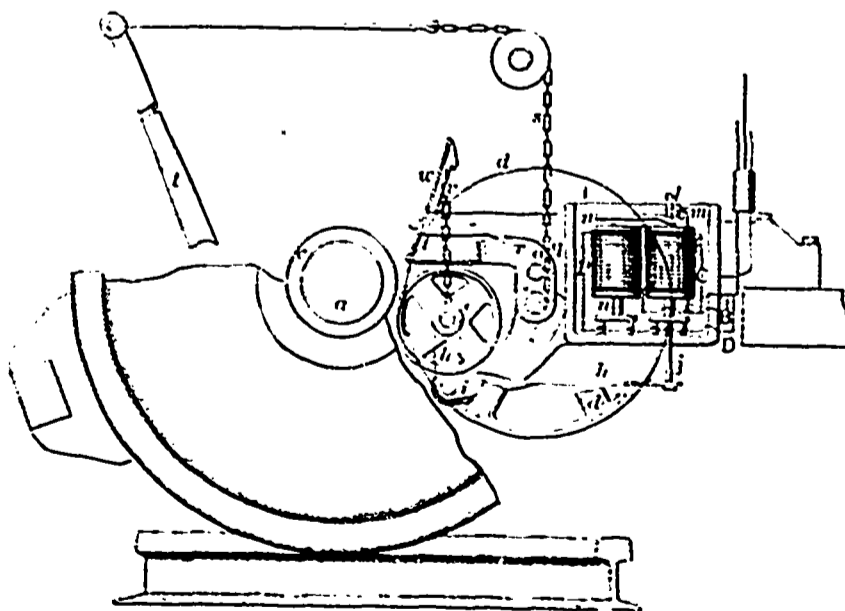


FIG. 2.

30 miles, in 76 seconds; eighth, slow-up to 5 miles an hour, and go ahead; ninth, short-service stop (speed 25 miles), in 38 seconds; tenth, emergency stop (speed 30 miles), in 20 seconds; eleventh, fly cars into siding; twelfth, emergency stop (speed 35 miles), in 22 seconds.

The eighth, "slow-up," was a good even partial stop, with quick release of brakes, when ordered to go ahead. The eleventh, "fly car on to siding," was particularly well done, and the control of the brake-power from the caboose was very favorably commented on. The return trip was made during a shower. Several emer-

gency and service stops were made to test the brakes on a slippery rail, all of which were made with great success. The extreme smoothness of the stops, absence of shocks to rear car, the perfect control of the brakes both from the engine and caboose, were noticeable features in the test.

The following named gentlemen comprised the party of inspectors: J. W. Kendrick, chief engineer of the Northern Pacific; Captain William H. Thompson, manager Metropolitan District Equitable Life Association of New York; P. M. Richards, publisher New York *Observer*; W. C. Baird, of Brooklyn; E. P. Thompson; T. W. Sprague, *Electrical Review*; C. H. MacLille, *Electrical Engineer*; C. B. Fairchild, *Journal of Railway Appliances*; T. R. Fuller, manager W. & B. Electric Brake Co., New York; Alex. H. Bowman, manager Allentown (Pa.) Electric Light Co.; W. P. Widdifield, Usbridge, Ontario.

The business affairs of the Brake Co. are now in the hands of T. R. Fuller Temple Court, New York.

## THE BEST FLOUR.

ALTHOUGH there are two points—I might say many points—to be considered in discussing this question, viz., the commercial value of flour (which would

embrace the reputation it may have acquired, etc., and as a consequence a fictitious value in the opinion of the people, which must not be underestimated), and the real merits of the goods, I only propose to deal with the question from a purely miller's standpoint.

To this question I think most people would without any hesitation say that the whitest flour was the best, while others would base their opinion on the brands which net the dealers the most money. Very few would say that the flour which would make the best bread was the best, yet this is really the answer to the question. It is astonishing to see the perversity of human nature as displayed in this matter of color as the one thing essential in flour, and the tendency to base the opinions of its value of human food simply on its whiteness as compared with some other flour as the standard. We might as well say that the jingle of the gold was more to be preferred than the coin itself. Whiteness has always been considered an evidence of purity, and has been associated with flour in that respect. The whiter the flour, the less dirt mixed with it, has been the assumption. In this I think we are mistaken, and I will here astonish some of our readers by stating that the purest flour almost always has a yellowish tinge. And to prove this we ask if it is not true that when the middlings are not properly cleaned the flour is of a dead white color, while on the other hand, if properly cleaned, if the flour is not of a bright, almost orange tinge. I do not believe the color of flour adds to or takes from its value as far as the human stomach is concerned. It might as well be black as white, provided the same chemical properties are present. A lump of coal would be as valuable white as black. Its value

should be based on the amount of heat or energy it would develop. As flour, or what it makes, is used for the same purpose, to develop energy, it follows that the flour which would make the largest loaf of bread, or the largest number, would be the best.

Chemical analysis would, of course, be the correct way to determine this question and in the future it will be so determined, but at present I think I can say with truth that it would be impossible to conduct a successful business on this plan, because of the multitude of different tastes we would be required to suit. A purely scientific

the flour would not suit everyone, simply because of the erroneous ideas the general public have on the subject. This on the part of the consumer would not be so surprising as it is not supposed that they should know the intrinsic value of flour on sight, or its characteristics. It is, however, astonishing to find so much ignorance among those who make the handling of flour their trade.

The usual manner of testing flour, especially in the winter wheat districts, is to place a little of two or more kinds or grades together on a board, smooth it off and examine it closely. The whitest invariably is voted the best, and will sell for the most money. No amount of argument will convince the average broker or buyer that he may be mistaken or will have a particle of weight which is in opposition to what he can see. Another

fallible test seems to be to dip the different samples into water while on the board, setting the whole aside to dry. The sample which dries out the whitest, will be considered the most valuable. It matters not if we know positively that the problem has not been solved correctly, having made the samples under consideration ourselves, watching them through their various manipulations and knowing the ingredients of which they are composed. A few weeks' difference in the age of flour will work a great difference in its appearance and its drying out

and the same may be said in regard to whether it is coarsely or finely bolted, one number of cloth making a visible difference on the same material. The characteristics of the wheat from which the flour is made will control its color, it matters not what may be done to it, always provided that no foreign matter is introduced.

The elements which enter into the composition of flour are known to the scientific world as gluten and starch, while they are known to the practical miller as strength and color. A strong flour, or one in which the gluten element is largely represented, will be characterized by a bright orange tint and sharpness to the touch. It is almost an impossibility to reduce or bolt such flour so fine that the particles will lose their individuality, while a flour composed of almost all starch will be of a dull leaden color, and easily pressed into any shape desired, which it will also retain. Under the water test the same characteristics will show themselves in a much stronger degree. The strongest flour will dry out almost brown, while the starchy product will be comparatively white.

A distinguished authority on flour and flour making has been credited with saying that "pure flour was patent flour and that all pure flour would be patent." While I beg to differ with the gentleman in regard to the conclusion that all pure flour would be patent, I will agree with him in assuming that the brands known as

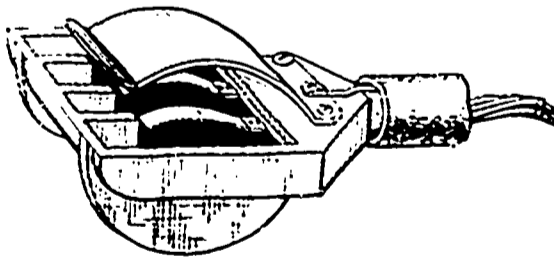


FIG. 4.

patent form the highest conception we have of perfection in flour. The reason for this superiority is easily found. It is because patent flour is comprised of the most glutinous part of the wheat, while the other grades are represented by the starch. If this be so, it follows that all flour could not be patent because the percentages of starch and gluten, or strength and color, would be necessarily different. To show that these facts can not be successfully disputed, I will cite as facts that our Hungarian friends across the water succeed in making a flour that nets them some shillings more per sack than anything we have as yet produced, simply by subdividing the material known among us as middlings and making three or more "patents." The great object to be attained by these subdivisions, is to separate the glutinous particles from the starch for the purpose of securing strength or really the "large loaf," which represents life, energy and economy. A professor of chemistry in writing on this subject, in answer to the question as to what was the best flour, says: "It was only by accident that I learned what was really the ma-

terial that made the best flour," and answers the question by stating that "the flour from pure semolina (middlings) is the best." Middlings may be pure and at the same time be only fit for the lower grades. If he had stated that the purest and the most glutinous semolina made the best flour he would have been correct.—A. M. Popplestone, in *Northwestern Miller*.

### SUBDIVISION OF POWER.

A CONTRIBUTOR to the Cincinnati *Artisan* notes how the volume of water flowing in our streams is becoming rapidly less from year to year, and recommends a course of procedure for water power users that appears to us to be of sufficient importance to bear

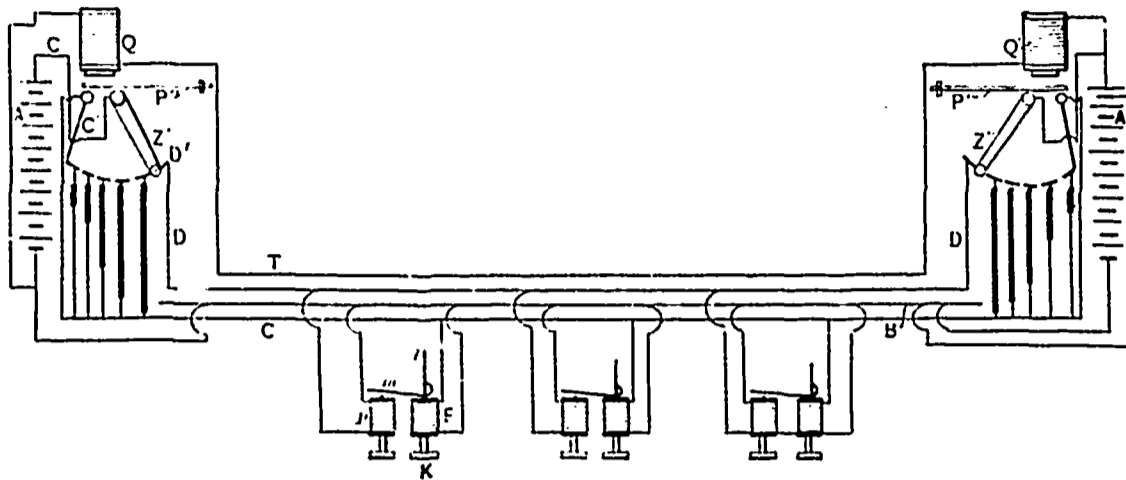


FIG. 3.

reprinting. He thinks that the proper way to improve a valuable water power is to use a number of very simple wheels instead of an elaborate and complicated one. Within the past few years this manner of improving a water-power has taken a strong hold upon mill owners, as they began to realize its value. It has become very popular, and deservedly so. It is a plan that not only secures the greatest economy in the use of water, but it carries with it other advantages of secondary importance. All efforts to secure good part gate wheels may be relaxed, and only the very simplest types of wheels selected, wheels built with the sole object of giving the highest possible results at full gate only. And, also, when the power is divided among several wheels, in case of accident or other cause, it becomes necessary to shut down a wheel, the whole mill need not be stopped.

It is, however, in cases where steam power is used in connection with water, that the value of subdividing the latter among a number of small wheels comes out most prominently. It then bears a dollars and cents aspect, and this is what appeals to the heart of a mill owner when nothing else will touch it.

Suppose, for instance, there is a factory upon one of the ordinary variable streams, common all over the land, and that it requires about 100 horse-power to drive it to its full capacity. Under a head of 15 feet, this amount of power the stream affords for a few months in the year, but for the most of the time a steam engine must be used to assist the water-power.

If, now, the owner of such a mill should select a 54-inch water-wheel to give him, at full gate, 100 horse-power, and utilize the full amount of his steam at its best stages, he will be compelled for the greater part of the year, to run costly fuel to supply the deficiency of his wheel, this operation is not a very paying one. If, on the other hand, he puts in a smaller wheel to suit the average condition of his stream, he must still, at the lowest stages of his water, use it at part gate at a loss; and also, when water is plenty in wet times, see hundreds of horse-power pouring wastefully over his dam while he is burning up tons of costly fuel. And so the second case is even worse than the first, and, in either event, he is not getting from his water what he should.

If, now, this same mill owner should improve his power by putting in, say, four 27-inch wheels of 25 horse power each, of the simplest possible construction, and made to yield at least 80 per cent. at full gate, it will be evident that he has at once a perfect solution to his difficulty. When water is plenty he draws the gates of all his wheels and gets all the power he needs. When the stream falls off, he shuts the water from one of his wheels, and still obtains the highest possible percentage and 75 horse-power, and when the stream still further decreases he shuts off another wheel, and with half the quantity of water still obtains as high a percentage as with the full amount and 50 horse power. If the streams grow still weaker, he can run but one wheel and still obtain full percentage and 25 horse power. In this latter case the single large wheel would not turn at all, and would have to be thrown off altogether. It will be

evident to every reader that, under the circumstances, it would take but a short time for a power, improved in this way, used in connection with steam, to pay for itself in a saving in coal bills. In fact, there is one prominent firm of wheel builders who so strongly urge this plan of subdividing the power, that they advertise themselves as being willing to put in their wheels and take for their pay what they may be able to save in coal bills, and there can be no doubt that where their offer is accepted they soon find themselves handsomely paid.

If such a manner of improving a power pays when used in connection with steam, it is evident that it will very often, when introduced upon a falling stream, do away with the necessity of putting in a steam plant at all, not only saving a great fuel account, but the large cost of an engine and boilers as well.

While the cost of a number of small wheels is necessarily greater than that of a single large wheel of equal power, the cost of setting in the mill is rarely little, if any greater, and the advantages of higher speed, greater ease of repair, and less liability of stoppages, go far to counterbalance the excess of cost, even when the greater efficiency is left out of the account.

It is the writer's firm conviction, reached after an extended experience in turbine engineering, that any manufacturing concern which puts in a single large wheel to drive its plant, makes a most grievous and unpardonable mistake. While they may, perhaps, save a few dollars in the first place, they will spend what they save many times over in the future, whereas a power well improved in the first place is not only by far the cheapest and a profitable investment, but is besides always a source of pleasure and satisfaction.

### HOW TO MANAGE A SAW.

THE first step in the successful management of a circular mill saw, says the *Saw Mill Gazette*, is to buy a good one fully warranted—one adapted to its work and to the man who runs it. A thin saw requires a great number of teeth and a more expert man than a thick one. It should be of stiff temper. It is more easily broken, more susceptible to misuse and negligence. Care should be taken that the arbor does not heat, that the track is in line, that the saw fits the arbor easily, and that it is hung true. Hardly any two saws hang alike on an arbor. A slight difference in the finish of a saw about the hole, or in the turning of the collars, makes a perceptible difference on the edge; and this should be remedied by rings of paper. A saw should be jointed carefully on the mandrel on which it runs, which can be done by pushing a piece of emery wheel squarely across the teeth while the saw is in motion. Any good mechanic can take a buckle out of a saw by using as an

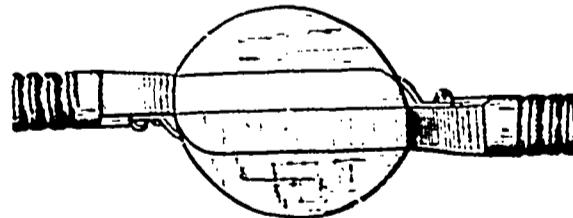


FIG. 5.—SHOWS THE ELECTRICAL COUPLING WHEN CONNECTED AND IN CIRCUIT.

anvil a block of hardwood set in the ground, with the top slightly rounded. Never use a steel or iron anvil, as it changes the tension. If the saw becomes rim-bound or snakes, it must go to the saw maker. A circular mill saw, to work freely, should be properly gummed, and set enough to clear the saw nicely; the teeth should be from one and one-half to two inches deep, with a gullet, and the backs of the teeth should be kept low enough to avoid striking the timber and rub. An emery wheel is the best saw gummer, but great care should be taken not to blue the teeth, and to keep them in uniform space and depth. The pitch of the teeth should be regulated somewhat by the work a saw is doing. From one-fifth to one-sixth of the diameter measured from the edge, will give the proper circle. A sawyer who does not know his speed can tell whether his saw needs expanding in the centre or on the edge by warming it in the different places with a narrow board while running, and watching results. Always avoid sharp corners, and always warm saws up in winter before putting them into the timber.

### THE MILLERS' CONVENTION.

THE committee of arrangements have adopted the following programme for the forthcoming convention at Toronto on the 7th and 10th inst.:

- Reorganization (a) central, (b) district.
- Appointment of permanent secretary and treasurer.
- The present condition of the milling industry, causes which have led thereto, and remedies proposed.
- Consignments, bank charges and insurance.
- Grinding in bond and transit, railway freights and discrimination in favor of American millers.
- Inspection of car wheat. And weights of same.
- Flour and wheat duties.
- System of exchange in lieu of grinding in roller mills.
- Market reports.

Address by D. Hewes on the most suitable grades of flour for export, style of package, etc., regulation of prices for wheat in connection with prices ruling on St. Louis markets, our principal competitor in the markets of Great Britain.

### TO PROTECT IRON FROM RUST.

PROFESSOR Calvert has recently made the interesting discovery, by practical tests, that the carbonate of potash and soda possess the same property of protecting iron and steel from rust as do those alkalis in a caustic state. Thus it is found, that if an iron blade be immersed in a solution of either of the above carbonates, it exercises so protective an action that, if it is exposed to a damp atmosphere, it will not oxidize, even after so extended a period as two years. Similar results, it appears have also been obtained with sea-water, on adding to the same the carbonates of potash or soda in suitable proportions.

### HOW TO SAFELY USE PETROLEUM FOR FUEL.

THE Association Factory Mutual Insurance Companies have something to say out of their experience with petroleum for fuel, which is of interest to underwriters.

The hazards attending the use of petroleum as fuel are largely of a controllable nature, and are dependent almost entirely upon the precautions taken in regard to its storage and use. The tanks should be of iron, placed upon solid foundations and fitted with tight covers provided with ventilating pipes for the removal of any vapor passing off from the oil. The tanks should be situated where they will not constitute an exposure to the buildings in case of fire. It is very desirable that the main tank, at least, if not above ground, should be surrounded by a dike or embankment inclosing a space sufficiently large to accommodate the whole contents of the tank without overflow.

There should be two tanks, the main tank being placed where it could receive the supply discards by gravity, whence it may be pumped into the smaller or distributing tank which feeds the oil directly to the burners.

An overflow pipe in the distributing tank should be placed so as to discharge any excess of oil back into the reservoir tank.

Pipes should be placed underground as far as possible; the various connections should be supplied with valves for cutting off the flow of oil when desired.

If the oil is admitted to the burners before a flame is placed in the furnace, flashes or explosions are almost sure to follow, and it is absolutely necessary for safety that a burning torch or other flame be placed in the furnace before the oil is let on to the burners.

The above requirements may be modified as needed, according to the circumstances pertaining to the use of oil fuel for metal working and other purposes.

### HOW TO PAINT A CHIMNEY.

FOR the benefit of steam users who are continually pestered by men who go about soliciting jobs of painting sheet iron chimneys or stacks, writes A. J. G. in the *Artisan*. I will say that if before raising the new chimney, each section, as it comes from the shop, is coated with common coal tar, then filled with light shavings and fired it will resist rust for an indefinite period, rendering future painting unnecessary.

In proof of this we have such a chimney at our works, erected in 1866, which was treated as above described, and is to-day as bright as it was the day it was raised, without having a particle of paint applied since, while I can cite several raised since ours and afterward painted several times with the kinds of paint usually employed that have long since been eaten up with rust.

Of course, every gang of chimney and roof artists who strike our city are anxious for a job of painting our new stack, and when told it is twenty-two years old they

stand aghast, as the iron looks bright and new, showing no signs of ever having been painted.

The theory by which I account for this result is, that the coal tar is literally burned into the iron, closing the pores and rendering it rust-proof. Now, while this may not be new to the scientific world, yet the plan is simple and has proven so efficient in our experience that I am induced to submit it to the readers of your valuable paper who have such chimneys to erect, provided you can spare the room for its insertion.



Nova Scotia reports state that the Londonderry Iron Company's works are being run to their fullest capacity, and have many orders ahead.

At the Kingston Locomotive Works, recently, a crank was cast for the Ottawa Water Works pumping engine which weighed 18,000 lbs.

Mr. Harry Brooke has purchased the Ingersoll foundry, formerly owned by Messrs. John Russell & Co., and will shortly have it in running order.

The Forbes Manufacturing Company has been formed at Halifax for the manufacture of patented articles of iron and steel, especially fine tools and skates.

A recent Order in Council provides that veneers of wood, shaved or cut with a knife direct from the log, not planed or otherwise smoothed or manufactured in any way, shall hereafter be rated for duty at ten per cent. *ad valorem*.

Messrs. Frost & Wood, agricultural implement makers, Smith's Falls, Ont., are going to enlarge their works and will thus give employment to 100 additional hands.

The town of Trenton, Ont., seeks to increase the number of its manufacturing establishments by offering to manufacturers locating there free sites, water power and tax exemption.

Among the machines to be introduced into the School of Practical Science is one to test the effect of lubricants on journals. This is a sad reflection on our contemporaries. — *Toronto World*.

A specimen of iron ore discovered at Port Kells, about twenty miles above New Westminster, on the Fraser river, B. C., showed 70 per cent. of iron and 2 per cent. silicate. The deposit is described as a very rich one and is owned by Mr. Hy. Kells and H. M. Strubberg, who have formed a company to develop it. The claim is situated within a quarter of a mile of the river on the Westminster Southern line of Railway, and the ore lies within a few feet of the surface.

A new method of utilizing the power of running streams has been devised by M. Tain, a Russian engineer. His apparatus consists of an endless cable carrying a series of canvas cones, which open and shut like an umbrella. The cable passes over a double drum on board a pontoon, and at the other end over a pulley suspended from a buoy. On the lower part of the rope the cones are opened and forced forward by the current of water, thus setting in motion a shaft or drum.

A fusible plug for steam boilers lately designed consists in the use of a piece of fusible metal tube adapted to fit between a cone and a tapered seat. The seat is screwed into the boiler plate and has a circular hole formed with a shoulder, the whole being tapered from the top edge. The cone is tapered to coincide, and is threaded to receive a hand screw fitted with a collar to rest on the shoulder in the circular hole. The fusible metal is placed between the cone and tapered seat, and the hand screw turned until a tight joint is made. When the plug melts, the cone will drop through the seat and allow a clear passage, the full diameter of the hole.

The process of smelting at the Copper Cliff Mine, Sudbury, Ont., is as follows. The ore is first roasted in large kilns to eliminate the sulphur and then smelted into matte or unrefined metal in the furnace. The roasting ovens and smelting works are so planned that every handling of the ore, from the time it leaves the mouth of the shaft till the matte is loaded on the cars for shipping, is down hill and without any lifting up at all. This is accomplished by the situation of the furnace on the side of the rocky tops and the half a mile of trestle work leading up to it. Six tons of ore will produce one ton of matte, worth \$150 a ton, as the copper ores of the Sudbury district carry a very large percentage of nickel. The output of the furnace is about 20 tons a day—in value \$3,000 a day, or over \$1,000,000 a year, and are operated by a force of only eight men. Two shifts of 16 men each get out from 120 to 150 tons of ore every twenty-four hours, or over 4 tons a day for each man. The shaft is down some 300 feet and the best bed of ore yet found in the mines has been struck at this depth. The work has only commenced as yet.

### PERSONAL.

The many Canadian friends of Mr. Wm. F. Swift, the general secretary of the Brush Electric Co., of Cleveland, will be pained to learn that he died at his residence, 104 Steator Avenue, on Tuesday, June 11th, of consumption. Mr. Swift was born in Ravenna, Ohio, on March 7th, 1852, and came to Cleveland in 1872. He first came into prominence as a reporter on the *Cleveland Herald*, and was afterwards city editor, and later held the same position on the *Leader*. He left the newspaper business to join the Brush Electric Co., and has been with it for the past eight years. He was secretary and a director of the company at the time of his death, and was held in the highest esteem by all who knew him. He was married on Jan. 2nd, 1879, to Miss Flora Chester, who, with three small children, survive him. The funeral took place on the afternoon of June 14th, and was very largely attended.

### PROFIT-SHARING IN MANUFACTURE.

IT is evident that many manufacturers in this country are becoming impressed with the policy of profit-sharing as applied to their workmen, says the *American Machinist*. It is too early yet to hazard an opinion as to the outcome of such a course, when quite generally put in practice, but it seems to be worth a fair trial.

As we understand profit-sharing, there is nothing but pure business in it. It is in no sense a matter of benevolence, any further than benevolence gets mixed up in the ordinary affairs of life. And it is in this fact that profit-sharing has a chance for success.

When some large manufacturing establishment determines to put in force profit-sharing, it is with the idea that at least equal money will be made by the firm, that the workmen will be more contented, and that the business is likely to go on more smoothly. And this is exactly as it should be. This is not saying that those who put the plan in practice would not like to see those who work for them make more money. Most people would like to see their butcher and grocer make money if they were buying their meat and groceries at fair prices.

When profit-sharing is put in practice the employer expects his workmen will be interested to the extent of increasing the profits of the business. This he has a right to expect. It is a poor man who cannot do better than he is now doing, and there is nothing so likely to induce him to do so as the prospect of getting more money for his work.

On the other hand, the workman expects that there will be profits to divide, and that is what influences him to try and increase them. It is, or should be, a fair bargain on both side, and should be honestly tried, if tried at all.

Profit-sharing to a limited extent is old. That is, there has been for years, in a good many establishments, one or more men who are considered especially valuable in the business, and who, in addition to a salary, receive a percentage of the profits. It appears to have worked well in some instances. But when it comes to applying it to all the men employed in a large manufacturing establishment there are difficulties in the way, no doubt. What these difficulties are, and their magnitude, can only be determined by trial. If all parties enter into the plan with honest intentions to make it succeed, a good many difficulties may be overcome without serious trouble; if it is not entered upon in this spirit, or if the attempt is made to cover other things than appear on the face, it will stand little chance of success.

In many instances the relations between employer and workmen in this country are not such as they should be for the best interests of both. If profit sharing, while interfering with the rights of none, helps to smooth the way, employer and workmen should alike look upon it with satisfaction.



The Hercules Mfg. Co., of Petrolia, have just completed a 40 barrel full roller mill for Mr. S. V. Wilson, of Union, Ont.

Messrs. May Bros., St. Thomas, Ont., since having their mill remodelled by the Hercules Mfg. Co., Petrolia, have been running night and day to keep up to their orders.

Mr. Thos. Hayne, Bigden, has been making some improvements in his mill and is using for that purpose machinery supplied by the Hercules Mfg. Co., Petrolia.

Mr. Wm. Partlo, of Ingersoll, Ont., is putting in his mill a new 125 h. p. Jerome Wheelock compound condensing engine, manufactured by Messrs. Goldie & McCulloch.

The Hercules Manufacturing Company, of Petrolia, Ont., report business booming. The Company are at present engaged putting in a 150 hbl. full roller mill for W. H. Cole, of Sparta, Ont.

The man who finds a want, and supplies that want, has caught the flood which leads to fortune. This, says the *Hobcaycon Independent*, is what Mr. Alonzo W. Spooner, of Port Hope, has done with his Copperine. In these days of high speed when everything is whirling at a rate that's enough to give ordinary mortals a touch of the razzle dazzle, machinists moan for a bearing metal clam-like in its cool and calm disposition, a metal capable of giving his Satanic Majesty the chills in his tail. Mr. Spooner has produced that metal, the want is supplied, and now that gentleman is floating on a flood-tide leading to fame, to fortune, to Parliament, and a summer cottage. Take for instance the Water Works of Toronto. Everyone knows that at one time these works got heated to such an extent, that the entire town was in a regular boil, but since the introduction of Spooner's Copperine, such a coolness has been thrown around, that members of the Works Committee and journalists now pass each other as strangers. It took over 2,000 pounds to cool those works, for they have the largest engines in Canada, but it fetched 'em, and the stokers after firing up, cool off now by standing near the bearings.

Stratford, Ont., is talking about an electric street railway.

Amherstburg, Ont., is sued by the electric light company for breach of contract.

The by law to raise \$10,000 for electric light for Campbellford, Ont., has failed.

The Canadian Edison Manufacturing Co. have removed to the new Imperial Building, 107 St. James St., Montreal.

The Mount Forest Electric Light Co. are putting a new 30 h. p. engine into their building, to replace one which was found to be inadequate.

The water power privilege of thirty-eight acres at the Sault, has been purchased by the Sault Ste. Marie Water Power & Electric Co., for \$29,000.

An American contemporary informs us that the United States Patent Office is soon to be lighted throughout by electricity, a change not only in the direction of economy, but of safety. A fire in that department would work irreparable loss and damage.

LUMBER PRICES.

Table with columns for LUMBER, CAR OR CARGO LOTS, and various grades of lumber with prices.

Table with columns for YARD QUOTATIONS, including prices for various types of lumber and shingles.

Table with columns for MONTREAL PRICES, listing prices for different grades of lumber.

Table with columns for various construction materials like Portland Cement, Iron, and other items with prices.

NEW YORK PRICES.

Table listing prices for various types of lumber such as Uppers, Selects, Fine common, etc.

Table listing prices for Eastern Spruce lumber in various sizes.

Table listing prices for Shingles in various sizes and types.

Table listing prices for Hemlock lumber in various sizes.

Table listing prices for Dressed Lumber, Car Load Lots.

ALBANY, N. Y. PRICES

Table listing prices for Shingles and Lath in Albany, N.Y.

Table listing prices for Hemlock lumber in Albany, N.Y.

PINE

Table listing prices for various grades of Pine lumber.

BUFFALO AND TONAWANDA PRICES.

Table listing prices for Norway Pine and White Pine in Buffalo and Tonawanda.

TIMEWELL & SON,

Designs, Plans and Specifications prepared for all classes of buildings. Tenders obtained, and buildings superintended in any part of the province.

MACHINERY

FOR SALE.

LIST of Miscellaneous Machines for sale by H. W. PETRIE, Brantford and Toronto.

ONE new World Typewriter.

PORTABLE Forges, genuine Buffalo make.

ONE Eureka Smit Machine.

ONE Dederick Perpetual Hailing Press

ONE Steam Rock Drilling Machine.

ONE Soda Water Fountain.

ONE Clover Huller and Thresher.

ONE Power Meat Chopper, American make.

ONE French Filtre Rapide.

ONE Card Cutter.

100 Press Plates.

ONE lot School Desks and Seat Castings.

ONE Ward Sulky Plow.

ONE Leather Rolling Machine.

ONE Pulverizing Cylinder Mill, Alsing, maker, New York.

ONE Set of Box Nailing Machines.

ONE Run of 40 inch Chop Stones.

ONE Corn Husker, Sell's make.

10,000 Rubber Grain Drill Tubes.

NEW Hand Corn Shellers only \$4 each.

ONE Cockle Separator.

CENTRIFUGAL Pumps, all sizes.

ONE Snow Plow, weight 25 tons.

ONE Machine, to make Wooden Bowls.

ONE Brick Repeating Machine.

ONE Complete Steam Heating Plant, for public or private building—a bargain.

ONE Union Leather Sifter, 45 inch knife.

ONE Clay Crusher, Galt make.

ONE Shooting Gallery Tube.

TWO Diamond Mill Stone Dressers.

ONE Ditching Machine.

STURTEVANT Pressure Fans, all sizes.

ONE Set of Hiscuit Machines

ONE Bark Mill.

FOUR Green Corn Cutting Machines.

ONE Large Iron Hand Wheel.

TWO Conical Ruhr Stone Mills.

TWO HYDRO Extractors for Wooden Mill.

ONE Wool Washing Machine, Galt make.

ONE Bottling Table, Matthew's make.

ONE Set of Heavy Vault Doors.

ONE Power Paint Mill.

ONE Small Bone Mill.

ONE Laundry Hand Shirt Ironer.

ONE Cast Iron Kettle, small size.

41 feet of 14 inch Leather Double Belt.

TWO Hand Paint Mills.

ONE large Letter Press and several small ones.

- ONE Hobbin Winder, Georgetown make.
ONE Cider Mill and Press.
TWO Sets Cable Wheels and Wire Rope.
ONE Sugar Cane Mill, Cincinnati build.
ONE Ronald Steam Fire Engine.
ONE Silby Steam Fire Engine.
TWO Village Hand Fire Engines.

MILLERS' AND MANUFACTURERS

INSURANCE COMPANY. HEAD OFFICE, 24 Church Street, Toronto. JAMES GOLDIE, Guelph, President. W. H. HOWLAND, Toronto, Vice-President.

- DIRECTORS. H. McCULLOCH, GALT. GEO. PATTISON, PRESTON. W. H. STOREY, ACTON. A. WATTS, BRANTFORD. S. NEELON, ST. CATHARINES. W. BELL, GUELPH. H. N. BAIRD, TORONTO. W. WILSON, TORONTO. J. L. SPINK, TORONTO.

HUGH SCOTT, Managing Director. DOUGLAS SUTTON, Secretary. GEO. HANSON, Inspector.

OBJECTS. To prevent by all possible means the occurrences of avoidable fires. To obviate heavy losses from the fires that are unavoidable by the nature of the work done in mills and factories. To reduce the cost of the insurance to the lowest point consistent with the safe conduct of the business.

The Combined Losses and Expenses on the business of 1887 was under Fifty per cent. (50%).

W. Stahlschmidt & Co.

Office, § School,



Church and Lodge

FURNITURE

Preston, - Ontario.

SEND FOR CATALOGUE. GEO. F. BOSTWICK, Representative. 24 Front Street West, Toronto.



Brough & Caswell 14, 16, 18 BAY ST. TORONTO \* Printers SEND FOR PRICES AND SAMPLES..



# THE BAG AND HESSIAN FACTORY OF CANADA BAGS

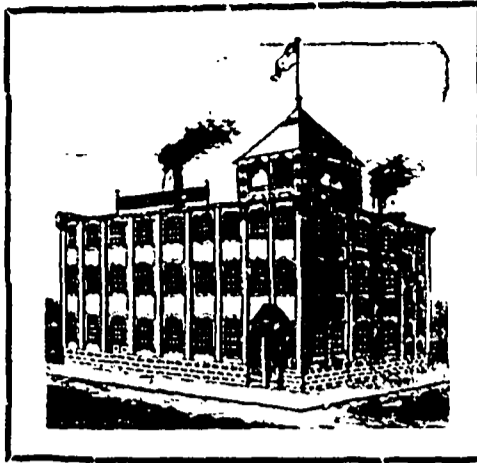
Of every quality and size.

**THE**  
**OLDEST, MOST COMPLETE AND BEST EQUIPPED**

*Bag Factory in the Dominion.*

WE MAKE EVERY DAY **THIRTY THOUSAND BAGS**

**The CANADA JUTE COMPANY, Limited,**  
TORONTO AGENTS: MESSRS. STARK BROTHERS, 62 Front Street East, TORONTO. 15, 17, 19 and 21 St. Martin St. - MONTREAL



*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 the country, at the LOWEST PRICES.

WRITE FOR SAMPLES OF OUR BAG PRINTING IN COLOURS.

# THE J. A. CONVERSE MANUFACTURING CO.

**A. W. MORRIS & BRO., PROPRIETORS.**

MANUFACTURERS OF

## Cordage, Red Cap Binder Twine,

JUTE AND COTTON BAGS, CALCINED AND LAND PLASTER.

Toronto Branch:  
**20 FRONT STREET EAST,**  
W. C. BONNELL, Manager,  
Telephone 475

Halifax Branch:  
**BREMNER & HART'S WHARF.**  
F. LEDDEN, Manager.

Winnipeg Branch:  
**MERRICK, ANDERSON & CO.**  
AGENTS.

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

HEAD OFFICE, - MONTREAL.

BRANDS, ELECTROTYPES

AND NOVEL DESIGNS

FOR PRINTING

SUPPLIED GRATIS.

Sample orders will always receive the greatest care.

# BAGS

**O**UR 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.

# A. W. MORRIS & BRO., - MONTREAL, QUE.

## LONDON MACHINE TOOL CO.,

LONDON, - ONTARIO,

MANUFACTURERS OF

Machinist--and--Brass--Finishers'--Tools.

L. A. MORRISON, with A. R. WILLIAMS, General Agents, TORONTO, ONT.

A. H. McCARTNEY

## McCARTNEY & BRADEN

W. A. BRADEN

## PRACTICAL MILLWRIGHTS,

64 Jarvis Street, - TORONTO.

MACHINERY OF EVERY DESCRIPTION ERECTED AND REPAIRED.

Flour Mills, Oatmeal Mills, Spice Mills, Barley Mills, &c.

Satisfaction Guaranteed.

Hangers, Shafing and Gearing.  
Correspondence solicited.

IMPORTANT TO STEAM USERS.

## THE PREVENTION OF BOILER EXPLOSIONS

AND OTHER ACCIDENTS TO STEAM BOILERS.

When were your Boilers last inspected? Are they in safe working order? Are they giving the greatest power at the least cost?

The Boiler Inspection & Insurance Company of Canada.

Head Office, - TORONTO.

Beaudry's Upright Cushioned

## POWER HAMMER

Simple, Practical, Low-priced, Entirely New Design.

--SEND FOR PRICES--

MILLER BROS. & MITCHELL.  
(Sole Makers for Canada) - MONTREAL.

Can be seen at Permanent Exhibition, Toronto.

