SPECIAL ANNOUNCEMENT.

THE 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 unequalled, 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.

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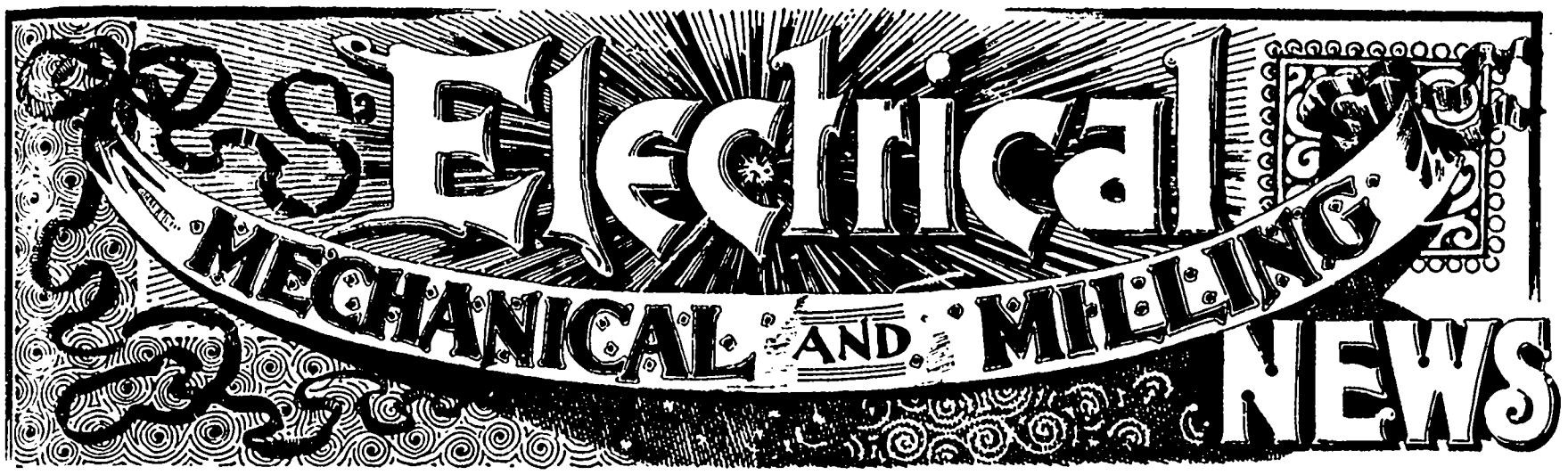

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ELECTRICAL,
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Office, 14 King Street West,
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Advertising rates sent promptly upon application. Orders for advertising should reach this office not 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 2nd day of the month.

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The ELECTRICAL, MECHANICAL AND MILLING NEWS will be mailed to subscribers in the Dominion, or the United States, post free, for $1 per annum, 50 cents for six months. The price of subscription may be remitted by currency, in registered letter, or by postal order payable to C. H. Mortimer. Please do not send cheques on local banks unless 25 cents is added for cost of discount. Money sent in unregistered letters must be at senders' risk. The sending of the paper may be considered as evidence that we received the money.

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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.

DOES Protection protect? must be answered in the affirmative in the case of the Canadian box shook manufacturers who have been compelled by the United States tariff to shut down their factory at Ottawa and remove to Rouse's Point. We learn from an exchange that they will continue to manufacture box shooks from Canadian lumber, but the manufacturing will be entirely done on the American side of the line, the lumber being imported. The American government will, it is understood, grant a drawback, equal to ninety per cent of the customs duty paid on the lumber, upon such boxes as are exported. This is a somewhat serious matter for the parties who are interested in Canada as the box shook factories in Ottawa provided a market for much lumber that was formerly wasted, and increased the value of the class of lumber used in the business of box making, by, it is said, at least one dollar per thousand feet.

THE probable results of the harvest is always a matter of the deepest interest to millers. Our Western correspondent in his letter published in this paper, conveys the cheering intelligence that the yield of wheat throughout the Northwest, which at one time gave promise of being too insignificant to be taken account of, will turn out much better than expected, giving probably from six to seven million bushels above provincial requirements. Under present tariff condition this is good news for Canadian millers. We regret the difficulty experienced in obtaining reliable data upon which to base an intelligent estimate of the probable outcome of the harvest in Ontario. A crop bulletin has just been issued by the Ontario Bureau of Industries, from which we quote as follows :—"In the following table the area of fall wheat in 1889 is taken from the returns of township assessors, but all other areas from this year are computed from the percentages of last year's crop as reported by correspondents. The estimates of total yield in 1889 are also computed from the reports of correspondents, but it must be borne in mind that those reports were made on 20th July. At that time all cereal crops had a promising appearance, and even the injury caused at that time by rank growth and rust was not very noticeable. Later accounts show that none of the cereals have realized the promise of 20th July :

Crops.	Acres.	Bushels.	Yield per acre.
Fall wheat :			Bush.
1889.....	822,115	19,132,007	23.3
1888.....	826,537	13,830,787	16.7
1882-8.....	948,041	18,778,659	19.8
Spring wheat :			
1889.....	398,610	7,679,642	19.3
1888.....	367,850	6,453,559	17.5
1882-8.....	589,210	9,248,119	15.7
Oats :			
1889.....	1,927,115	73,663,061	38.2
1888.....	1,849,868	65,466,911	35.4
1882-8.....	1,569,371	55,997,425	35.7

Owing to the causes given in the above extract, the information afforded by this bulletin must be regarded as of but little value at the present time. From the enquiries we have made, we are led to believe that the damage to the wheat crop of Ontario by rust, will be from 15 to 20 per cent. It is tolerably certain that the average yield throughout the Province will be about 15 or 16 bushels per acre. The acreage sown to wheat this year is said to be less by about 100,000 acres than in 1888. A careful calculation based upon the acreage and probable average yield, leaves little room to doubt that the Province of Ontario will produce 18,000,000 bushels or upwards of wheat, which would leave about three million bushels for export It is therefore pretty certain that export prices will rule the coming season, and that those farmers who are holding back new wheat in the hope of getting higher prices are doomed to disappointment. The average weight of new grain in Western Ontario is from 57 to 58 lbs. In Eastern Ontario it will average nearly standard weight. Many Western millers were counting upon an abundant supply of oats, but the crop is said to be badly rusted.

Crop reports are at best a risky thing for the miller to depend upon, as persons are continually setting rumors afloat with the object of influencing the markets in the interest of their own pockets. The most reliable reports thus far, have been those presented at the meetings of the local millers' associations; and in this direction these associations give promise of proving extremely beneficial. If the millers desire to avoid the mistake so generally made last year of paying too high a figure for their wheat, they cannot do better than join the Central Millers' Association, and thus be entitled to receive a semi-weekly official report giving them the *actual values* of wheat at their local buying stations.

SINCE our last issue the Millers of Ontario have organized local associations in almost all the districts of the Province, and have come to a common ground of agreement concerning the causes of the present general depression in their business. The almost unanimous verdict is that three great causes have led to this result, viz.: 1. The tariff; 2. Fictitious prices; 3. Reckless buying. That the second and third causes are results of the first is beginning to be better understood among millers. We will endeavor to show how this is the case. Under existing circumstances we have no market for flour but Canada; we can buy no wheat outside of Canada; and hence are tied down to the trade of this country. The price of wheat, owing to the duty of 15 cents per bushel. has averaged about 14 cents higher than in the United States, consequently it has been simply impossible to compete in the Liverpool and Hamburg markets, and the product of our enormous milling capacity had to seek a market at home. Owing to the short crop, the competition between the millers was very strong, and they could not bring in outside wheat to meet the demand, hence the fictitious prices which have ruled during the last few years. Then, as a natural consequence of the state of the market and the position they found themselves placed in, the millers, or some of them, began to buy recklessly in the vain hope that war or something else would turn up and let them out. They now find themselves shut up like rats in a box, and in sheer desperation are taking to devouring each other. One of the immediate results will be the entire destruction of the custom mill, for the larger mills are already turning their attention to the local trade, and there is not a doubt but the small mills will have to go unless their larger competitors find a market in the Lower Provinces or in Liverpool.

We are unable to sympathize very much with the custom millers in this matter, for hitherto they have been saying : "We do not do any shipping trade, and as the question of competition in the Provinces and Great Britain does not affect us in the least, we will not take any part in the fight for a fair tariff." The most of them have held aloof from the Central Millers' Association, and there are still about 700 of them who will participate in any advantage gained by the Association, but will not contribute one cent towards placing their trade on a fair footing. They are infinitely worse than the man who always borrows his neighbor's newspaper and never takes one himself, since he gets no material advantage and they do. The Association has already done more good to every miller of this province than ten times his annual subscription would amount to, in placing the position of the industry squarely before them and the public, and showing them the dangers of the present and the utter annihilation of the future, unless things change in a wonderful degree. The Association proposes to give each member a correct quotation of the value of his raw material at his own station daily as soon as possible—for the present, bi-weekly—and without extra charge. This alone will pay every member ten times over his membership fee. The Secretary has been instructed by the executive to telegraph to each member any sudden change in the markets, so that no miller in the Province need be without the means of knowing exactly what to pay for his raw material. These things are not done for nothing, and what is now open to every miller in the Province may for want of general patronage, develop into a body supported by the few, who will reap enormous advantages from it to the disadvantage of those who have neglected to join when the opportunity offered. It is not to be expected that those gentlemen who have already spent so much time and money for the general good of the trade will continue to do so unless they have a much better measure of support than they have hitherto received. There are a number of very important reforms which have been considered by the Executive of the Association, but owing to lack of funds, are being held in abeyance. We are charitable enough to ascribe the apparent apathy to mere forgetfulness and not to a deliberate determination on the part of outside millers to let the Association members spend their time and money, while they reap the advantages, and we trust if this article should reach any millers who have not yet sent in their names and subscriptions, that they will do so at once.

IT is strange that some of our inventors have not before this succeeded in making some radical improvement in telephone apparatus. Although the instruments in use by the Bell Telephone Co. of Canada are if anything more perfectly constructed than the majority of those in use by the American Co., still we must all acknowledge that these same instruments are very far from perfect, and that the field for improvement is wide indeed. Fortune awaits the inventor who will give to the public a simple practical telephone that will not readily get out of adjustment, and by means of which conversation can be carried on as readily as if the parties were in the same room.

IT is often said that in this present age of rapid progress in electrical science, it is quite possible that all the present systems of electric lighting may be supplanted in the near future by a far cheaper and more efficient system. This prophecy is generally discredited by electrical experts, but it seems likely to be fulfilled to a certain degree by the placing on the market at an early date of a new compound wound arc machine, the regulation of which is said to be so absolutely perfect that without any regulator outside of the dynamo itself the full load of lamps can be cut on and off, either singly or in one lot, without the slightest change occurring in the current. The machine is being brought out by one of the largest arc light manufacturing concerns on the continent, and its advent will be earnestly looked for.

THE growth of the electric bell business in Canada during the past few years has been truly surprising, and the manufacturers of the ordinary door bells have felt the opposition so keenly that they have been putting forth all their efforts to produce a bell that would resemble the electric bell as much as possible, both in appearance and tone, and at the same time be sold at a low price. The latest result of these efforts is a clockwork bell intended to be placed on the inside of the door and wound up by turning the gong around. A mechanical push button is placed on the outside of the door, and on being pressed releases the clockwork in the bell, which produces a vibrating ring much similar to the electric bell. This imitation is all very well as far as it goes, but it costs more than the electric bell, is more liable to get out of order, and besides the bell and push button have to be placed close together, so that the new arrangement is at the best only adapted to certain circumstances which seldom exist.

WHEN electric lighting first began to be generally introduced, the circuits were usually tested with a small detector galvanometer of low resistance, with a battery of four or five Leclanche cells. This method worked very well for a time, but soon the ordinary magneto bell was found to be so convenient for testing purposes, that many of the companies adopted it in preference to the galvanometer, and now it is almost exclusively used for testing lighting circuits generally. To say the least, both of these methods are clumsy and unreliable, and we will endeavor to place before our readers a plan that we think is preferable to either of the above, and is certainly very much more, if not absolutely reliable. First of all it is necessary to provide an ordinary tangent galvanometer of good make, having four different coils surrounding the needle. The inner of the coils should be a strip of flat copper having practically no resistance; the second should have a resistance of about three or four ohms; the third about thirty ohms: and the fourth one hundred and fifty ohms The battery should consist of about six or eight cells of Disque Leclanche, and should be kept in a cellar or in some other convenient place where the temperature is comparatively steady and does not rise above 60 degrees at the highest. It is a great mistake to place this battery in the engine room, as the heat there is usually so great as to evaporate the solution in the jars (even if caled) and also to cause the salts to run over If a battery of this kind is placed in a proper place, it will run for from two and one-half to three years without attention, whereas, if placed in a hot engine room it will run down in six months. Now, in order to test for a closed circuit, all we have to do is to connect up the low resistance coil in the galvanometer, and if the circuit is closed, the needle will deflect strongly. If the circuit is a very long one, however, it would be perhaps better to use the second coil In order to test for a ground, it is necessary first of all to have a good reliable ground wire, and this we regret to have to say is seldom to be seen. A wire stuck down a few feet in the earth, or wrapped loosely around a gas or water pipe, is by no means a good ground wire and is practically useless for testing purposes. If there is no well or water pipe convenient, the best plan is to solder a No. 6 copper wire to a copper plate about three feet long by fourteen inches wide. This should be buried four feet deep in *permanently* moist ground, and if such a spot cannot be found, it will be necessary to thoroughly wet the place each day just before testing. If there is a well convenient you will get an excellent ground by putting the plate in the bottom of it, or if you have water or gas pipes at hand, file about a foot of the pipe bright and clean, then wrap about twelve feet of the wire tightly around it and solder carefully. In the case of gas pipes, it is necessary to make the connection on the street side of the meter, and it is better not to use water pipes unless they are in connection with considerable underground piping, as is the case with city waterworks. Now supposing that we have a good ground wire at hand, all we have to do to test for grounds, is to connect one side of the battery to the ground wire, the other to one side of the fourth or high resistance galvanometer coil, and the other side of this coil to the circuit to be tested. If there is even a very slight ground, the needle will be deflected, and thus indicate trouble. Now try the third coil, and if the needle does not deflect, the ground is so slight as to be of little importance. If it does deflect, try the second coil, and if the needle deflect now, the ground is serious and should be removed before starting. Of course the above refer only to testing in dry weather, as it will be found that where underwriters' wire is used for the lines the needle will deflect slightly through the second coil when testing in wet weather, even though the lines be in as perfect condition as it is possible to have lines of underwriters' wire. If the circuits are constructed of Okonite rubber, or other thoroughly waterproof insultation, the needle should not deflect in the least, even when testing through the high resistance coil in very wet weather.

IN placing lightning arresters on lighting circuits, great care should be exercised in choosing the proper kind of instruments. Until quite recently it has been the custom to place an arrester something like the old fashioned plate telegraph lightning arrester on each leg of the circuit just where the wires enter the station. This method is an extremely faulty one, as in most cases the lightning will jump both arresters at once, and will be followed up by the dynamo current forming an arc between each of the mains and the common ground wire, thus actually short-circuiting the dynamo, and rendering complete burn-out and break-down extremely probable. We think the best method is to use an automatic arrester which is arranged so that the current passing to the ground from the line is made to pass through an electromagnet, which in its turn releases clockwork that throws the plates apart and breaks the arc, returning the plates to their normal position a moment later and leaving them ready for the next discharge. There are several of the kind in the market, but as some of them are very poor quality, lighting companies would do well to purchase them only on approval.

ORGANIZATION OF EASTERN MILLERS.

A MEETING was held in the town hall, Peterboro', on Tuesday, August 6th, for the purpose of organizing a local Millers' Association. The following millers were present in response to a circular from Mr. David Plewes, Secretary of the Central Millers' Association: Messrs. Esterbrook, of Tweed; A. H. Mulhern, Ashburnham; Smith, Campbellford; Fowlds, Hastings; Rayburn, Deseronto; Thurston, Cannington; Mackenzie, Beaverton; Sills, Myersburg; Geo. Hilliard, Peterboro'; Rollins, Madoc; Hull, Lakefield; Peplow, Port Hope; Lazier, Belleville; Meldrum, Peterboro'; Vanstone, Bowmanville; Flavelle, Lindsay.

After adopting a resolution in favor of organization, Mr. Plewes, was called upon to address the meeting.

Mr. Plewes opened his remarks by saying that the chief work of the local associations should be to get the farmers to sign petitions impressing upon the Government the necessity of rectifying the flour duty. Under the present duty, the nominal protection to the farmer of 15 cents per bushel on wheat, in reality amounted to no more than 10 cents. When the present duty of 50 cents per barrel was first put upon flour, the millers considered it sufficient, and he would quote figures to show that for a time it served to a great extent, to secure his home market to the Canadian miller. The quantity of American flour entered for consumption in Canada for the year ending 30th June, 1878 just before the imposition of the duty amounted to 314,520 barrels. Now, he had no hesitation in saying that whether those present were Grits or Tories, they didn't want such a state of things as that to happen again. They wanted this thing cured now, and this fact should be impressed upon their representatives. As showing the beneficial effects of the duty imposed in 1878, the returns for the fiscal year ending 30th June, 1880, showed imports of only 101,799 barrels, and this decrease continued until the imports in one year amounted to less than 60,000 barrels. Owing to changed circumstances, however, the importation of American flour into this country during the last two years, had been rapidly increasing, until almost the same condition of things exists as prevailed in 1878. An important factor in this change was railway construction throughout the Northwest, which had resulted in cheapening very much the cost of transport. In 1876 it cost 60 cents per barrel to bring Minneapolis flour to Montreal; now it costs exactly half that amount. This had resulted in giving Minneapolis millers access to our markets, and depriving the Canadian miller of the protection which he formerly enjoyed. He had recently written to Ottawa, asking for a return of the quantity of flour imported into Canada for the fiscal year ending 30th June last. He got a reply stating that the figures could only be given for eleven months for the provinces exclusive of British Columbia, and for nine months for the latter Province. The return showed that during eleven months of the last fiscal year, there were imported into Canada, exclusive of British Columbia, 223,591 barrels of flour. During nine months there were imported into British Columbia 19,072 barrels. These amounts added together, make 242,603 barrels. Assuming June to be an average month, and adding 22,000 barrels for that month, would bring the total quantity up to 264,605 barrels. Taking the Government standard, it would require to make this quantity of flour, 1,257,420 bushels of wheat. The duty on this amount of wheat brought into Canada for grinding purposes, would be $198,638. The duty charged the American miller who ground this wheat in the United States and exported it into Canada in the shape of flour, was only $132,360, or a bonus in favor of the American miller of $56,253. Mr. Plewes said there were three parties opposed to the work which the Millers' Association had undertaken. These were the extreme Conservative millers, and the extreme Liberal millers, who put party interests before the interests of the business in which they are engaged; and the short-sighted millers who begrudge the small fee necessary to enable them to become members of the Central Millers' Association. Touching upon other matters, Mr. Plewes urged the buying of wheat by the tester. Millers had been accustomed to pay the same price for poor wheat as for wheat of good quality. This was unjust to themselves and to the farmers. In buying, they should enquire "How much does your wheat test?" If the millers as a body would enforce buying car loads by the tester, wheat buyers would be forced to do the same. He explained that the object of the semi-weekly bulletin which it was proposed to issue to members of the Central Association was to put before them the actual value of wheat at their local buying point. Then if a miller chose to pay 10 or 20 cents per bushel more than he knew to be the value, let him do so. Small millers in out-of-the way places, belonging to the Central Association, would be advised by telegram from the office of the Association concerning any unusual fluctuation in the markets, thus insuring them against loss. The speaker closed a capital address by urging the millers to adopt a system of uniform exchange in gristing.

Mr. Hilliard pointed out that if the 264,000 barrels of imported American flour had been ground in Canadian mills, Canadian farmers would not now be suffering for want of bran for dairying purposes. The American miller kept his offal at home.

Mr. Peplow reminded Mr. Plewes that he had promised to give them some information about the export flour trade.

Mr. Plewes said soft flours for export should be put up in 8 ounce sacks holding 140 lbs. The reason for this was, that this class of flour went into the retail shops in Scotland and Ireland, and the cotton sack was worth 3d., while the jute sack was worth nothing. Strong flours, on the other hand, went direct to the bakers, and should be shipped in jute sacks. He advised them never to mix their wheat when manufacturing for export, as the British bakers prefer to do their own mixing. Neither should they put spring wheat in white wheat flour. Biscuit makers want no spring wheat flour, their object being to secure whiteness, not strength. A market could be found in Belgium for low grades if wheat gets down to an export basis. Such flour must be put up in 220 lb. jute sacks.

The election of officers was then proceeded with, and resulted as follows: President, John Hull, Lakefield; Secretary, W. H. Meldrum, Peterboro'; Executive

Committee, Messrs. Esterbrook, Mackenzie, Flavelle, Vanstone, Smith, Rayburn, with the President and Secretary.

President Hull said he had long felt the want of union among millers, in order that they might enjoy greater prosperity and become better acquainted with each other. He asked the assistance of those present in making this newly-organized association a success.

A resolution was adopted pledging those present to endeavor to secure the assistance of the farmers for the readjustment of the flour duties, as far as possible to buy what it by the tester, and issue a schedule after seeing the quality of the new crop.

The Association will meet at Belleville on the second Tuesday in Sept., when the Committee appointed to prepare rules for its government will make their report.

ELECTRICAL SPARKS.

The St. Thomas Gas and Electric Company have ordered a new dynamo of 200 incandescent light power, and will establish a new circuit.

The city of Kingston proposes to purchase the plant of the Electric Light Co., and operate it by means of power supplied from the Kingston mills.

The Nova Scotia Electric Telegraph Company are importing about eight or ten miles of shore end of a telegraph cable, to be laid from the landing point at Dover Bay, N. S., to the village of Canso where the cable office now is.

Mr. Wright, manager of the Federal Telephone Company, has completed arrangements for the erection of a new switchboard having a capacity for 5,000 subscribers.

Letters patent have been issued by the Ontario Goverment incorporating the Electric Light, Telephone and Power Company, of Rat Portage, limited', with a capital stock of $30,000.

The Hamilton Gas Co. have been awarded the contract to supply the city with 230 arc and a limited number of incandescent lights. The Company will, it is said, put in a complete electric plant.

The contract for the lighting of the Penetentiary at Kingston has been awarded to the Brush Electric Co., of Cleveland. The plant will consist of two 550 light dynamos and two high speed engines and will be one of the finest incandescent installations in Canada.

Lighting companies are fast beginning to recognize the fact that it pays them to do their own repairing work, and as a consequence we find that there is being attached to nearly all lighting stations of any size, a well equipped manufacture machine shop, where all ordinary repairs can be executed at about one-third of what the work would cost if sent in to the parent company.

Mr. Wm. Barron, of Toronto, called at this office a few days since to protest against the statement contained in a paragraph published in a recent number of the ELECTRICAL, MECHANICAL & MILLING NEWS, regarding the uselessness of the device called the "Telephone." Mr. Barron showed us a number of testimonials from business firms in this and other cities who have used the device and who speak in commendation of it.

Nearly all of the companies manufacturing apparatus for incandescent lighting are now placing on the market new and improved meters for ascertaining the number of lamps burned by consumers and the number of hours which the lamps burn. These meters have been found to be thoroughly reliable, and we bespeak for them a ready sale, as we feel that the public have grown tired of paying for lights when they don't use them, and will heartily appreciate anything that will accurately measure the amount of light used.

Another case has just come to our notice says *Modern Light and Heat*, where the incandescent lamp would have saved a fire of $1,000, and one life at least, the occasion being the explosion of tan dust caused by a workman's careless handling of a kerosene lamp. These accidents occur so frequently it seems as if insurance companies would insist upon the use of incandescent lamps in such places, and that mill and factory owners would be alive to this freedom from dangers of this sort ensured by their employment.

There is still apparent among certain mechanical engineers, a feeling that the electric motor is an intruder, says *Electric Power*. This can only be accounted for upon the theory that its merits are neither understood nor appreciated. The advocates of manilla rope transmission should bear in mind the fact that those most directly interested in that system recommend the electric motor in connection with it. The most thorough dissemination of power by whatever means is to the interest of engineers in every branch of the industrial field.

A correspondent of the London *Electrician* writes as follows: I have recently made an invention which I consider of the great value to the electrical trade, and I shall be glad to publish, to give them the benefit of my invention. I find that such articles as the scores of electro magnets, bobbins, and, I believe, even wire, can be coated with enamel or similar vitreous substance, and that this acts as a splendid insulator and protection for the wire to be wound thereon. It can also be used for the inside coating of iron tubes for the carrying of underground wires, and I think that many of your readers will find this of the greatest value.

It has been the work of electricity during the past half of a century to introduce many changes and effect many revolutions in the arts and sciences. Some new arts it may claim to itself, and one of these is electric welding. In time, electric welding will be one of the most important of electrical applications, for nothing will stand in its way save the difficulties that may naturally arise in adjusting old conditions to the new and unfamiliar methods. Although the idea seems to have lurked in minds electrical, the practical development of the art announced by Professor Elishu Thomson some two years ago came to all as a welcome surprise. This new process of welding, will be believe, not only be adopted by many branches of metal manufacture as a great boon, but its facile mending and repairing will greatly recommend it as well to the lineman as to the wire maker.

Now that the time is near at hand when a large number of the original contracts entered into between corporation and lighting companies for the supply of electric lights will expire, the municipal authorities are beginning to think that they can get the contracts renewed at such unheard of figures as 10, 15, and 20 cents per night for arc lights. They seem to have got the idea that the lighting companies have been making a great deal too much money in the past, and are determined to cut down their prices in the future. We would suggest that Canadian municipal authorities who think thus, should communicate with the officials of the largest American cities (where the competition is extremely keen and and the number of lights large) and we think they will find in nearly every instance that they have been getting their lights for considerably less than these places which have so many advantages in favor of cheap lighting.

Felling trees by machines driven by steam power, according to the London *Times*, has been superseded by electric power and has been adopted in the Galician forests. Usually in such machines the trunk is sawn, but in this case it is drilled with a series of holes close together. When the wood is of a soft nature, the drill has a sweeping motion, and cuts into the trunk by means of cutting edges on its sides. The drill is actuated by an electric motor mounted on a carriage, which is comparatively light and which can be brought up close to the tree and fastened to it. The motor is capable of turning around on its vertical axis, and the drill is geared to it in such a manner that it can turn through an arc of a circle and make a sweeping cut into the trunk. The first cut made, the drill is advanced a few inches and another section of the trunk is removed in the same way, until the trunk is half severed. It is then clamped, to keep the cut from closing, and the operation continued until it would be unsafe to go on. The remainder is finished by a hand saw or an axe. The current is conveyed to the motor by insulated wires brought through the forest from a generator placed in some convenient site, which may be at a distance from the scene of operations. The generator may be driven by steam or waterpower, and does not need to be transported from place to place.

It is a matter of surprise that one half of the electric lighting companies in Canada are able to pay even a nominal dividend. When we look around us, and see in one place a dynamo running in the basement of a flour mill almost entirely covered up with flour and grit, in another a first-class dynamo kept in a comparitively clean and tidy room, but furnished with power from some rickety old engine that has been doing service for the past twenty years, and in still another place, see a boy at $5 a week firing the boiler, running the engine and dynamo, and doing the lamp trimming in the forenoon of the following day. Of course we do not mean to say that there is not any lighting station in our Dominion, and plenty of them, that can be looked upon as models in themselves, but we fearlessly assert that there is room for radical improvement in nearly one-half of the Canadian lighting stations. This state of things seems to be caused by the fact that in many instances parties having no electrical knowledge whatever, go ahead and put in plants for commercial and street lighting purposes, and actually trust to their own ingenuity to run these plants properly. The idea never seems to occur to them that it is not only expedient, but necessary to employ a competent man for the work, and the man they do employ is expected to develop into a full fledged electrician after a few days instructions from the expert who installs the plant. This kind of management may work very well for the time being, but after a time when the bills for repairs begin to assume a formidable aspect, it will suddenly dawn upon the proprietors that the only way out of their trouble is to employ a competent man, which, if they had done in the first place, they would have saved all the trouble and anxiety resulting from insufficient service, to say nothing of the rapid depreciation on plants caused by ignorant manipulators.

It is becoming more apparent day by day that many of our towns and some of our cities have been equipped with electric fire alarm systems that are only such in name. The ill-kept battery, the gong out of adjustment, the rusty uncleaned signal box, and the miserable state of the line work, are but too glaring evidences of this fact. If the attention of the authorities of a town possessing such a system is called to the fact, the invariable answer is to the effect that the alarm does its work well and *hardly ever* misses a stroke. It seems that because by some chance or other the alarms come in all right for nearly every large fire, and even if the gongs do sound an unintelligible number occasionally, it is thought everything is all right and will continue so for all time to come. It is surprising that the underwriters do not give this matter the attention that it deserves. There are very few towns without a local electrician of more or less ability, and the expenditure of one or two hundred dollars a year for the benefit of this individual in keeping the alarm system in proper order would be more than repaid in the actual saving of depreciation of plant, besides the greatly increased feeling of security that would result. Of course we do not mean to say that a man can be found in every town capable of intelligently handling a fire alarm system, but we do not believe there is a town in Canada where there is not a telegraph or telephone agent or some other party taking an interest in electrical matters that would be perfectly capable of doing the work properly after receiving a few instructions from an expert electrical engineer, whose services it would pay the town well to engage for a few days for this special purpose. A properly installed fire alarm system does not need much attention, but the attention it receives should be intelligent attention and not (as is generally the case) the clumsy tinkering of a "handy man."

One of the features of electric street railways that has not as yet attracted much attention from the public is the effect that electricity will have on that class of investment. It is the claim, and results thus far justify it, that an ordinary electric road operated either with the overhead or direct system, shows an economy of forty per cent. as compared with a similar road using horses, while besides there are advantages of higher speed, little wear of track, no running expenses during strikes of employees, and less depreciation on cars. Under such circumstances, it is impossible that electric street railway stocks can long remain unattractive to the investing public. If our readers would take the trouble, as we have, to look into the question of the standing of electric street railway enterprises and their earning capacity, they would be surprised, not only at the general stability of the business, but at the rareness of financial difficulties in it, and the steadiness with which fair dividends are maintained. An electric railway may not be a bonanza, but it is at least a property whose productiveness it is hard to impair, and whose management every stockholder can judge of with his own eyes daily. Some of the shrewdest financiers in the United States have shown their appreciation of the value of those railways by securing control of several in the largest cities. The great railroad system of the country whose stocks are snatched up eagerly by trustees and small capitalists, are subject to a thousand adverse influences, and suffer from short crops depressed markets, the shifting of industries, and bad weather, all of which in one way and the other render almost certain the payment of only a small percentage on the amount invested. Besides, the competition for the better class of stocks has long since rendered them a dear purchase. Now, in the case of electric street railways, the traffic is of one kind and regular, and a man can find out for himself pretty closely what is affecting the income or the expenditure, and if, with all the opportunities of personal inspection, he is unable to tell whether it is the right time to buy or sell, he is assuredly safer out of the investing business altogether. We may be wrong, but we are willing to stake our reputation on the opinion that before many years have passed, it will at least be as easy to raise a hundred thousand dollars for electric railway enterprises, as for any other large railway operation, and when the time comes, if indeed it has not yet come already, the change will have been wholly brought about through the agency of electricity, and from the fact of its being substituted for horse traction. We fail to see a safer form of investment anywhere than electric railways well equipped and well managed.

ROLLS.

SAYS R. James Abernathey in the *Merchant Miller and Manufacturer*: The first pair of rolls in a short system mill are finely corrugated, never coarser than 18 to the inch, consequently a very slight untruth develops itself in irregular and bad work.

A good and experienced short system miller will notice it very quickly. As is understood the aim of a thorough short system miller is to make all the break flour he reasonably can with the first pair of rolls. In doing that he must grind low. If one or both of the rolls are out of true, that is, not round, the high place will touch before the balance of the surfaces are close enough together to do the required work. What is the result? The high spots cut and powder the bran, the fine particles going with the middlings, making them much dirtier and more difficult to clean than they should be or otherwise would be, and to that extent is a dreaded injury. Then, too, the tendency to cut and reduce the germ to such an extent as to get a part of it in the flour is greatly enhanced. On the other hand, if the rolls are adjusted to suit the high places, then the main body of the roll surfaces are too far apart and the main object of short system milling is defeated.

Not enough break flour can be made and by far too much middlings, and the first thing that will be known, the smooth roll surface will be over-tasked and unable to properly do its work if perfectly true; and less so if not true.

Now that is not a "theory" alone "but a condition that often confronts millers whether they know it or not.

That is not all, the bran goes from the main break to the bran rolls in unequal conditions, putting a complex task upon them which they are unable to well perform, even when perfectly true, and, as with all other rolls, still less so when not in good condition.

The complaint, and a very just one too, comes to me by millers so situated, that they are greatly vexed in a constant and useless effort to get a clean and even finish on their bran.

The millers fully appreciate the value of having the bran rolls absolutely correct but, unfortunately, the mill owners in many cases do not, and so the miller continues to worry.

The reason is, mill owners are rarely practical millers, and so long as the mill business is in fair condition they take other matters easy, and especially what they consider very small matters.

Two or three pounds loss to the barrel does not seem much when profits are fairly good and stock low, and really it is not when measured by single barrels, but the aggregate for a years run amounts to a large figure.

But it is not in the loss alone, as we have tried to show, that the evil lies. It is impossible for any miller to do the best work under such circumstances. Commencing with untrue break rolls and running through to the end under similar circumstances, and with all or only a part of the rolls in a like fix, the entire work of the mill is viciously affected.

Some may ask how are we to know the rolls are not true? Well, it can be discovered by examination. Many a miller has already discovered the fact and did not know it. He has discovered that after carefully tramming his rolls they did not appear to work much better, and the first chance he has he tries the tram on them again, when lo, they are out of tram again, and the trouble is explained, so he thinks. The tramming device won't hold, is his mental conclusion and so proceeds to tram again.

The miller arrives at a wrong conclusion. There is nothing the matter with the tramming device and it undoubtedly remains just as he had fixed it. The real trouble is the rolls are not true, and on the second trial with the tram he does not strike the exact spot at which he had trammed, and, of course, they show out of tram. All can readily enough see how impossible it is to tram a pair of untrue rolls.

Tram one spot and another spot is thrown out. Every miller knows, or thinks he knows how important it is to have his rolls in tram, and exerts himself to get them in perfect tram, in one spot, when he finds them out, and like a scared ostrich that hides its head in the sand, mills away for awhile quite contented, thinking all is right with his rolls, but the delusion lasts but a little while,

ANOTHER LOCAL ASSOCIATION OF WESTERN ONTARIO MILLERS.

A WELL attended meeting of millers representing the counties of Middlesex, Elgin, Essex, Kent, and Lambton, was held at London, Ont., on the afternoon of August 16th, with the object of forming a local association to work in conjunction with and assist in securing the objects sought to be attained by the Central organization. Among those present were :—Messrs. J. D. Saunby, London ; B. Stanley, Lucan ; William Plewes London ; J. King, Sarnia ; John Reith, Hensall ; Henry Cook, Hensall ; J. Johns, London Township ; David Waite, Strathroy ; David Plewes, Brantford ; Richard Pincombe, Strathroy ; A. Dunlop, Watford ; J. Campbell, St. Thomas ; Joseph Kidd, Tilbury Centre ; J. Brown [Vice-President of the Dominion Association], Toronto ; Neil McCahill, Forest ; John Hunt, London ; Stephen May, St. Thomas ; Robert Procimier, Bayham ; Thos. Syer, Thamesville ; J. C. Hay, Listowel. James King was appointed Chairman and Mr. Neil McCahill Secretary.

The meeting was called to order by General Organizer, David Plewes, and Mr. James King was appointed Chairman and Mr. Neil McCahill Secretary.

A short discussion took place as to what territory be included in the local district, and it was finally decided to include Middlesex, Elgin, Essex, Kent and Lambton.

The election of officers was proceeded with, and resulted as follows:—

President—J. Campbell, St. Thomas.

Vice-President— James King, Sarnia.

Secretary and Treasurer -Wm. Saunby, London.

Executive Committee—Stephen May, St. Thomas ; Neil McCahill, Forest ; Thomas M. Syer, Thamesville ; Richard Pincombe, Strathroy ; Thos. Vollens, Windsor.

It was decided to fix the membership fee at $1.

Mr. David Plewes, the General Secretary, was then introduced. He commenced by referring to the differential duty on American wheat compared with American flour coming into this country. The duty on the latter was only 50 cents per barrel, while American wheat had to pay a duty of 15 cents per bushel. This told decidedly against the Canadian millers. The 50 cent duty amply protected the interest of the native millers ten years ago when it was first put on, but it had been more than neutralized since by the heavy tax imposed on imported wheat. In 1878, the last year of the Mackenzie regime, there was imported from the United States 314,520 barrels of flour but in 1879 when the Conservative Government was in power and the 50 cent tax was imposed the importations fell to 101,279 barrels, and the reduction continued until only about 62,000 barrels were brought in from the other side. But circumstances have greatly changed since then. The 50 cent duty on flour no longer afforded protection to the Canadian milling interests. The roller process enabled a mill to turn out two grades of flour at the one grinding. The American millers found a ready market at home for their best grade, and realized remunerative prices for it. The demand for the secondary grade was not so large, and they shipped it to Canada. Because of the price realized on the first grade, they could afford to sell it below cost. There was very little demand here for the finest high patent flour, and the Canadian millers were accordingly placed at a great disadvantage when brought into competition with the Americans. The Maritime Provinces were particularly solicitous that the import duty on flour should not be increased, for they imagined that they would thereby have to pay double for their breadstuffs. But the annual capacity of Canadian mills was 18,000,000 barrels, while the consumption was only 6,000,000. When these figures were considered it would at once be seen that there was but little danger of the native millers ever effecting a corner in the flour market. Mr. Plewes defended his figures relative to flour importations given at former conventions, and which had been called in question by the *Mail*. From the Customs Department at Ottawa he ascertained that 223,591 barrels of flour had been imported from the United States in the eleven months ending 30th May, 1889, including 19,072 barrels brought into British Columbia. Taking the average monthly importations it would be seen that the importations for the year were 264,723 barrels. These were the figures the *Mail* had assailed, but surely it was a legitimate computation. From this he argued that the Canadian millers would have to pay $198,960 duty on the raw material, not including the general tax which they had to pay in common with the rest of the Canadian people, while the Americans were permitted to bring in the manufactured article, without any additional tax, for $132,162, thus giving a bonus of $56,000 to an alien people to compete with the natives. Such a thing was without a parallel in any civilized country, and especially in a protected one. Another big advantage which would accrue to members was the adoption of a bulletin showing the export value of wheat which it was proposed to issue semi-weekly or oftener. The relative export value of flour would also be given when practicable. Another important question was the testing of wheat, and he urged upon all the necessity of having a "tester." The practice of giving as much for half-cleaned light wheat as for good 62 lb. wheat was disastrous to the millers and dishonest to the farmers. The only practicable way of coming at the relative value of wheat for flouring purposes was by means of the "tester." Everything but the farmers and millers was protected by duties and something had to be done without delay if disaster was to be prevented to the milling industry of this country. He had met with three classes of men who would never become members. The first were similar to that class of people who read their neighbors newspapers, but would never pay for one themselves. The second were those who were such strong supporters of the Government that they would do nothing to reflect on it. The third were extreme liberal, who knew there was an injustice in the thing but who were not willing to lend their hand to have it remedied just now—who wanted it to go on until the next election, in order that they might raise a cry and turn the Government out. [Laughter.] We didn't want to wait until the next elections, because they were two years off yet, and by that time many of us might be ruined. All that was necessary to effect the reform desired in the tariff was to show to the country that the farmers and the country wanted the change and were determined to have it. [Applause.]

Mr. J. C. Hay, of Listowel, the President of the Central Association, was called upon for a few remarks.

He said that he had come down to the meeting at the request of the General Secretary and to ascertain how the work of local organization was being carried out. He pointed out the advantages which were to be obtained by organization, and said it was in the interest of all millers to become members of the Central Association. He went on to speak then of the importance of strong subordinate organizations in every part of the country, and impressed upon those present the necessity of obtaining membership. It was particularly in the interest of the small millers to join in order that they might keep themselves thoroughly posted as to the condition of the wheat market at a minimun cost. There was no doubt that the millers had a grievance—a great grievance. Members of the Government admitted it, but owing to the pressure brought to bear from the eastern Provinces no attempt had been made to remedy the tariff. Consequently nothing could be obtained in this respect until the millers brought something to bear to counteract the maritime influence. Mr. Hay in concluding urged all to use the "tester" in purchasing wheat.

Mr. Stanley asked regarding freight rates. He knew of instances where the railways discriminated largely in favor of one miller and against another in the same town.

Mr. Hay said that was one of the objects of the Association. Mr. Brown said the question of freight rates had been discussed in the meeting of the Central Executive, but it was laid over until the work of local organization had been completed. The Executive did not think there would be much use going to either Mr. Van Horne or Mr. Hickson before then. In olden times the Israelites had been commanded to make brick and find their own straw. What the Millers' Association needed was

VICE-PRESIDENT, W. SNIDER.

PRESIDENT, W. PARTLO.

SEC.-TREAS., C. W. WATTS.

OFFICERS OF OXFORD, NORFOLK, BRANT, HALDIMAND AND WATERLOO COUNTIES MILLERS' ASSOCIATION.

axe straw. Every miller in the country, no matter how small his business, was needed in the Association if it was to be made a success. These small millers also needed to join if they did not want to be driven out He would guarantee that unless something was done to stop the present disastrous course the milling industry was taking there would not be a custom or grist mill in the country ten years hence. When the tax was put on breadstuffs Nova Scotia asked as a *quid pro quo* that a duty be placed on imported coal. A duty of 21¼ per cent was put on coal, but this did not remedy the evil at all. We in Ontario had to pay $668,000 additional for our coal, but that was all. It did not help the Nova Scotian miners one cent as far as we were concerned. But if the rate was increased still higher on American coal we could afford to send cargoes of it to the Maritime Provinces, and bring back coal in exchange. When the deputation of millers waited upon Sir John Macdonald he admitted that there was a grievance, but said that his Government wasn't strong enough to remedy it. If the request was granted Ontario and Manitoba alone could be counted on for support. Then this was simply a matter of votes. In concluding he paid a high compliment to the newspapers for the assistance they had given.

Mr. Stanley differed greatly from the last speaker on a couple of points. The Government couldn't remedy the matter as long as there were the two factions to deal with. Sir John had given all he had been asked for, and the remedy lay largely in the millers' own hand. If the duty was raised to $1 the price of wheat would go up and American flour would still come in. If a "tester" was used the business would be a great deal more profitable.

The remaining routine business was then proceeded with.

Mr. Saunby moved that until next meeting the following buying schedule be adopted :—

For 60 lb. wheat, standard price.
For 64 lb. wheat, 4 cents more.
For 63 lb. wheat, 3 cents more.
For 62 lb. wheat. 2 cents more.
For 61 lb. wheat, 1 cent more.
For 59 lb. wheat, 1 cent less.
For 58 lb. wheat, 2 cents less.
For 57 lb. wheat, 5 cents less.
For 56 lb. wheat, 8 cents less.
For 55 lb. wheat, 12 cents less.
For 54 lb. wheat, 16 cents less.
For 53 lb. wheat, 20 cents less.

Mr Campbell favored laying this question over until next meeting. He expected to experience a great deal of opposition from the wheat buyers in St. Thomas, and if the members were bound to any cast-iron schedule they would outbid the millers.

Mr. Saunby said the case was even worse here in London. The buyers were the sworn enemies of the Association, and had threatened to break it up. Of course it was not intended to bind any person to the schedule in any such case as this.

With this understanding Mr. Campbell withdrew his opposition, and the motion was carried.

On motion of Mr. Syer, seconded by Mr. May, the following exchange schedule was adopted :—

For 63 lb. wheat, 38 lbs. straight roller flour.
For 62 lb. wheat, 37 lbs. straight roller flour
For 61 lb. wheat, 36 lbs. straight roller flour.
For 60 lb. wheat, 36 lbs. straight roller flour.
For 59 lb. wheat, 35 lbs. straight roller flour.
For 58 lb. wheat, 34 lbs. straight roller flour.
For 57 lb. wheat, 32 lbs. straight roller flour.
For 56 lb. wheat, 31 lbs. straight roller flour.
For 55 lb. wheat, 28 lbs. straight roller flour.
For 54 lb. wheat, 26 lbs. straight roller flour.
For 53 lb. wheat, 23 lbs. straight roller flour.
And 13 lbs. offal.

Mr Campbell said he would like to see the system of exchanging done away with altogether. He found the practice of paying cash for the wheat and selling the flour and offal for cash was by far the most satisfactory. He had adopted this custom in both his St. Thomas and Chatham mills, and sold to farmers at wholesale prices.

Mr. Saunby said he had adopted the cash system too as far as practicable but some farmers were determined to have their gristing done on the exchange plan.

Mr. Stanley and other members also spoke in favor of the cash system, and thought that the schedules adopted would effect a cure.

Moved by J. D. Saunby, seconded by Neil McCahill, that we agree to adopt till our next meeting the Brantford schedule of buying by tester. Carried.

It was decided that the table for exchanging farmers grist be two lbs. less than the Brantford schedule, and that 13 lbs. of offal be allowed.

Moved by J. D. Saunby, seconded by Thos. Syer that the Secretary get 500 cards printed with the tables of buying and exchange, and send them to the millers in the five counties. Carried.

Moved by J. D. Saunby, seconded by Neil McCahill, that until our next meeting, or until the Secretary's bulletin is issued, we base our value of street prices on the daily report of the Detroit markets for No. 2 red as soon as the crop moves faster than the local demand for flour can take it.

Mr. Campbell asked how the members in the small towns were to get the Detroit quotations.

Mr. Wm. Saunby They can get it in the morning papers every day.

It was decided to hold the next meeting at Chatham the second Monday in September.

MILLERS MEET AT WOODSTOCK.

THE recently formed Association of Millers representing the counties of Brant Haldimand, Norfolk, Waterloo and Oxford held its second meeting at Woodstock, Ont., a few days ago. The attendance included the following: David Plewes, Secretary Dominion Millers' Association; Messrs. James Wells and R. Marshall, Plattsville; D. Clark and D. Goldie, Ayr; H. McKnight, Teeterville; W. Snyder, Waterloo; A. Wolverton, Wolverton; J. G. Bechtel, Burford; Robert Shirra, Caledonia; C. Whitlaw, Paris: Geo. Harper, Norwich; Geo. Geddes, Tilsonburg; P. J. Griffin, Mt. Vernon; R. A. Thompson, London: D. Ross, Embro; McDonald, Suitter and Cullen, Woodstock, and Secretary Watts, of Brantford.

After some discussion the following tables for the buying of wheat and exchange of flour, were adopted :

WHEAT BUYING TABLE.

For 64	lb.	pay	4c.	more	than	standard price.
" 63	"		3c.	"	"	" "
" 62	"		2c.	"	"	" "
" 61	"		1c.	"	"	" "
" 60	"		Standard price.			
" 59	"		1c.	less	than	standard price.
" 58	"		2c.	"	"	" "
" 57	"		5c.	"	"	" "
" 56	"		8c.	"	"	" "
" 55	"		12c.	"	"	" "
" 54	"		16c.	"	"	" "
" 53	"		20c.	"	"	" "

Democrat wheat is classed as red.

The standard price of white wheat may be 1 or 2 cents more or less than red according to relative values of white and red wheat.

FLOUR EXCHANGE TABLE.

For 63	lb.	wheat	40	lbs.	straight	roller flour.
62	"		39	"	"	" "
61	"		38	"	"	" "
60	"		38	"	"	" "
59	"		37	"	"	" "
58	"		36	"	"	" "
57	"		34	"	"	" "
56	"		33	"	"	" "
55	"		30	"	"	" "
54	"		28	"	"	" "
53	"		25	"	"	" "

and 12 lbs of offal.

A motion of Messrs. Snyder and Wells in favor of the use of a funnel on grain testers as required by law and pledging the members of the Association to use it, was carried.

From the crop reports given to the meeting by the members, it appeared that the average yield would be about 15 bushels per acre.

Mr. Whitlaw thought the millers ought to do something to introduce some new seed wheat as the present wheat was degenerating. He thought that there might be some obtained off the rock foundation along the Niagara river which would suit our soil and climate. He proposed to send a committee.

Mr. Ross referred to the steps taken by the West Zorra Farmers' Institute but also thought the millers could do something in this respect.

Mr. Plewes warned millers against a brand of wheat called Rogers wheat. It was no good for bread as it had no strength.

On motion of Mr. Whitlaw, Mr. Bechtel, of Burford, was instructed to proceed to Lewiston and Rochester and procure a car load for distribution among the millers of the Association.

Secretary Watts referred to an editorial in a Brantford paper on the price of wheat. There had been a raise of 6d in wheat in England and the paper had therefore argued that the farmer might expect 90 cents for his wheat. But this rise was on the quarter and not on the bushel and therefore the prices could not be so high as 90 cents. He thought the millers ought to use the columns of the press more to inform the farmers of the real state of prices. Wheat is cheaper in the States and they can sell for export where the Canadian millers could not.

Mr. Plewes corroborated Mr. Watts' statements about the rise in prices in England. The rise is on the quarter and not on the bushel. He had received offers from England of 25s 9d to 27s for 290 lbs. This according to the exchange prices now in vogue would mean $2.25 per 100 lbs. The freight amounted to 38 cents, leaving the net price at $1.96 per 100 lbs., that is $3.94 per barrel. He could not fill that at that price but Michigan millers could do so to advantage. Wheat in Liverpool was quoted at 7s 2d for 100 lbs.; this would amount to $1.02½ for 60 lbs. It costs 19 cents to pay freight and insurance from Woodstock leaving 83 cents as the net price. Cost of shipping would be 2 cents, thus giving the farmers a net price of 81 cents. But the question is, will there be any to export? Manitoba will average nine million bushels and Ontario twenty-seven millions, making a total of thirty-six million bushels or about 5¼ million barrels. For seed and consumption about twenty-seven millions will be required at home, leaving 9 millions to be exported. Besides this about 1½ million bushels of wheat in the shape of flour comes into Canada from the United States. The sooner they get rid of nine million bushels the better for them. Wheat shipped from St. Louis costs only 5 cents per bushel more for freight than at Woodstock and if the millers cannot buy at 5 cents above St. Louis prices they can't export.

Several other members spoke on this subject. All appeared to think the Detroit market the best basis on which to work, and a resolution making that a guide was passed

The date of the next meeting was fixed for the first Thursday in September to be held in Galt.

NORTHERN COUNTY MILLERS FORM AN ASSOCIATION.

AN association of the millers of the counties of York, Cardwell, Grey, Simcoe and Muskoka was formed at a large and enthusiastic meeting held at Barrie on August 27th. The meeting was addressed by the Secretay of the Central Association on the subject of the griev-ances under which the millers are laboring.

The election of officers resulted as follows : C. McDonnel, of Collingwood, president; James Spindloe, Cookstown, vice-president, and J. A. Breckenridge, Nottawa, secretary and treasurer.

It was agreed to buy both car wheat and local by tester, and to exchange grists as per a schedule agreed on, and in the meantime to pay four cents per bushel over St. Louis prices for standard wheat. The Association will hold its next meeting at Alliston.

TRADE NOTES.

Messrs. Laidlaw & Co., of Parkdale, Toronto., have just set in operation in the G. T. Railway elevator in Toronto, two of their well known barley cleaning machines. They placed one of these machines in the Company's elevator at Port Hope a year ago, and its satisfactory working led to this second sale.

Among installations now in process of construction by the Ball Electric Light Co., are the following: Lindsay Electric Light Co., 75 arc plant, 1,000 c. p.; Arnprior, Electric Light Co., 75 arc lamp, 1,000 c. p.; Cannington Electric Light Co., 50 arc plant, 1,000 c. p.; St. Marys Electric Light Co., 50 arc plant, 1,000 c. p., and 250 incandescent, 16, 25, 30, and 50 c. p.; Hellmuth Ladies' College, London, 200 incandescent, 16 c. p.; London West Electric Light Co., 25 arc, 3,000 c. p.

Messrs. Hy. S. Thornberry & Co., Electrical Contractors, of 39 King St West, Toronto., are very busy wiring private houses and places of business for electric lighting, electric gas lighting, furnace regulating, etc. They have under construction the electric light wiring in the Canadian Bank of Commerce, The Elm St. Methodist Church and Palmer House. Also residences of D. S Thompson, Queen's Park, John Pugsley, Bloor St., Geo. H. Gooderham, Jarvis St., and others. They have recently completed a system of electric gas lighting of 314 lights in the Broadway Methodist Tabernacle, and are installing 78 lights in old St. Andrew's Church. This firm have recently been appointed contractors for the installation of electric lighting in connection with the new Toronto Incandescent Electric Light Co., (Edison system).

The Dodge Wood Split Pulley Co. report the following recent sales of their Patent Rope Transmissions, all of which can be seen daily in operation: Robt. Gardiner & Son, Montreal; The H. R. Ives Co., Montreal; Ontario Bolt Works, Toronto; Augustus Newell & Co., Toronto; Dartmouth Rope Works, Halifax; A. W. Morris & Bro., Montreal; The Joseph Simpson Co., Toronto; J. T. Huber & Co., Berlin; Warden King & Son, Montreal; J. Brown & Co., Quebec; The Beaudry Estate Co., Montreal; Gananoque Carriage Co., Gananoque; Pillow, Hersey & Co., Montreal; Force & Dickinson, Elmwood; Darling Bros., Montreal; J. Laurie & Bro., Montreal; J. & T. Bell, Montreal; North American Glass Co., Montreal; The Abbatoir Co., Montreal; Canadian Edison Mfg. Co., Sherbrooke; Doty Engine Works, Toronto; Cumberland Railway & Coal Co., Spring Hill, U. S.; Chas. Boeckh & Son, Toronto. They also report large sales of their celebrated wood split belt pulleys, which are rapidly taking the place of iron in all portions of the country.

Our Western Letter.

FOR the past three weeks harvesting has been going on actively, and is now pretty well wound up. The weather has been most favorable, and if the crop of Manitoba does not turn out a very big one, it is going to be the best in regard to quality for many years. There is of course some possibility of damage to grain in stack, from wet weather, but this is not at all probable, as the falls here are usually clear and dry. All that is wanted now is a period of favorable weather for threshing, and the wheat will soon be moving actively. Up to the time of writing the weather has been very fine ever since the harvest commenced, though a little too warm for comfort. The grain ripened up rapidly, and farmers having a large acreage in crop, as many do here, varying from 100 to 1000 acres, had to pile in pretty lively to get their grain cut. It was not an unusual thing, in driving through the country, to hear the rattle of the binders all hours of the night. In this country, many farmers keep the machines going night and day, during harvest, as their fields are broad and harvest time short. The clearness of the atmosphere in this great prairie country enables night work to go on almost as readily as in the day, and all that is wanted is a sufficient number of horses and men to hustle things through. Samples of new wheat are commencing to come in, and they are "daisies" to be sure. Finer grain miller never set eyes on, and consequently there is a broad smile on the faces of our honest western millers. With the wheat they will have to work with this year, they will have no trouble in making flour which will beat the world. The wheat is plump and hard, and as bright and clear in color as amber. Nothing seen so far but will grade from No. 1 hard to extra hard. Most samples are absolutely pure, hard wheat.

Crop prospects have steadily improved right up to the time of writing, and though our wheat crop will not be heavy for Manitoba, yet it will be a good yield for any other part of this continent. The outlook has greatly improved during July and August, and some farmers who considered their crops a total failure on the first of July, report that they will have a good half crop at least, and a half crop in Manitoba is almost equal to a full crop in some parts. To show the way things have gone here this season, I may relate the experience of a Winnipeg man who has a large farm in Southern Manitoba. Some time ago this gentleman reported, after a visit to his farm, that his crops were entirely destroyed by drought and gophers. The only thing he would cut would be a little oats about enough to do his own horses. His wheat, he said, was a total wreck. About the commencement of harvest this man again went out to his farm, and at once wired in to have two extra teams of horses and several men sent out without delay, as he found his crops had improved so much that all the grain would be well worth cutting, and would return a fair yield. This is the situation in most of the districts which have suffered from drought this year.

The crop report of the Manitoba Government, issued toward the latter part of August, sums up the crop situation for the year. Regarding wheat, the report says that in every case where the grain was sown on summer fallow or fall plowed land, the crop is good, but on spring plowing the yield is poor. Grain put in with a drill has proved very much better than broadcast sowing. In some districts the gophers have damaged the grain from 25 to 50 per cent. These little animals, which are a species of ground squirrel, have been very destructive this year as a result of the dry weather. In a wet year they are not nearly so bad, as they stay on the prairie, and away from the grain field, but as soon as the prairie grass gets dry, they attack and cut down the juicy grain. Another reason for the gophers being so bad this year is, that in a wet spring a great many of the young ones die on account of the ground being wet and cold. Returning to the Government crop report, we find that the average yield of wheat for the whole province is placed at 14.8 bushels per acre. In some sections the average yield is as high as 40 bushels per acre, but other sections are very low. The southwestern portion of the province shows the poorest. This is less than one-half the average yield in 1887, in which year wheat returned an average for Manitoba of about 30 bushels per acre. Oats are estimated by the Government report to yield something over 21 bushels per acre, and barley over 18 bushels per acre, or about half the return of 1887. A large amount of new prairie land has been plowed this season, and will be ready for crop next spring. The Government report places the amount of new prairie plowed this year at 135,639 acres. This is by far the largest quantity of new land ever before broken in Manitoba in one season, and it shows that the country is settling up and the farmers are fast increasing their cultivated areas.

If Manitoba returns an average yield of wheat of 14.8 bushels per acre, as intimated by the Government report, the season will not be such a bad one after all, especially considering the fine quality of the grain. Even with this yield, Manitoba still stands away ahead of the United States. In 1882 the great western spring wheat region of the United States returned an average yield of 11.43 bushels per acre. In that year the August crop report of the United States Government placed the condition of spring wheat at 82. This year the August report places the average condition at 81.2, so that the average yield this year will be less than the average yield of 1882. Compare this with over 14 bushels per acre in Manitoba. Taking the Government crop report of 14.8 bushels to the acre, or say 14 bushels per acre, we find that the total wheat crop of Manitoba this year will be 8,725,430 bushels. The total acreage in wheat was placed at 623,245 by an earlier report, issued in June last. About 2,000,000 bushels of this crop will be required at home for food and seed next spring, leaving 6,725,000 for export. There will also be some wheat for export from the territories west of Manitoba, and not included in the previous figures. The amount coming from the Territories will be under 1,000,000 bushels.

In the establishment of new flour mills, very little has been done, owing to the poor crop prospects earlier in the season. However, at least four mills will be added to the milling capacity of the Province. One mill of about 100 barrels has been lately completed at Gretna, Man., and the machinery is being put in. In the northwestern part of the province, a 60 barrel mill is being built at Russell, and another mill at Birtle. The latter mill is a second-hand one, moved up here from Ontario. The fourth mill is at Boissevain, in Southern Manitoba.

Elevator building is going on briskly at present, as grain men are rushing the work to be ready for the new wheat. This is going to be a big year for elevator building in Manitoba, which shows that the grain men have every faith in the country. Fully twenty or twenty-five new elevators will be erected this year, a great many of which will be on new lines of railway built this summer. The Martin Elevator Company, formed for the purpose of building elevators on the new railways built in the province by the Northern Pacific & Manitoba Co., will build nine elevators in all this year. These elevators will be on the most improved pattern, and will have a capacity of 30,000 to 40,000 bushels each. They will cost on an average about $6,000 each. The company has a capital of $200,000, and will continue to build elevators as fast as eligible points are found. Next comes the Keewatin Milling Co., with five elevators. These will be located one each at Carman, Gretna, Plum Coulee, Deloraine. A number of other grain men are establishing additional elevators. A. C. Smith will build one at Rosebank, W. Clougher will replace his elevator at Otterburn, recently burned, with a new building. Roblin & Atkinson will build at Carman, M. A. Russell & Co. at Norris, The Manitoba Milling & Brewing Co. at Carberry, and so on all over the country new elevators are going up. This is not so bad for a short crop year, and shows that the country is going ahead, in spite of all drawbacks.

MIXTURES FOR BRASS CASTINGS.

AN English paper gives the following as the proportions of the different metals used for brass casting in a prominent English locomotive works.

Brass for side rods—Six pounds of copper and one pound of tin; to 100 pounds of this mixture add one-half pound of zinc and one-half pound of lead.

Brasses for driving boxes—The same as for side rod brasses.

Some master mechanics prefer harder brasses, and call for five pounds of copper and one pound of tin, one-half pound of zinc and one-half pound of lead.

Bells—four pounds of copper and one pound of tin; to every 100 pounds of this mixture add one-half pound of zinc and one-half pound of lead.

Castings subjected to steam pressure—Twenty pounds of copper, one and one-half pounds of tin, one pound of lead, and one pound of zinc.

Pumps and pump chambers—Eight pounds of copper and one pound of tin; to every 100 pounds of this mixture add one and one-half pounds of lead and one and one-half pounds of zinc.

Piston packing rings—Sixteen pounds of copper, two and one quarter pounds of tin; to every 100 pounds of this mixture add one pound of zinc and one pound of lead.

USEFUL INFORMATION

CEMENTING IRON. The following mixture has been used, says a contemporary, with the greatest possible success for the cementing of iron railing tops, iron gratings to stoves, etc.; in fact, wherever such effect as to resist the blows of a sledge hammer. This mixture is composed of equal parts of sulphur and white lead, with about one-sixth proportion of borax, the three being thoroughly incorporated together, so as to form one homogeneous mass. When the application is to be made of this composition, it is wet with strong sulphuric acid, and a thin layer of it is placed between the two pieces of iron, these being at once pressed together. In two days it will be perfectly dry, all traces of the cement having vanished, and the work having every appearance of welding.

Insurance men have been formulating points for inspectors, and in wood-working risks they have set forth the following in connection with certain establishments. 1. Carriage and waggon factories—exposures important; watch moral hazard; possibility of much carelessness and many accidental fires. 2. Cooperage establishments—moral hazard considerable; sparks and defective flues and kilns common fire causes. 3. Furniture and Upholstery factories—chief dangers are from spontaneous combustion; moral hazard important, carelessness and accidents in many forms. 4. Furniture and undertakers' stores—exposure very important; moral hazard considerable; danger from spontaneous combustion. 5. Lumber yards—exposures important moral hazard high, flying sparks chief inherent hazard. 6. Paper and pulp mills—moral hazard moderate; chief inherent hazards are spontaneous combustion, friction in machinery, engines and boilers. 7. Paint, varnish and oil stores—exposures important; chief dangers are spontaneous combustion, matches, stoves and ignitions and explosions of oil. 8. Planing and molding mills—moral hazard somewhat above the average; sparks, engines and boilers, friction in machinery and furnaces are dangerous. 9. Saw-mills—moral hazard above the average; sparks and engines and boilers are very dangerous.

Thomas Marshall, for many years a manufacturer in Pittsburgh, Pa., has advanced this theory to account for many of the mysterious boiler explosions, which have been of frequent occurrence lately: "Some years ago a tub of cold water was standing in my foundry, and something prompted me to pick up a ladle of molten metal and pour it into the receptacle mentioned. Some of my employees, who were standing near by thought me crazy and tried to prevent my contemplated action. They reasoned that even children knew that such a proceeding meant an explosion. I answered them: 'That would be the result with a tiny pool of water on the floor, but I do not believe it will occur under these circumstances.' My audience disappeared, and the next moment I poured the glowing, melted iron into the tub. The effect was harmless, yet startling to my mind. There was no explosion, but instantly a powerful jet of flame shot upward 15 feet in height from beneath the surface of the water. It resembled in force, noise and every other particular the natural gas flame of to-day. I then and since then have bent my reasoning to the cause of that effect. I have reached a partial conclusion. Of this I am convinced. The sudden collision of the molten substance immediately decomposed the water, and it immediately resolved itself into its hydrogen and oxygen, which, encountering the air, became a magazine of incalculable power, a double powerful dynamic agent. I certainly apply this theory of mine to boiler explosions in general. I know there are many persons who believe there is a force, yet undiscovered, which pervades this havoc. I know there is such a force, but cannot say what it is. That it is possible to identify its origin I believe, and I am persuaded its solution is only a question of time."

La Lumiere Electrique reports that M. Firmin Larroque is carrying out a systematic investigation to determine the deterioration of copper by the long-continued action of electric currents, and his experiments have already been four years in progress. M. Larroque has examined some wire taken from a lighthouse, which had been in use over twenty-years. He found its surface was pulverulent; it was easily broken by a hammer, and its texture was granular; in fact it presented many of the properties of ordinary electrolytically-deposited copper. In another case in some wire taken from a secondary of a Ruhmkorff coil, and which had therefore been subjected to alternating currents, the deterioration was even more marked. The coil could not be unwound without repeated fracture, and its resistance had increased by no less than 30 per cent. In this case, also, the texture resembled that of electrolytic copper. M. Larroque's experiments are being conducted in the following manner. He has taken thirty-six strips of copper each ten millimeters in width and three millimeters in thickness (the length is not given). One half are beat into spirals and the other half into zigzags, and some are annealed and some hard-drawn. They are suspended from a frame, and kept stretched by weights of 10 grams attached to the lower ends. Each strip is traversed by a current varying from 5 amperes to 2 amperes, which has been maintained constant since the commencement of the experiment. The current is alternating (at the rate of 75 reversals per second) in one set, and continuous in another. From time to time an exact measurement of the elongation of the spiral is obtained, and this is taken as a measurement of the loss of elasticity of the metal. For the first eight or nine months no effect was observed, but after that a slow elongation became manifest. The amount of elongation in the different specimens increased with the current, and was more marked with the alternating than with the continuous currents.

Mr. Kenneth Chisholm, M. P. P., mill owner, of Brampton, Ont., has made an assignment. Mr. Chisholm was also engaged in several other business ventures, and the assumption is that he had "too many irons in the fire."

THE PERFECT ARC CENTRAL STATION.*

By M. D. Law.

It has usually been more the rule than the exception that electric light central stations have been located in almost any place that could be had; some old shell of a building would be rented that would have nothing to recommend it except that it was cheap.

In [illegible] the first station for central lighting purposes was started in San Francisco in a blacksmith's shop, using an old, worn out, portable engine and boiler. The force consisted of one man, who was superintendent, dynamo man, engineer, fireman, trimmer, janitor and lineman, but the price received for the lights would warm the hearts of the electric light companies of to day, they were dollars per week per lamp, and burned from dusk to daylight except Sundays. And when I look back to that time [illegible] are lamps on one wire, with ground return, I am surprised that there were so few troubles in the shape of grounds and crosses. Not only was a ground return used, but inside wiring was thought good enough when put up without any insulation, stapled with wire staples.

There are a great many places even now where bare wires are stapled, showing the absolute need of good, competent, fearless inspectors, who will examine every inch of wire in a building, and be afraid to condemn it if it does not come up to the requirements of safety. Then, again, all inside wiring should be inspected at least once a month.

The lighting station should be located as near the center of the territory to be lighted as possible, but if sufficient ground cannot be obtained at a reasonable cost, then it is better to go a little outside rather than be crowded for room; for when an electric lighting station is cramped for room it cannot be handled economically, as one of the great successes of central station work lies not only in the simple running of the machinery well, but also in the ability to overcome the shape of break-downs, which are liable to occur in the best regulated station, there should be sufficient room to move the machinery, without taking too much time. In all cases time is money, for the amount of money allowed in insurance is only a small fraction of the loss as the reputation of [illegible] ing the lights out is worth much more than their mere cost. For electric lights are not a success until they can be depended on in business houses and halls, having no other method of illumination, without danger of their being suddenly left in dark [illegible] either have the machinery and lines in such shape that the lights can be depended upon at all times. This may take a little more money for the construction of the plant but it will be more than made up in the commercial value of the lights.

The electric lighting station should be built of brick or stone, in a substantial manner, not more than two stories high, and as near fire proof as possible. One of the important factors of [illegible] station is good ventilation, it being necessary to keep engines and dynamos as cool as possible. This not only adds to their life, but their over-heating is a great element of danger to the success of the lights.

Boilers and Boilers. The boiler room should be located on the ground floor, with plenty of ventilation, making the fireroom cool and comfortable. Everything being in full view and reach, can be kept clean and in order.

In constructing an electric light station, the dynamos and engines generally placed first, and what room is left the boilers are run into, without much regard to their economical location.

It is better to have a comfortable fire-room, as the boilers will then remain by the boilers, doing justice to their cost, than having boilers in cellars, cramped, or poorly lighted and ventilated places, makes the men careless and also detracts from the life of the boilers by corrosion and improper cleaning, and that two-thirds of the steam which is generated in a boiler is made on the shell, and not in the boiler tubes, as is generally supposed. In taking the heating surface of boiler tubes, we generally take one-half of the circumference, as the flame only touches the upper half of the tubes. With proper setting, flame can be carried the full length of a 30 foot boiler, with ordinary natural draught, using secondary combustion. Automatic stokers should never be used; by their use it is impossible to get proper combustion, as they are either opened or closed, besides the tendency to make firemen careless. An ordinary fire [illegible] hand dampers, can fire with not over two pounds variation of steam in a run of twelve hours. When the boilers are worked within three or five pounds of their utmost capacity, the dampers are kept partly open, and as the steam varies the draft is changed to right, therefore always allowing of combustion.

For one thousand light station there should be twelve single tubular boilers, 48 inches in diameter and 20 feet long, with [illegible] 5 inch tubes, the shell to be made of three-eighths best iron, having a tensile strength of 10,000 pounds and [illegible] electricity in 8 inches.

The riveted longitudinal seams and first-class workmanship [illegible] a safe working pressure of 130 pounds per square inch, which gave 1,325 horse power. With the Corliss type of engine using 110 pounds per square inch, there would therefore be two boilers, which could be held in reserve, that being none [illegible] for safety, and the other nine boilers can be worked [illegible] as rapid combustion is the most economical.

Engines.—Electric lighting is one of the hardest kinds of work for an engine, the continuous running and the work being put on and off instantaneously, causing immense strain.

There should be two engines, connected at right angles, by which to have steadier power than with single engines, because there is the impulse of the steam at every quarter of a revolution. They should be built specially and have a larger amount of iron in their parts than is used in an ordinary commercial engine, so in cases of trouble they can be forced for a short time beyond the necessary load.

For one thousand light station there should be two 23 x 48 inch engines, running at a speed of from seventy to eighty revolutions. With this number and size of an engine there will be a reserve of *one* engine, as the three engines will easily carry the load of one thousand lights with economy.

It is a settled fact that the Corliss type of non-condensing engines, *properly constructed and handled*, are the most economical, using less than two and a half pounds of coal per horse power, working at 110 to 115 pounds of steam per square inch. High rotative speed is *not necessary for* electric lighting, but it does require a steady and uniform speed. An engine running forty revolutions per minute, provided the speed is regular, will make as good lights as one running three hundred revolutions.

It has been practically demonstrated in a great number of plants, which have used the small, high rotative speed engines, that such is the fact, the low speed using less coal, oil and attention, while the cost of repairs is very much less, as well as loss of steam from radiation, clearances, etc., than high speed engines. On a pair of Corliss engines 23 x 48 inches, at 75 revolutions per minute, running day and night for nearly seven years, the actual cost for repairs was but $25, and during that time they were shut down but once on account of breakage, and then only ten minutes to disconnect *one engine*, the other being run with the load of both at increased steam pressure.

Shafting. The friction of a high rotative speed engine and a 60 light dynamo is 6 indicated horse power, while the friction of one pair of engines, shafting, 22 empty dynamos, 11 idlers, and 22 Hill clutch pulleys, 5 feet in diameter and 12 inch face, is but 72 indicated horse power, both running up to speed. The only argument against large engines is that in case of breakage it stops the whole plant, whereas in a series of small engines, connected direct, it will stop but *one* dynamo.

In all cases shafting should be made of hammered iron and for a 1,000 light station the main line should be 75 feet long and 6 inches *in diameter*, and about 55 feet of counter shaft, commencing at 5 inches diameter and reducing one-half an inch for every two machines, to be located on the ground floor, with pedestals as low as possible, and bearings of cast iron, not less than four to one. The main bearings ought to be of phosphor bronze, and the shafting run not less than 300 revolutions per minute. The expense of oil, on such a shaft, with proper appliances, will not be more than $3 per year.

The driven pulleys from the engines should be on the two ends of the main line of the shaft, with a clutch cut-off between one engine and the first dynamo pulley, one between the last dynamo and counter pulley, and one between the counter pulley and the other engine with a clutch on the counter-pulley. This will give perfect control on the main shaft and countershaft, and can either run one or both engines, as the load may require.

Dynamos.—The dynamo room should be directly over the shaft lines so as to use angle belts. The light should be good, and the ventilation perfect. The roof should be supported without posts and of sufficient height so that the dynamos or armatures can be hoisted and carried over the ones that are running. Insufficient room overhead is a great drawback to the successful handling of electric light machinery.

The dynamos should be small and mounted on cast iron beds, left entirely open to allow perfect cleaning, as the life of dynamos depends very much upon their cleanliness. They should be placed in rows, with sufficient space between them to allow easy access to all of their parts, as well as their sample room, that they may be moved from one part of the room to another without disturbing those that are running.

If the roof cannot be made sufficiently strong to support the combined weight of dynamo and armature on a track, then a good substitute is a frame supported on large casters, with a track over the top, having on it a chain-geared trolley and a chain hoist. This will allow of the rapid lifting of the dynamo, its moving to some other place, rolling the hoisting frame to that place, and putting the dynamo in proper position for running. With this arrangement a 3 ton machine may be moved and put in running order in 30 minutes, requiring but four men; with a little longer time two men will do the same work.

A cupola should be provided, not smaller than 10 x 30 feet, and 10 feet high, with window ventilators extending the full length of the two sides, and so arranged as to be under the full control of the machine man. With such a cupola, one is enabled to put the lines in good shape, as well as to carry off a large amount of heat. The wires should run to the switch-board from leading posts placed through the center of the cupola, and all crossing of lines should be made at this point.

Switch-Board.—The switch-board should be placed in the middle of one side of the dynamo room, and 4 feet from the wall, and should be at least 25 feet long, which will give room for 30 circuits. As it is impossible to keep all circuits built up to the full capacity of the machine, it is well to have a number of small circuits to couple in, in order to build up to the full machine capacity, as all dynamos work more economically with a full load.

The line wires should come into spring jacks, which are arranged in two rows, with one side of the circuit on top and the other below, with 8 inches of space between them, so that there is no possible danger of a person being liable to touch or short circuit two of them. Before attaching to the spring jack, one side of the circuit should pass through an indicator for showing the direction of the current. The wires from the dynamos should run beneath the floor, coming up on the back of the switch board, and enter binding posts, to which a flexible cable should be attached, having a wooden-handled plug for entering the spring jack; these cables should be of sufficient length to reach either end of the switch-board. The spring jacks and binding posts of the machine cable should be so arranged that a connection cable can be hooked on for the purpose of moving the machine cable from one circuit to another, to cut out or cut in circuits, without extinguishing the lights already burning. The positive wire coming from the dynamo should pass through an ammeter before entering its binding posts.

A good arrangement for making ground tests and locating grounds while lights are burning is a set of thirty 50 volt incandescent lamps in series, so arranged with a circular switch that any number may be short-circuited at will. With one side of this lamp circuit connected to ground and the other side connected to the line to be tested, a ground on the line will show by one or more of the lamps burning.

I find that with one lamp burning, on say, the positive side of the test circuit, with an electromotive force of 92 volts, the ground may be looked for between the second and third arc lamp on that side of the circuit, in fact, each 92 volt lamp will represent two arc lamps or their equivalent in line wire resistance. This is a simple and handy method of locating grounds, especially if the positive and negative side of the circuit are much separated, for it starts one out the right end of the wire, which is rarely the case, without any reliable method of testing. When two grounds occur at night, cutting out a number of lights, it is necessary to be able to start out with some knowledge of its locality, especially if such a circuit is from 12 to 15 miles long, and starting out from one point of the compass, and returning by another.

If there is an indication that the full number of arc lamps are not burning on a circuit, by attaching one side of this test to the positive and the other to the negative spring jack of the circuit in doubt, it will show within one or two lamps of the number that are burning.

Ammeters, lightning arresters, indicators and all connections should be placed on the switch-board.

Lines. Lines in all cases should be supported on glass or porcelain throughout their whole length, and should never enter a building without passing through hard rubber tubing with water drips on the outside. In all cases, inside wires should be run on glass or porcelain insulators; mouldings or cleats should never be used for arc light wires, and in no case should they be put under floors or out of sight.

All arc lamps should be hung on porcelain insulators, and in the case of outside lamps all iron should be galvanized to prevent the rust from collecting on the insulators, which gives a first class ground, if the fixture connects to tin gutters or iron work.

All lines should be tested for grounds at least three times during the day, and once every hour while the lights are burning, as soon as a ground occurs it should be immediately found and cleared.

Store Room. The store room should be of good size and provided with cupboards, drawers and shelves, that a full line of all supplies can be kept on hand and issued only on requisitions from foreman construction gang. When a job is completed a return should be made of the material returned and the charge entered in the proper books.

A carbon book should be kept in which each trimmer signs a receipt for the carbon issued each day, as the trimmer reports each day the number of carbons used on his route. The stumps returned must accord with the report at the end of the week, he must account for the number of carbons on hand or pay for them. The trimmer will only pay for one lot of lost or broken carbons, as he finds it easier to take care of carbons than buy them.

Shop. The shop should be of good size and provided with at least one 12 inch lathe, drill press and buffing wheel, with sufficient small tools for all kinds of repairing and the manufacturing of switches, fixtures, insulators, and all the thousand-and-one articles that come up for use in such a station.

The test rack should be located in the shop and be large enough to hold at least four lamps, each lamp to be provided with an adjustable lens for focusing the arc of a lamp on a screen; this affords a good opportunity of closely watching the arc without injury to the eyes, and has a capacity of from seven to ten lamps per day.

*Before the National Electric Light Association.

CANADIAN RAILROAD COMPETITION IN THE UNITED STATES.

THE United States Senate Committee on Inter-State Commerce have lately been holding session in Boston. Alden Spear, president of the Chamber of Commerce in that city, drew up a statement to the Committee. It includes resolutions passed by the Boston Executive Business Men's Associations deprecating any interference with the competition of Canadian roads with the New York lines. Mr. Spear gave figures to support this position, and detailed the efforts of various trade organizations for relief from the unfair discrimination of the laws against Boston and in favor of New York before the interference of Canadian laws. After this appeal, he said, the matter began to assume a different aspect and the American roads became a little more accommodating. If Canadian competition were eliminated New England trade would suffer. If the Canadian roads could be placed under the regulations of the Inter-State law it would be agreeable to New England. New England, however, was satisfied with the present condition of things and would like to be let alone.

President H. B. Goodwin of the Boston Executive Business Men's Association detailed Boston's disadvantages as compared with New York, and said these disadvantages would be increased should Canadian competition be withdrawn. Forty per cent. of the grain coming to New England comes by Canadian roads in winter. In summer the proportion is larger. The Grand Trunk was the pioneer in giving accommodations to the produce traffic, and the American roads were forced to fall into line. The Inter-State Commerce law affects New England adversely, because all its traffic is Inter-State, while New York has one line entirely within its borders. After the passage of the Inter-State law, through rates were taken from a large number of New England points. The Canadian traffic tended to equalize the effect this had. The trunk lines had seemed to consider New England a ground for preying upon. Witness favored the repeal of the Inter-State law rather than extension of its provisions to Canadian lines.

A CORRECTION.

Editor ELECTRICAL, MECHANICAL AND MILLING NEWS.

DEAR SIR, In your report of the Millers' Convention, you close by saying I "charged that the Board of Trade quotations were 'cooked' for the purpose of the Toronto members, but Mr. H. N. Baird scouted this idea and drew an apology from Mr. Watts." I asserted that the quotations printed by the Toronto daily papers for flour, wheat, etc., were often too high for weeks at a time, as many small millers who trusted to them found out to their cost; as when stuff reached Toronto it would not fetch nearly the prices reported as having been offered at the Board of Trade for it. This was confirmed by Mr. Spink, of Toronto, who said, as reported by the Toronto Evening *Telegram*, July 10th, "Mr. Spink explained that if a member of the Toronto Board of trade knew there was no wheat or flour of a certain kind in Toronto, he could bid the price up as high as he liked This had been done, and it was in this way that over values were reported. H. N. Baird.

'Yes, and it is a miller who generally does that.'"

From the above you will see there was no need of my apologizing. As I stated the facts for the benefit of my brother millers who had been misled, and knew they were true, I did not think it worth while to correct the misstatement in the great Toronto dailies, but think that the MILLING NEWS should report things as they are, even if not pleasant to the ears of Torontonians.

Yours truly,

CHAS. B. WATTS.

Brantford.

A WORD TO MILLERS.

TORONTO, Aug. 26, 1889.

Editor ELECTRICAL, MECHANICAL AND MILLING NEWS.

SIR, There is a small class of men in every trade who are never so happy as when engaged in annoying their competitors. They are veritable "dogs in the manger." They do not care to make a living themselves, nor let others do so. This fact has been exemplified recently in several cases at the millers' meetings throughout the country, and particularly so at Woodstock and London. A firm of grain dealers who have their headquarters at London, but who have a buyer at Woodstock also, have come to the conclusion that they can drive the whole milling fraternity of this province into the same reckless style of buying that made last year such a disastrous one for the trade. In a conversation with an officer of the Association, one of the members of this firm said: "The millers are a lot of d——d fools, and we made money out of them last year, and they are the same lot of d——d fools yet," and he supplemented this statement by a laugh at his anticipated triumph. The same party has been in the habit of bluffing all the millers at the points where they come into competition, and afterwards selling them his wheat at an advance. Now let me say to the millers who are bothered by such men, you need not fear them in the least; just bid as high for your wheat as you dare go with safety, and let them have it if they go higher. Let them fill their storehouses, where the wheat will stay, or they will have to sell at loss. The banks will not give these men accommodation when they find that they are doing such an unsafe style of business. I would strongly recommend every miller to see his banker and have a talk with him about this matter. You will be surprised how much he can and will help you. Place your case fairly before him, and as a common sense business man he will understand it, and act accordingly.

There is one saving clause in the constitution of these "dog in the manger" buyers which you can get at every time. A mean man hates to lose a cent. They may bluff and talk; it costs them nothing; but they will not fight if it means lost money to themselves. Some may say, "But we want the wheat." Very well! Send to your neighbor, explaining the circumstances, and borrow or buy a car or two; pay freight rather than spoil your own market for yourself. Above all things, keep the Secretary of the Association notified of what occurs in these cases. He can help you and keep you posted on all points of advantage, and more than that he will do it willingly. That is precisely what he is there for, and you may depend upon him. If you receive the bulletin and your neighbors on the same market do not, you will soon find that they will wait for you to "make" the price, and trouble will cease. Remember always that the Association does not bind any member to buy at any fixed price, but leaves it to his common sense whether he will give more than the grain is worth.

All wheat should be bought or exchanged by tester. If the millers of Ontario only knew how they have been literally robbing themselves and the farmers too, they would not continue the present system of purchase or exchange for another day. It seems strange that the only equitable system known should not have been adopted many years ago, since it has been in vogue in England for an indefinite period.

Under the present system, the millers have been giving the farmer with wheat weighing 55 or 56 lbs. to the bushel just as much money or flour for it as they gave his neighbor for 63 or 64 lb. wheat. In many well authenticated cases the grist miller has been grinding for the dirt not the offal simply the dirt.

It is to be regretted that some of the millers do not attend the local meetings in their own districts. Now the experience of the past two months goes to show that one of the most desirable results is the total destruction of the petty jealousies that have played such havoc with the trade. Millers have just about come to the conclusion that a common love for their business should be a common ground for confraternity, and it is a feeling that should be encouraged, and one which will certainly lead to success in our efforts to promote the welfare of the whole trade. He would be a poor observer indeed, who could not get anything out of the interchange of ideas at a millers' meeting. I may state right here, that I never attended one, however small, that I did not get more than full value for my railway fare and expenses, and there is no reason why every miller should not do likewise. The best plan to adopt is to go with a definite idea of finding out something, and if you are not afraid to ask questions, you will be sure to find some one who can answer them, and you will no doubt also have the satisfaction of adding something to the general fund of trade knowledge.

Yours truly,

JOHN BROWN.

M. W. Bateman miller, Sheffac, N. B. is dead.

A new grist mill is being built at West Craig, Ont.

J. A. D. Clark, millers, Ayr, Ont., have dissolved.

Flour has again dropped ten cents a bag in Winnipeg.

Proctor & Foote, millers, Smith's Falls, have dissolved.

The stone grist mill at Pilot Mound, Man., is advertised for sale by legal process.

Messrs Fox Bros., of Lucan, Ont., are changing their grist mill to the roller process.

An effort is being made to have the grist mill at Emerson, Man., put in operation again.

Mrs Bedell's new mill at Eganville, Ont., will be ready for business about Sept. 1st.

The amount of grain being locked through the Cornwall canal is said to be exceptionally large.

Mr T. Syer of Bannesville, Ont., is having his grist mill thoroughly overhauled and repaired.

The failure is announced of Mr. Geo. Marks, mill owner and general storekeeper at Bruce mines, Ont.

The contract has been let for the erection of eight elevators along the Northern Pacific and Manitoba road.

The Indian department has given $1,500 towards the erection of a grist mill at St. Albert, in Northern Alberta.

Jermyn's mill at Minnedosa in the Northwest has been closed down for a short time to undergo necessary repairs.

W. Coughlet, of Winnipeg, will build an elevator at Otterburn, Man., at once to replace the one burned last week.

Hewitt Bros saw mill in Galt, Ont., is being torn down to make way for improvements in the adjoining flour mill.

The necessary amount of money has been subscribed for the erection of another grain warehouse at Binscarth, Man.

J. L. Spink has added steam power to the Spink mills at Pickering, Ont., making this one of the finest mills in Canada.

The mills belonging to the Ogilvie Company and Messrs. Brown & Rutherford at Winnipeg, have been closed down for repairs.

Messrs. Hastings Bros. & McCraw, who recently took charge of the Large mill at Keewatin, are said to be doing a good business.

Messrs. Stickney & Lipsey of Elora, Ont., are going to put up an oatmeal mill, which they expect to have in operation in a short time.

The North Dakota Millers Association has decided to place an agent in London to dispose of their direct to the bakers of Great Britain.

Mr. P. McRae has sold his flouring mill at Renfrew to a syndicate consisting of Messrs. W. Greer, W. A. MacRae and Robert Logan.

An elevator will be built at Rosebank, Man., by Mr. A. C. Smith. The Northern Pacific has promised to furnish cars at present.

Brantford millers have been put to serious loss and annoyance by the action of the Water Commissioners in closing the Upper Canal without giving the millowners notice of their intention to do so. The latter should have good grounds upon which to base actions for damages.

Mr. A. Moore, of the milling firm of McLaughlin & Moore Toronto, has just returned from an extended visit to the Northwest and British Columbia.

Wm. Orr's grist mill at Mount Forest, Ont., was burned on Aug. 5, with a large quantity of customers' grain, etc. It was insured for $3,500 in the Western.

It has been decided that Manitoba wheat shall be allowed to go in storage at Duluth, without being inspected, graded or weighed, as is the custom there with native wheat.

Mr. R. B. Williamson, of Port Hope, who owns property and a valuable water power near Rapid City, Man., is said to be thinking of erecting thereon a roller flour mill.

Mr. A McDonell, of Lindsay, Ont., is building a new grain warehouse on the site of the one destroyed by fire a few years ago. It will be very large and an elevator will be added next year.

Mr. P. O. Pilkie, late foreman for Messrs Dundas and Havelle Bros., Lindsay, Ont., has built a fine grain warehouse at Realoro, Ont., and will engage in the buying of grain and produce there.

Mr Wm. Martin is erecting a 35,000 bushel elevator at Morris, Man. Messrs. M. A. Russel & Co. are also building a large elevator there, and the Ogilvie Milling Company are having theirs overhauled.

The Winnipeg grain exchange has been put on the list of corresponding exchanges by the Chicago board and again receives full market quotations daily from Chicago, Minneapolis, Duluth, New York and Europe.

Smith & Bingham, of Moosomin, have purchased the large mill building at Fort Ellice, Man., and are removing the timber and lumber to Moosomin, with which they purpose to erect a building to increase their storage capacity.

The Keewatin Milling Co. will build several elevators throughout Manitoba. One at Carman, one at Plum Coulee, one at Gretna and two at other points not yet decided upon. Messrs. Roblin & Atkinson will also build an elevator at Carman.

Crop reports received from all parts of Ontario and a few points in western Quebec show that fall wheat will be more than an average crop, spring wheat, barley and oats an average one, peas slightly below the average, roots, average, and fruits almost a failure.

A by-law is to be submitted on the 12th of September to the ratepayers of Bayfield, Ont., to raise the sum of $5,000. Of this amount $2,000 is to be granted to Mr. John Kalbfleisch, on condition that he move his planing and saw mills to that village, and $3,000 to be loaned to him for ten years without interest, to erect a steam roller grist mill having a capacity of not less than 50 barrels per day.

The Empire and Phoenix flour mills both owned by Sylvester Neelon were totally destroyed by fire at St. Catharines, on Aug. 23. The Empire mill was one of the finest and largest mills in the country, and was erected in 1882 at a cost of nearly $100,000. The total loss on the property and to the business will probably reach nearly $200,000. The stone mill was insured for $25,000, and the other property for $30,000.

The Millers' Association of the counties of Huron, Perth, Grey, Bruce, and North Wellington held its fourth annual meeting at Listowel on August 23th. There was a good attendance, thirty mills being represented. The following officers were elected:—President, H. Reilly, Blythe. Vice President, James Stark, Paisley. Secretary, John W. Meyer, Listowel. Mr. David Plewes, Secretary of the Dominion Millers' Association, addressed the meeting. The Brantford wheat-buying table was adopted, as was also a resolution to buy wheat from farmers and dealers by test. The present prices for new crop wheat are to be governed in the meantime by Detroit No. 2 red winter.

The Eastern millers met at Brockville on the 20th Aug., and formed a local association. The counties of Leeds, Grenville, Lanark, Dundas and Glengarry were well represented. Among others present were Alex. Woods, Smith's Falls; D. Eager, Winchester, Wm. Brodie, River Beaudette, J. H. Wylie, Almonte; J. A. Cox, Almonte, James Cumming, Lyn; P. R. McDonald, Oxford Mills, Herman Easton, Merrickville, R. E. Gilson, Morrisburg, T. Ayres, North Augusta, C. H. Tate, Merrickville, D. R. Lockerbie, Spencerville. M. F. Beach, of Iroquois, was elected President, and J. M. Brown, of Carleton Place, Secretary-Treasurer. Mr. D. Plewes, Secretary of the Dominion Millers' Association, gave an address on the difficulties caused by the present flour and wheat duties. It was resolved to make an unanimous effort to induce the readjustment of the tariff. The Association will meet at Smith's Falls on the 17th September.

The large saw mill recently erected by J. & T. Coulter, on Parmachene, in Gloucester Bay, is cutting 100,000 feet of lumber a day, giving employment to 100 men.

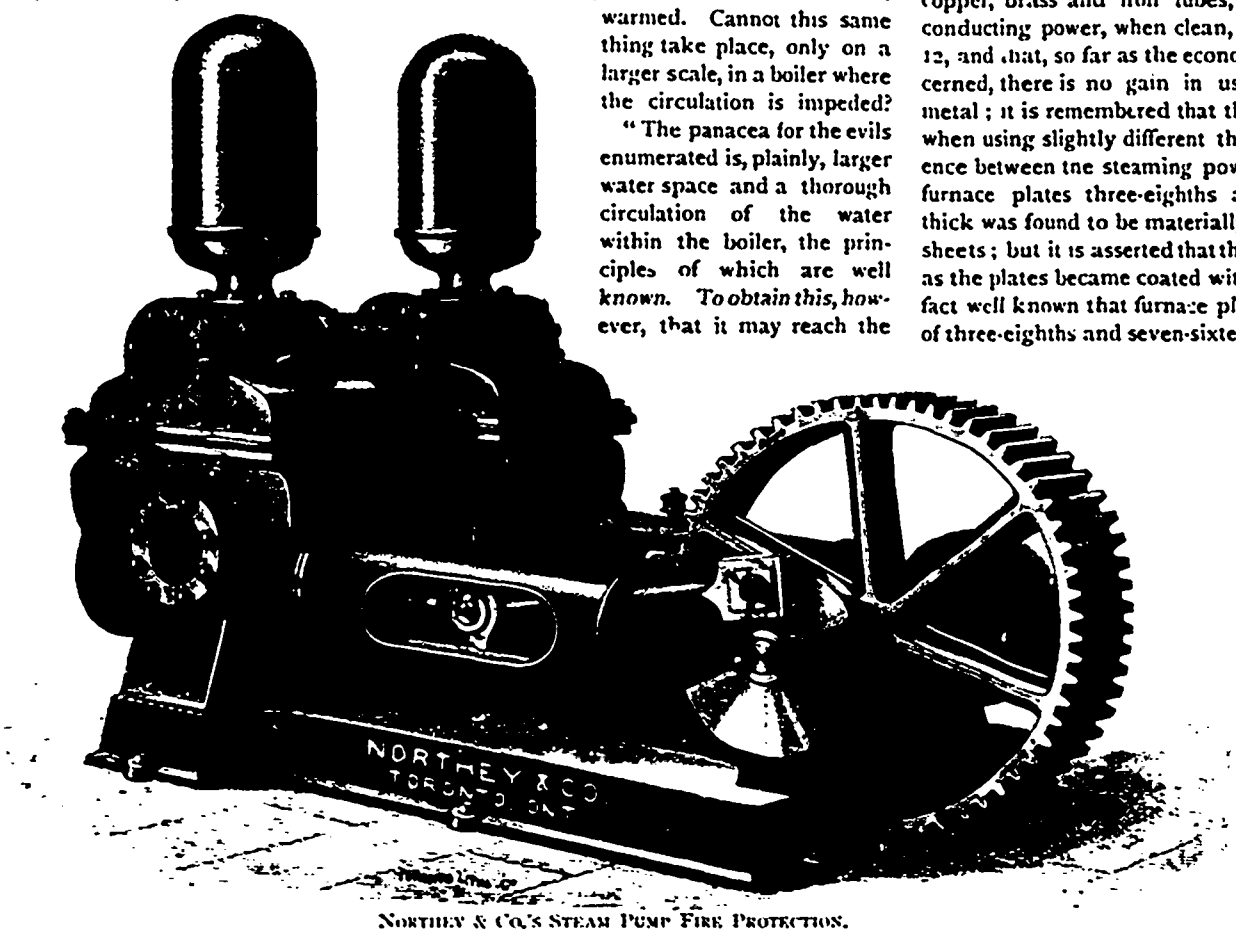
While working in his saw mill at Dummer, on July 9th, Mr. Wentworth Richardson, of Norwood, Ont., was struck by a breaking wheel. His collar bone was broken, his head nearly scalped, besides a flesh wound in the side.

J. T. Fanning, engineer of the St. Anthony Water Power Co Minneapolis, who recently examined the Assiniboine river at Winnipeg Man., to ascertain the feasibility of improving its power, estimates the stream to be capable of producing 6,985 h. p. with an ordinary summer flow of water, for use 24 hours per day. By constructing canals to lakes Winnipeg and Winnipegoosis, he thinks that a steady power of 10,000 h. p. could be obtained the year round. This is greater than the power derived from the Merrimac river either at Manchester, Lowell or Lawrence in New England. The cost of a canal and dam 1,500 and 600 feet long respectively together with all necessary appurtenances, is placed $300,000. As to revenue from the power, Mr. Fanning figures that the rentals on 2,500 h. p. at $10 per h. p. per annum would make a return on the investment of 5 per cent., 5,000 h. p. at $11, 12 per cent., 7,500 h. p. at $12, 18 per cent.; 10,000 h. p. at $13, 30 per cent. He considers the location well adapted for flour manufacturing, both as to sites for mills and facilities for producing the wheat, and thinks that Winnipeg ought to grind the wheat raised in Manitoba.

STEAM PUMPS.

WE show on this page an illustration of a steam pump, a machine used for a vast variety of purposes, but which has of late years come largely into use for the protection of mills, factories and manufacturing establishments of all descriptions against fire. In fact a good fire pump is now looked upon by all far-seeing mill and factory owners, as a most necessary, if not absolutely indispensable, portion of their plant. We need not point out the great advantages accruing from the possession of such a pump, but may say, that in addition to the advantages readily apparent it is a source of direct economy, from the fact that it lowers insurance rates considerably, always enough to pay a good percentage on the outlay incurred, and, in many cases, the pump pays for itself in a short time from this source. Again, the authorities of many villages and towns in which factories and mills are situated will pay a good price for the privilege of connecting fire mains to the pump, thus protecting their property for a nominal sum, and paying the manufacturer a fair premium for his enterprise.

We have illustrated the production of a Canadian firm, Messrs. Northey & Co., of Toronto, Ont., who furnish us the following information which may prove of interest: The most approved method of setting up these fire pumps, is to place them in a small building isolated from the main factory or mill, as by this means all danger of the pump being cut off by the flames is obviated—a very important consideration. Many large manufacturers who are alive to the great importance of fire protection put up a special pump and boiler house, and in numerous cases have been amply repaid for their prudent course. The majority, of course, do not care to go to the expense of a separate building, but, more particularly in saw mills, place the pump in their engine room and use it in the double capacity of fire pump and boiler feed. This plan is very popular and will commend itself to most mill men. People are apt to think that the purchase of a fire pump necessitates a great outlay, but we are assured that this impression is erroneous, a large and costly pump not being necessary, in most cases, from the fact that what is needed is a ready and reliable means of throwing a stream promptly on the commencement of a fire. Thus a couple of hundred dollars will purchase an effective machine, which may save its cost a thousand times over the day after it is put in. This firm manufacture pumps of all sizes and for all conceivable duties, from water-works pumps down to the smallest boiler-feed. An important branch of their business is the manufacture of independent condensers, which are *perhaps the most important development in the* condenser line for some years. The condensers consist of a direct acting steam air pump, connected to a jet condenser, the whole being very compact, and easily connected. The condenser draws its own supply of injection water, by suction up to 20 feet vertical lift, and by its use, as it works independent of the main engine, a vacuum may be formed before the main engine is started. These condensers economise a large percentage of fuel and power and are recommended wherever economy of fuel, or increase of power is desired. They require no attention after being once started. Northey & Co. will be glad to furnish estimates for anything in their line. Their office and works are at the corner of Front and Parliament streets, Toronto.



NORTHEY & CO.'S STEAM PUMP FIRE PROTECTION.

The publisher of the Manitoba *Colonist* has issued as a supplement to that journal a handsomely printed and illustrated descriptive history of the town of Port Arthur, Ont. The work is done in a thorough and most creditable manner, and its circulation will doubtless result to the material benefit of this town of rapidly increasing importance.

THE FUNCTIONS OF STEAM BOILERS.

THE report of the Committee of the Railroad Master Mechanics' Association contains a presentation of facts concerning the principles involved in the construction of steam boilers which are of very general interest. The committee reported as follows:

"The results of improper circulation of water in a boiler are not confined to the loss of a reduced evaporation for a given amount of fuel used; to this is due the rapid deterioration of the fire-box plates caused by overheating, the pernicious effects of which are scarcely realized. When plates are overheated, the unequal expansion of the inner and outer sheets strains them to such an extent that frequent renewal of stay bolts becomes necessary; there is also danger that overheating may cause an expansion of the metal to a point in excess of its elastic limit, in which case a permanent set must occur, and the metal is in precisely the same condition as though the limit of elasticity had been exceeded by overstrain.

"May not in some cases, also, the heat in our fire boxes be too high to produce steam? In our early years we were taught that steam was a perfect non-conductor of heat, and for illustration the rolling of a drop of water across the surface of a hot stove was cited; by way of explanation we were told that the drop rested on a thin cushion of steam through which the heat could not penetrate, so that the water was not warmed. Cannot this same thing take place, only on a larger scale, in a boiler where the circulation is impeded?

"The panacea for the evils enumerated is, plainly, larger water space and a thorough circulation of the water within the boiler, the principles of which are well *known. To obtain this, how*ever, that it may reach the full measurement of requirement, is a question not so easily solved. That such is necessary in order to obtain the full heating value of the fuel used, is indisputable, and to reach that point will require more attention than has heretofore been given to it, is also certain.

"When we depend on the specific gravity of water to bring about a circulation necessary to absorb the heat generated in a locomotive fire box, large and unrestricted passages for its operation are essentially necessary. It is but waste to produce heat unless we have the means at hand to absorb it. In order to get any work or usefulness from heat it is necessary to have a hotter body and a cooler one; it is, therefore, as necessary to produce the colder body as that the hotter one be generated.

"Another point which involves a common mistake is the attempt to increase the amount of heating surface by putting in more tubes; this will not necessarily increase the steaming capacity; indeed, the reverse may take place, the crowded condition of the tubes retarding the circulation. The number of tubes on many locomotives can be reduced from ten to twenty per cent. with decided advantage. It is true that this will reduce the heating surface, but in very many cases the increased efficiency of those remaining will more than compensate for the loss in number.

"Heating surface in the abstract is one thing, its capacity for transmitting heat is another. With a circulation not too restricted, undoubtedly the most important part of the heating surface are the fire-box sheets; this may include 12 inches of tube surface nearest the fire-box. A flat, horizontal surface, situated as the crown sheet above the fire, or one at that point concave to the fire, is best adapted for receiving and transmitting heat, and from its situation in the boiler must facilitate the access of fresh supplies of water to replace the heated ascending particles, hence the necessity of freeing the crown sheet of every possible attachment that might interfere with the free movement of water.

"A surface sloping toward the fire is next in efficiency for transmitting heat; if it is proposed to enlarge the water ways surrounding the fire-box, the space bordering the foundation ring need not, perhaps, be increased, as the water at that point receives but little heat. A tapering enlargement of the space in a vertical direction may be accomplished by sloping inwardly the side sheets of the furnace, thus increasing the heat imparting power of the surface, without perceptibly diminishing the efficiency of the combustion chamber; the sloping sides need not only receive the rays of heat at a more favorable angle for transmission, but, on the water side, the heated particles have less difficulty in disengaging from the surface than if the sheets were strictly vertical.

"The evaporative efficiency of a boiler depends, no doubt, to some extent on the nature and thickness of material forming the heating surface. Carefully conducted experiments, some years since, however, and the results later of actual practice, show that, after the first few days of work with ordinary impure feed water, there is no perceptible difference in the evaporative power of copper, brass and iron tubes, although their relative conducting power, when clean, are respectively, 74, 24, 12, and that, so far as the economical use of fuel is concerned, there is no gain in using the highest priced metal; it is remembered that the same result was found when using slightly different thicknesses. The difference between the steaming power of new boilers with furnace plates three-eighths and five-sixteenths-inch thick was found to be materially in favor of the thin sheets; but it is asserted that this difference disappeared as the plates became coated with incrustation. It is a fact well known that furnace plates having a thickness of three-eighths and seven-sixteenth-inch are more liable to fracture than five-sixteenth-inch plate, and this argument is used at times to prove the inferior evaporating power of thick plates; this, however, does not necessarily follow; the injury to thick plates is mostly caused by unequal expansion, this evil being directly proportional to its thickness. Considering the speed of the heated currents in a locomotive fire box and the short time allowed for transmission, a homogeneous plate of absolutely uniform thickness, and about five-sixteenth-inch thick, practically appears to be best adapted to perform all duties required of the sides and back plate of a furnace.

"Your committee have observed cases where a portion of the tube surface nearest the fire box has been replaced by combustion chambers, reducing proportionately the area of water space of the boiler, and presenting a less amount of transmitting surface for the flame, but allowing a better mixture of the gases and a more perfect combustion, yet a loss of evaporative power, or at least no perceptible gain of the latter, could be observed, showing that changes of this kind should be made with great care, and reminding one of the necessity of keeping constantly in mind that the correction of one evil may lead to another.

"Your committee cannot urge too strongly the nessity and importance of admitting the feed water regularly, and at the same time entering with an equal flow at points on opposite sides of the boilers. The inlet volume of the feed water is by this means divided, resulting in less variation of boiler temperature, effecting a more uniform expansion, and assisting largely the circulating action of the water."

The Dominion government has exempted the Ottawa river from the Chaudiere falls to MacKay's bay, and the Gatineau river from Chelsea to the mouth of the river, from the operation of the regulation which prohibits the depositing of sawdust and mill refuse in navigable streams. In addition to the Ottawa and Gatineau rivers, the following rivers and streams have been declared exempt from the regulation restricting the deposit of mill refuse: Crooked Creek, Albert county, N. B.; Nashwaak river, N. B.; Beaver Creek, Ont., and that part of St. Francis river, in the county of Richmond, Que., known as "Brompton Falls."

MANAGING FIRES.

IN order that a boiler may furnish steam uniformly, says the *Safety Valve*, regularity in firing is necessary, and the water should be kept at a uniform height also, by feeding constantly. But previous to cleaning a fire, the water may be allowed to rise a little above its ordinary level in the boiler, and the feed may be partly, or wholly, shut off during the operation, and until the fire has "come up," as it is called.

It is also productive of great economy in fuel, as well as increased evaporative efficiency, to heat the feed water to a high degree before it is allowed to enter the boiler; this also adds to the life of a boiler, by preventing unequal contraction of the sheets by cooling, which often costs crystallization, grooving and ruptures.

When using bituminous coal, with a rapid rate of combustion, the fire should be from 8 to 10 inches in thickness; but if the combustion is slow, a thickness of five or 6 inches is sufficient, care being taken to prevent the fuel from burning into holes.

The furnaces should be regularly fired at intervals of from ten to fifteen minutes, to avoid making a great change of temperature, which always occurs when a large mass of coal is thrown in at one time, due to heat becoming absorbed in the evolution of the gases. And for the same reason it is best to fire only on one side of a wide furnace at a time. The several furnaces of a battery, or of a range of boilers, should be worked in rotation, and the coaling and working of the fires should be done as quickly as possible, in order to allow the influx of no more cold air than can be avoided.

With anthracite coal the fires should be kept as thin as possible, from 4 to 7 inches being the usual limit, dependent on the size of the lumps, which should be as nearly uniform as possible, and also open the strength of the draught.

In the use of some bituminous coals it is found that they agglutinate and form a cake over the whole surface of the furnace, and to maintain the steam at a constant pressure, it is then necessary to introduce a slice-bar into the furnace and break up this solid cake into fragments. This operation liberates the gases and fills the furnaces with flame, generating an intense heat. By watching the needle of the steam gauge, and breaking up only so many fires at a time as may be found necessary to keep up the pressure, the fireman will find it easy to carry steam uniformly and with economy of fuel.

When a fire reaches a certain point of intensity, after the gases have been driven off, it is necessary to put on more coal, for if it is suffered to go beyond that point before the addition of more fuel, the chilling effect produced is so great that the temperature is reduced to so low a point that it is with difficulty that the fresh mass can be sufficiently heated to ignite, causing a waste of the gases and a diminution in the evaporative efficiency of the boiler for the time being, and a consequent drop in the steam pressure. The condition of the fire, suitable for cooling, can be learned only from practice, and a knowledge of this very point is what constitutes the principal difference between a good and a poor fireman. When a uniform, bright light is thrown over the ashpit from the fuel on the bars, the fires are clean and burning well; but when the ashpits are partially or wholly dark, there must be ashes or clinker on the grates, which should be removed. Ashes and clinker are very apt to accumulate at the front and corners of furnaces, against the sides, and also at the back and against the bridge wall. These places must be kept as free as possible from this refuse, and the coal heaped a little above the general level on the bars.

The fires should be cleaned at least as often as once in twelve hours, sometimes at shorter intervals, dependent upon the amount of refuse in the coal and the rate of combustion.

In cleaning a fire the fireman sometimes pushes with a hoe the live coals from the front half of the fire into the back of the furnace, and then hauls out the ashes and clinker, and then pokes all the fire to the front, and pulls the ashes and clinker of the back end of the furnace over the top of the live coal and out at the furnace door. He then closes the door for a moment, wets down the ashes and clinker, throws it one side, opens the furnace door again, spreads the fire evenly over the grate, and throws on a light charge of coal as quickly as possible. That is the old method of cleaning a fire, and it is still practised to a great extent both on land and at sea.

A much better plan, and one which is coming into vogue, is to move all the live coals from one side of the furnace along its length to the other, then haul out the clinker and ashes, then move all the live coals to the side already cleaned, and remove the remaining refuse from the other side of the furnace, afterwards spreading the live coals evenly over the grates and charging the furnace with fresh fuel.

Where the furnaces have considerable width, it is better to clean only one side of the furnace at a time, cooling it of course, but leaving the other side to be cleaned in an hour's time or so. This method will promote economy of fuel and render it much easier to maintain a uniform supply of steam.

Different kinds of coal require different modes of treatment in a furnace, and the best method of handling each is determined by experience only.

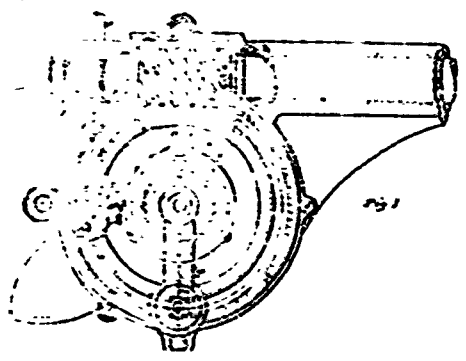
THE COMING POWER.

ONE of the most suggestive facts connected with the development of electric power transmission, says *Electric Power*, is the continual growth of the field to which it seems adapted. The electric railway is perhaps the most important application, and appeals most directly to the general public. For sixty years horse power has remained firmly intrenched for street railway purposes, and so many unsuccessful attempts have been made to supplant it that it is not strange that the advent of the electric motor has been looked upon with suspicion. Its adaptability to this work is strikingly apparent when we consider the requirements. Perhaps one of the most serious obstacles to its more immediate application has been the mysterious character of this form of energy. Every person can understand how a pair of horses hauls a car. A moving cable is nearly as simple an application of power. Steam has been with us so long that all know its wonderful power, even though they may not comprehend the various devices by which it is applied to useful work. The peculiar properties of electricity, however, its generation at the dynamo, its instantaneous transmission to distant points over a solid conductor, without any visible manifestation of motion, all tend to raise a doubt as to its perfect control. The duty which it has been called upon to perform, for intercommunication, and the supply of artificial light, is but a hint at its unfathomable future. We write of it to-day as the most economical and satisfactory agent for the transmission of energy. Those who ridicule its claims may live to see it take its place but a single step from the very fountain head of energy itself.

RECENT CANADIAN PATENTS.

Machine for Planing and Shaping Metals.

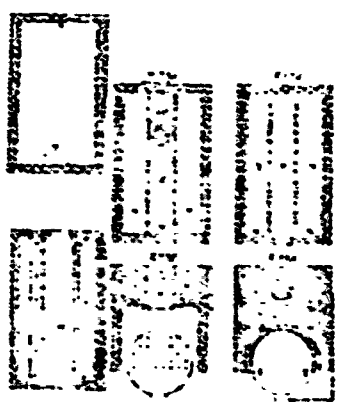
No. 31,184. Henry Bertram, Dundas, Ont., dated 24th April, 1889.



Claim. 1st. In a metal planer or shaper, the fixed abutment I, the movable abutment M on the annular cog D, for operating the duplex pawl G on the revolving case H on the shaft B, in combination with worm or other driving gear substantially as and for the purpose specified. 2nd. In a metal planer or shaper, the revolving case H, in combination, with the pawl G, ratchet wheel E, steel friction ring F on the shaft B, with worm or other gear for operating the feed, substantially as and for the purpose specified. 3rd. In a metal planer or shaper, the quadrant J operated by the gear I in combination with the revolving case H to impart feed motion, substantially as and for the purpose specified.

Hydro-Carbon Furnace.

No. 31,085. William Lawrie and John McMillan, Petrolea, Ont., dated 10th April, 1889.



Claim.—1st. In combination with a furnace, having a mixing chamber P, an injector burner extending into the front end of said chamber, and openings around the injector burner, for the admission of air, substantially as specified. 2nd. A furnace, with central inlet passage K, return passages L, L, communicating with passage K at the front of the furnace, flues or passages N, P and N, directly above the flues L, K and L, openings M and M connecting the rear ends of the flues L, L and N, N, and openings O, O, connecting the passages N and N with the chamber P at the front end of the latter, and an outlet R at the rear end of chamber P, substantially as specified. 3rd. A furnace, provided with hot air flues L, K and L, N, N, connecting at alternate ends and causing a circuitous travel of air, and the mixing chamber P receiving the injected fuel and the heated air, whereby the air, steam and oil or gas are thoroughly mixed, and perfect combustion secured, substantially as specified. 4th. In a furnace, the combination, with the main body, having an air inlet J, of short partitions dividing the floor space into flues L, K and L, the latter L, L, communicating with the former K by passages, covers for said flues L, K and L, partitions dividing the space above the flues L, K and L into similar flues N, P and N, two of which N and N communicate with the chamber P and the flues L and L, an outlet in flue or chamber P and an injector burner extending into the chamber P, all substantially as shown. 5th. In a furnace for burning hydro-carbons or other liquid, or gas fuels, the combination, with the mixing chamber P, of the closed pockets V, V, and the steam pipe passing through said pockets and serving to deliver superheated steam to the injector burner, substantially as specified. 6th. In a furnace, the combination of the communicating passages L, K and L and N P and N arranged in two series, one above the other, and having their walls made of fire clay or other heat resisting substance, of the pockets V, V, and the injector burner extending into the chamber or passage P, substantially as specified. 7th. In a furnace of the class described, the combination, with the recessed front wall, of the mixing chamber P provided with an opening in the front end and a discharge opening at its rear, the air flues on each side of the mixing chamber communicating therewith, and an injector burner extending into the open end of the mixing chamber, substantially as specified. 8th. In a furnace of the class described, a long, narrow mixing chamber P, having an inlet and outlet, in combination with an injector burner arranged at the inlet end of the chamber to cause the flame to impinge upon the walls of the said chamber, substantially as specified.

Wood Working Machine.

No. 31,157. George Hughes, David A. Ross and William G. Scott, Mount Forest, Ont., dated 16th April, 1889.

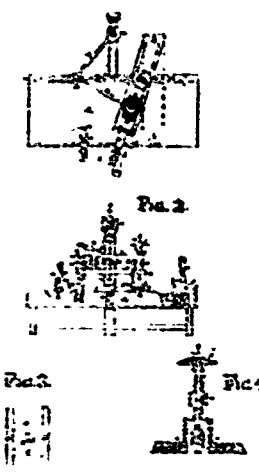


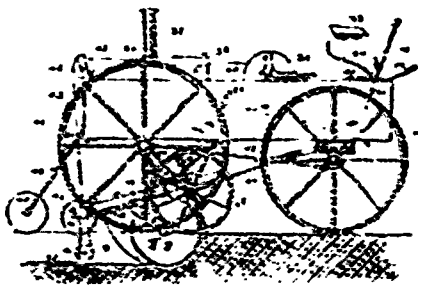
Fig. 2.

Fig. 3. Fig. 4.

Claim 1st. The combination of the guide bar 5 and the movable head block M and revolving cutter H, substantially as and for the purpose hereinbefore set forth. 2nd. The combination of the draw bar D and lever P, substantially as and for the purpose hereinbefore set forth. 3rd. The combination of the bolt e and slot in lever P and draw bar D, substantially as and for the purpose hereinbefore set forth. 4th. The combination of the hand wheel z and screw J on outer spindle g for raising and lowering cutter H, substantially as and for the purpose hereinbefore set forth. 5th. The combination of the cutter block M, connecting to guide bar 5 and connecting to table N, substantially as and for the purpose hereinbefore set forth. 6th. The combination of the stop gauge W, with movable pin x and lever x, and spring 5 substantially as and for the purpose hereinbefore set forth.

Machine for Laying Electric Wires Underground.

No. 31 o/o. Alexander M. Brown and Archibald Wright, Winnipeg, Man., dated 8th April, 1889.



Claim.—1st. An automatic machine for laying subterranean electric wire, operated by animal, steam, or other power, substantially as and for the purpose above set forth. 2nd. An automatic subterranean electric wire laying machine, coating the wire with indestructible composition, substantially as and for the purpose above set forth. 3rd. An automatic subterranean electric wire laying machine having plough share 1, with hole 2 for securing same to beam 3, pin for same 4, revolving pulley 5, axle pin 6, tubular aperture in plough share 1, 7, revolving collar 8, shank 9, axle pin 10, beam hinged to front axle tree 11, 11, covering disks, axle pins 12, 12, 13, collar gauge 14, lifting link 15, lifting lever 15½, lever beam 16, lever arm 16½, knuckle joint 17, 17, fulcra 18, lever rod 18½, knuckle joint 19, hand lever 20, fulcrum to same 21, waggon box 22, foot board 23, seat 24, 24, spring supports 25, slot in bottom of waggon box 25, 26, clamp for hand lever 19, 27, wire coil roller 28, 28, standards for same 29, connecting or tell tale pin 30, indicator 30½, standard for galvanometer and electric bell 31, shelf 32, striking arm with or without 33, tank for composition 34, 34, apertures 35, spindle and roller 36, furnace 37, 37, flue pipes 38, lid 39, furnace door 40, ash pit 41, door to same 42, 42, grate bars 43, material non-conductive of heat 44, false bottom 45, insulated wire 46, revolving pulley 47, hole through beam 16, 48, roller 49, 49, lifting levers 50, lever beam 51, 51, fulcra 52, lever arm 52½, knuckle joint 53, connecting rod 54, hand lever for roller 54½, knuckle joint 55, fulcrum for same 56, guards for 53, 57, 57, front wheels 58, front axle tree 58½, bolster 59, bounds 60, rear axle tree 61, 61, rear wheels 62, main reach 63, 63, guide wheels 64, guide wheel reach 65, guide slots for outer beam 16, 66, guide slot attached to rear axle tree 60, 67, electric connector 68, pole 69, stays 70, axle tree for guide wheels 63, 63, 71, holder for hand lever 54, 72, indicator arm 73, fulcrum for indicator, substantially as and for the purpose above set forth.

Among additions now being made to the equipment of the Massachusetts Institute of Technology, is a 150 horse-power triple expansion Reynolds' Corliss engine, designed to work under 150 pounds steam pressure. In general design it will consist of three wrought iron frame horizontal engines with one main shaft, the cranks being set 120 degrees apart. The cylinders will be steam jacketed, and the receivers and piping will be so arranged that any one of the cylinders may be worked singly, either condensing or non-condensing; any two cylinders may be operated together as a condensing or non-condensing compound, or all three cylinders may be worked triple expansion, either condensing or non-condensing. The different combinations are made necessary by the fact that the engine is an experimental one. When in place and at work it may be expected, says the *Stationary Engineer*, that some important facts concerning high ratios of expansion and multiple cylinders will be made matters of record.

Mr. S. B. Crossfield is erecting a shingle mill at Spanish Bay, Ont.

The year the exports in lumber from Ottawa to United States were, $2,405,088, as against $2,[illegible] this year.

The Imperial Lumber Company, limited, with capital stock of $200,000, has been incorporated. It is composed of Toronto men.

About midnight on July 23rd a blaze was discovered in the roof of the shingle mill at Flint & Rice's saw mill, Belleville. The fire was put out before any damage of consequence was done.

The manager of the E. B. Eddy Co. at Ottawa says the mills will be shut down if not sold, so soon as the logs at present on hand have been cut. The company will devote itself to manufacturing exclusively, the new pulp factory promising to be the principal enterprise. The Eddy mills found employment for about 500 men each day. The mills employ a day gang of about 300 men and a night gang of about 250, so that 550 men will be thrown out of employment.

The French River Boom Company has given notice of its intention to apply for letters of incorporation from the Ontario government to enable them to carry out work and improvements, to facilitate the transmission of timber on the French river in the district of Puget sound and Nipissing in the province of Ontario, between Kidd's landing at the mouth of Pickerel river, the rapids Big French river, below Recollect rapids at the mouth of the Wahnapitae river, and at intervening points to the mouth of the French river to the mouth of the Bad river and to the mouth of Boss creek. The company is also asking for power to acquire timber limits and to build mills for the purpose of carrying on a general lumber business. The operations of the company are to be carried on at French river, Post Office, which is to be the chief place of business. The capital stock of the company is to be $[illegible],000, in shares of $100 each. The names of the applicants are H. H. Cook, H. J. Bohme, F. J. Macdonald, all of Toronto, C. Henderson, Parkbridge, and N. Irvine, of French river.

The Locomotive, published by the Hartford Steam Boiler & Insurance Co., says: "In examining a boiler recently, that was offered us for inspection and insurance, we found the following state of things: The fire line extended above the water line, the back head was improperly braced, and there was a stop-valve between the boiler and the safety-valve. Of course we directed that the fire lines be lowered to the top of the tubes, that the back head be stayed above the tubes, and that the stop-valve be removed, or else that the safety-valve be put directly in the dome. It was also directed that the additional braces be put on the back head. Last we was advised that the feed-pipe be changed to the top so that the inflowing water might not impinge the shell, and that the blow-off be inserted in the bottom of the shell instead of through the ash pit as at present. We meet with all of these things very often, but it is rare that so many of them are found at the same time in one boiler. The boiler is in a planing mill. It is comparatively new, and is fired with shavings."

The C. P. R. will shortly commence the erection of a foundry at Fort William.

Messrs. Rohm & Sadler, the well-known manufacturers of leather belting, Montreal and Toronto, have supplied to the Royal Electric Light Co. for the city of Montreal electric light plant, five large driving belts, which are running on their five double engines. Each of these belts are about 100 feet long, and widths are 28, 32, 32, 38 and 38 inches respectively, double leather. In addition to these they have also furnished a number of 10 inch belts.

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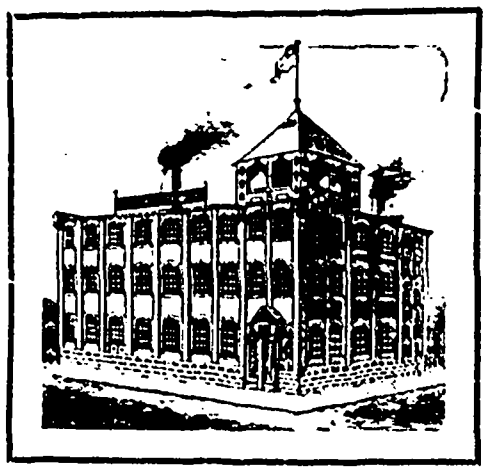

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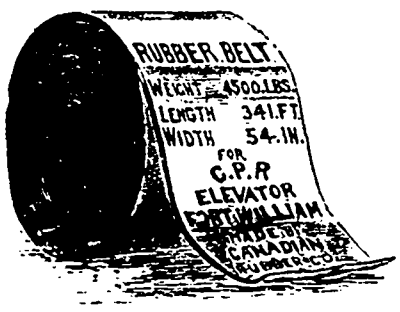

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