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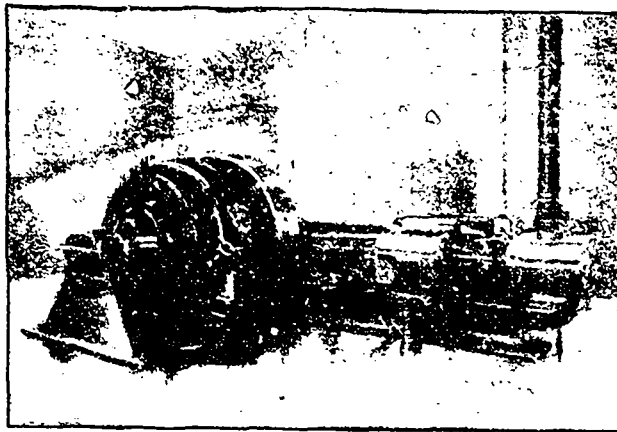
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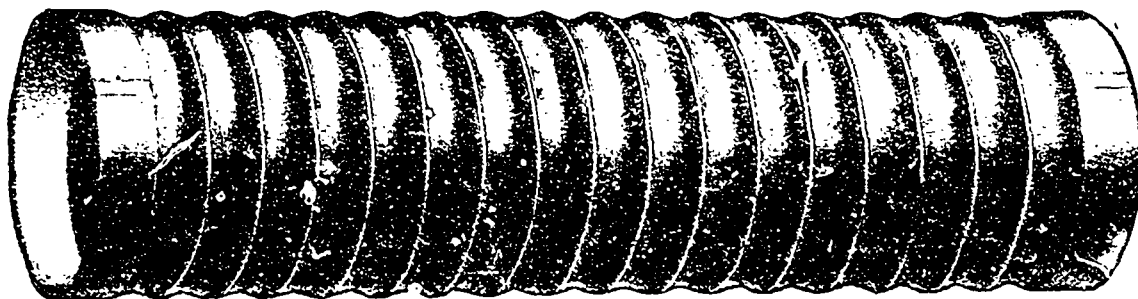
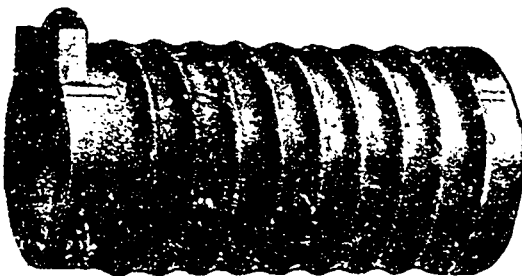
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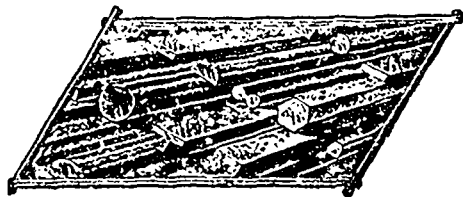
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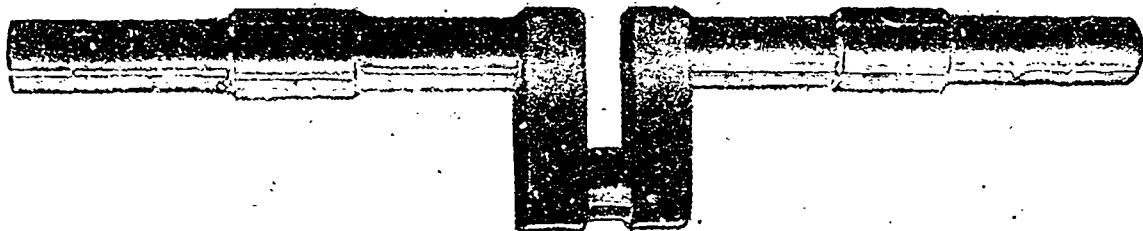
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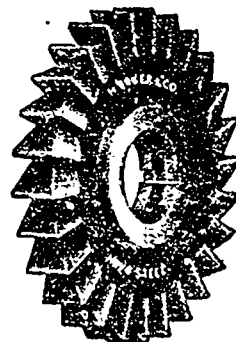
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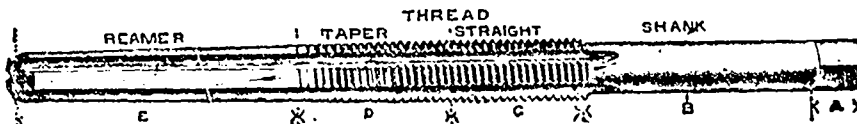
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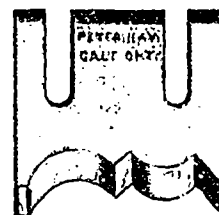
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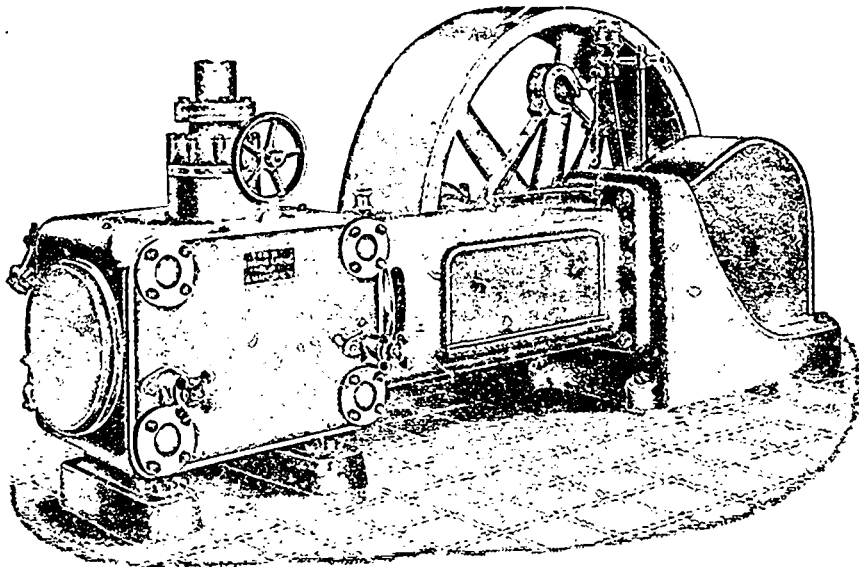
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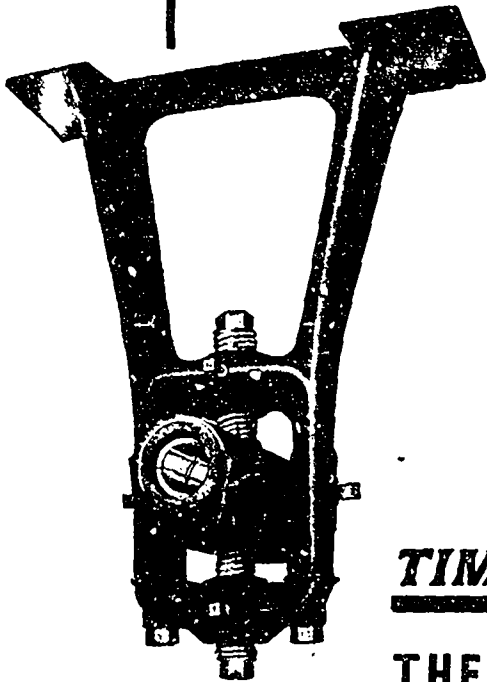
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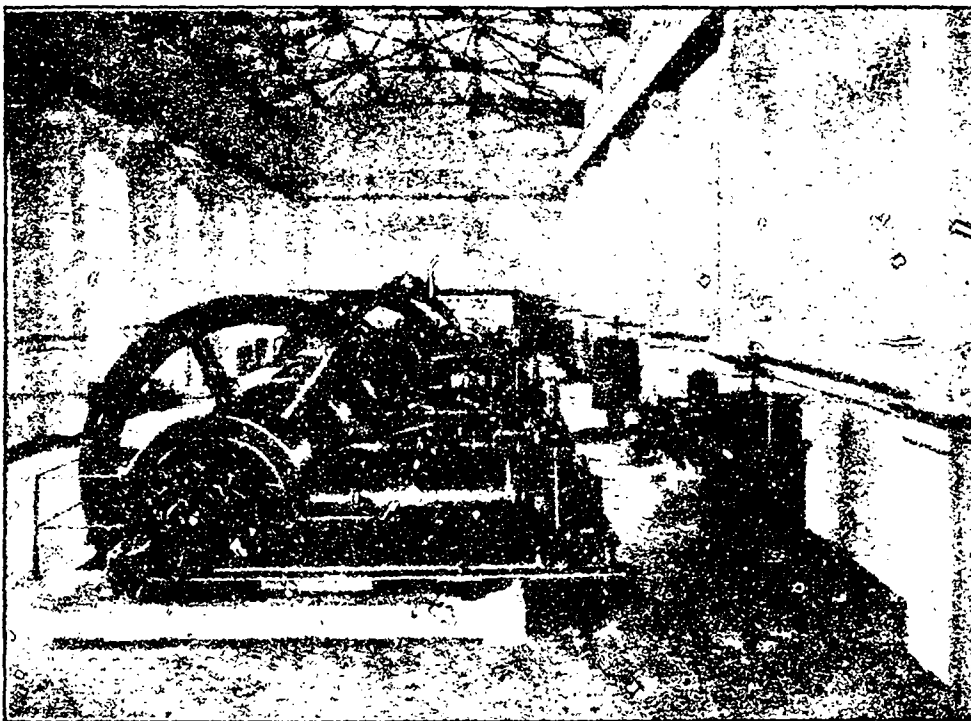
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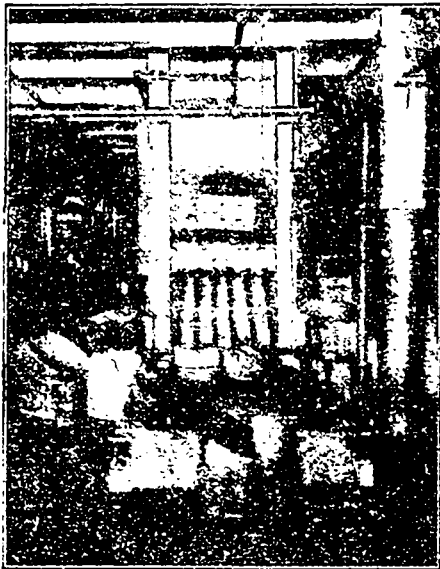
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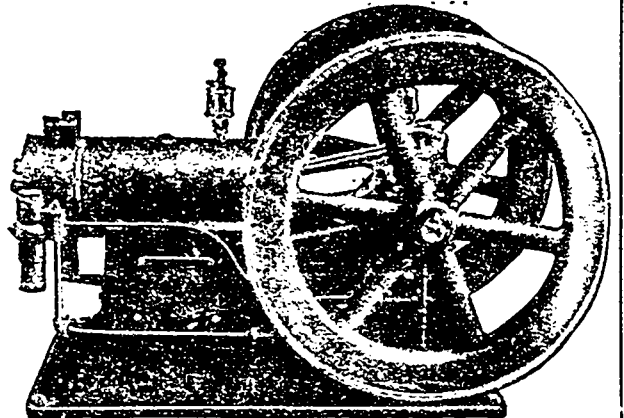
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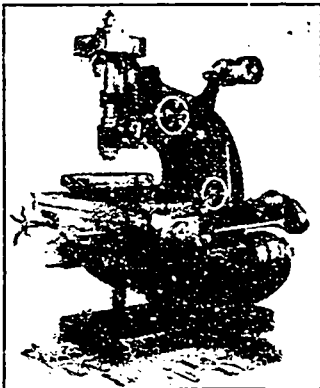
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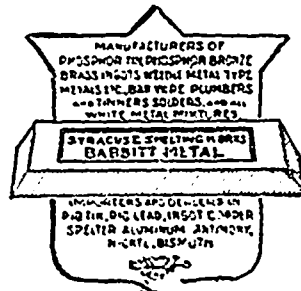
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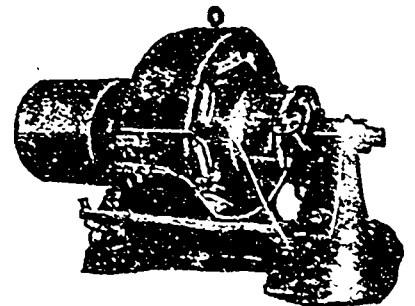
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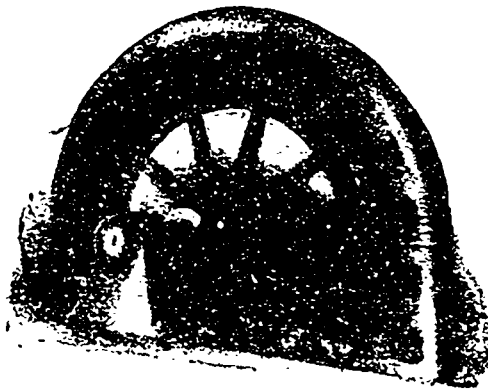
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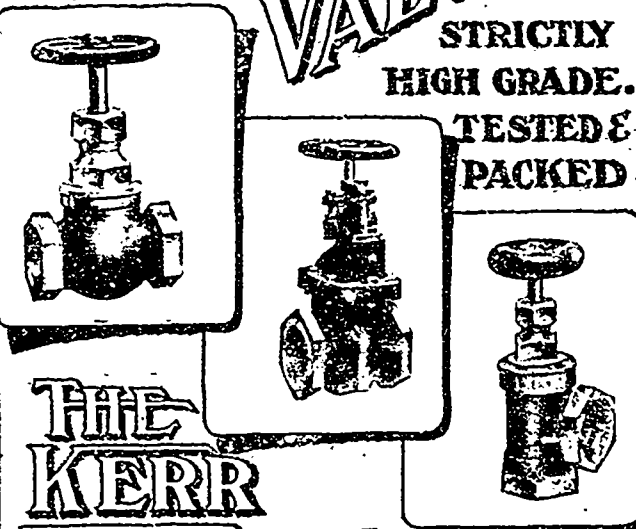
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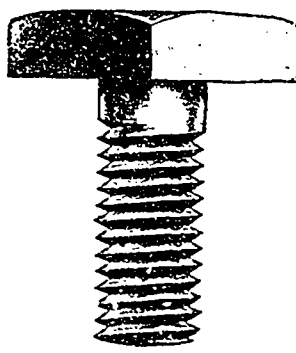
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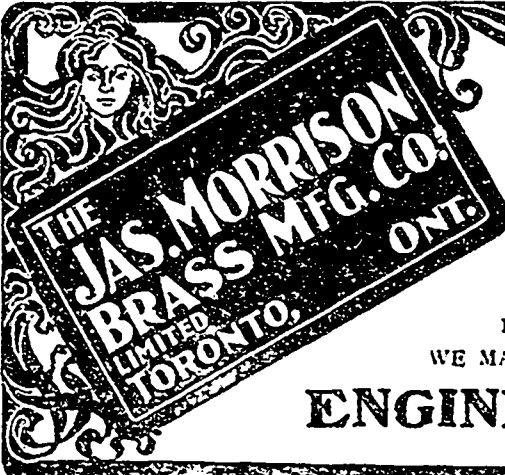
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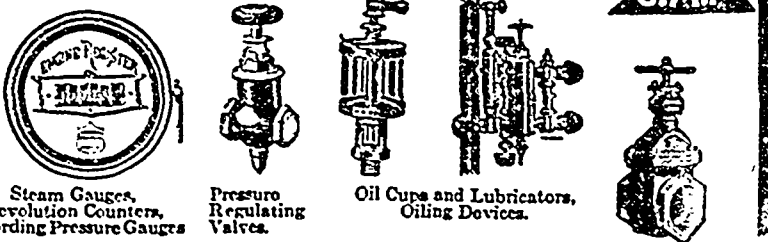
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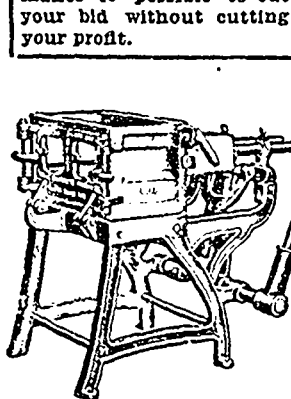
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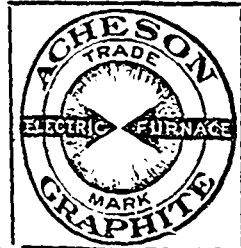


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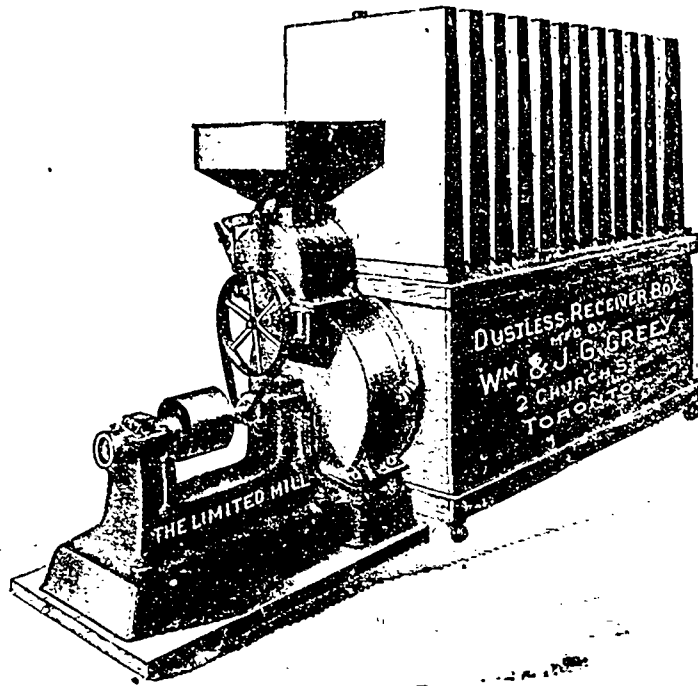
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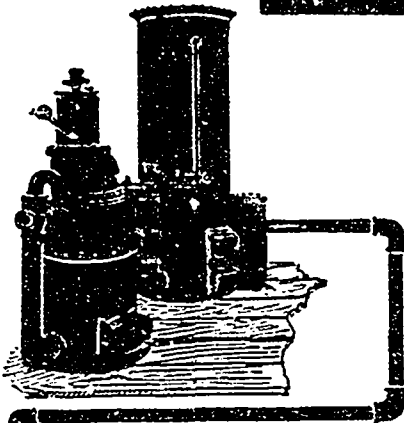
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McKinnon Building, Cor. Melinda and Jordan Sts., Toronto.

J. J. CASSIDY, Editor.
D. O. MCKINNON, Business Manager.

Cable address: "CANAMAN." Western Union Telegraphic Code used.

SUBSCRIPTIONS:

Canada and United States \$1.00 per year. All other Countries in Postal Union six shillings sterling, including postage.

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THE NATIONAL POLICY AND THE CANADIAN MANUFACTURERS' ASSOCIATION.

Industrial Canada, the official publication of the Canadian Manufacturers' Association, is, as it announces, "devoted to the advancement of the industrial prosperity of Canada." In its March issue, in an editorial entitled "Protective Tariffs and Industrial Efficiency," it says:

A prominent woolen manufacturer, commenting on the new tariff, recently remarked to the Association that the only hope now left for his industry, if indeed there was a hope, lay in technical education. * * No scheme of industrial development can be said to be truly national in character which limits itself simply to the problem of reserving the home market for the home producer by means of a protective tariff. Such a policy may encourage the establishment of factories to turn out everything that can profitably be made in the country, but unless it goes further it falls short of accomplishing what should be the real object of all protection. Protection is not in itself the be-all and the end-all of a national policy, but only the means to an end. It is but the first step towards the goal of sound economic production, wherein producer and consumer share equal benefits. By far the most important of the intervening steps is industrial training. This training, or technical education as it is sometimes called may be described as the domestic side of the tariff. The tariff is a nation's foreign industrial policy in that it practically dictates the amount of foreign-made goods that shall be allowed to enter. By so doing it ensures from the start a market for the home producer, and living wages for his employes. Technical education is a nation's domestic industrial policy in that it improves the efficiency of its working men and makes for economy of production. * * Another point to be borne in mind is that, as industrial efficiency increases, the need for protection decreases. * * The industry which utilizes materials indigenous to the country will be able gradually to dispense with protection as the efficiency of its working men and its equipment approaches the level of the efficiency of the working men and equipment em-

ployed by the same industry in other countries. If the remark of the woolen manufacturer is correct, it would almost seem that in some industries at least success may be achieved even without adequate protection, provided facilities are given the workers to perfect themselves in all the practical and theoretical branches of their trade. * *

We have no knowledge of any recent banquet of the Canadian Manufacturers' Association when liquid refreshments were used to excess, and therefore cannot account for this most mischievous slopover. It is a complete give away and surrender of all that Canadian Manufacturers have always contended for. It removes the corner stone and foundation from the structure upon which Canadian manufacturers in every branch of industry have always built their hopes. And to think, too, that the unconditional and cowardly surrender should be so publicly announced in the official organ of the Canadian Manufacturers' Association, compromising as it does, the dearest and most vital interests of not only every member of the Association, but of every manufacturer in Canada as well.

We raise no protest against technical education. It is a good thing, and the more we can acquire of it the better. So of Latin, and Greek, and French, and German, and college education generally. A man who is well equipped in any of these things is better prepared to fight the battle of life than if he were not so prepared; but why should the Association deliberately surrender the life and soul in its body to the end that it may have silver handles on its coffin?

The scheme of industrial development in Canada, from the standpoint of the manufacturers, includes as far as possible the possession of the home market, and the home market is what the manufacturers have always fought and contended for, and for the possession of which the Canadian Manufacturers' Association many years ago became an active and influential feature in the politics of the country. That the policy of tariff protection to Canadian manufacturing industries should be thus sent to its grave is bad, very bad, but that it should be thus slaughtered in the house of its friends, and at the hands of its friends, is regrettable and lamentable.

Suppose that every individual member of the Association, and every mechanic in his employ were endowed with all the technical knowledge regarding his industry capable of being imparted, of what use would it be to him if he could not sell his products? Time and again woolen manufacturers, members of the association, have sent up the cry that for lack of protection the home market was being lost to them. But they have never complained that because of lack of technical education they had failed to produce good goods—their contention has always been that their products were quite as valuable, intrinsically, as those made in any other country, and that their prosperity—yea their very existence depended upon a tariff protection that would give them a fair share of the home market. As we understand it, that is their position to-day, and yet the organ and mouth-piece of their Association deliberately informs them that "no scheme of industrial development can be truly na-

tional in character which limits itself simply to the problem of reserving the home market for the home producer by means of a protective tariff." What are manufacturers to think of the assertion that "Protection is not in itself the be-all and the end-all of a national policy, but only the means to an end."

The organ of the Association with owl-like solemnity tells manufacturers that "the industry which utilizes materials indigenous to the country will be able, gradually, to dispense with protection." What constitutes "indigenous" materials? Why should the using of them in manufacturing industries tend to place the industries which use them outside the necessity of protection? Cotton is not indigenous to Canada, and yet there are cotton mills in Canada which in the many lines in which they work, supply almost exclusively all such goods consumed in Canada. These goods are the equal of those made anywhere else, nor are the proprietors willing to forego the advantages of the home market, nor to admit that they are ruinously handicapped for lack of technical education. Trees growing in the forest, and iron ore buried in the earth, are indigenous to Canada. Trees are converted into lumber and lumber into furniture, and iron ore is the foundation of many most important Canadian industries, but the manufacturers of furniture and other similar wares, and of iron products would thank the Association to be informed why they will be able to dispense with tariff protection?

MENTAL IRRESPONSIBILITY.

We make the following extracts from a leading editorial in the March issue of *Industrial Canada*, the official publication of the Canadian Manufacturers' Association, and "devoted," as it says, "to the advancement of the industrial prosperity of Canada."

"No scheme of industrial development can be said to be truly national in character which limits itself simply to the problem of reserving the home market for the home producer by means of a protective tariff."

"Unless it goes further it falls far short of accomplishing what should be the real object of all protection."

"Protection is not in itself the be-all and end-all of a national policy, but only the means to an end."

"It is but the first step towards the goal of sound economic production, wherein producer and consumer share equal benefits."

"By far the most important of the intervening steps is industrial training."

"This training or technical education may be described as the domestic side of the tariff."

"The tariff is a nation's foreign industrial policy in that it practically dictates the amount of foreign-made goods that shall be allowed to enter. By so doing it insures from the start a market for the home producer."

"Technical education is a nation's domestic industrial policy, in that it improves the efficiency of its working men and makes for economy of production."

"As industrial efficiency increases the need for protection decreases."

"The industry which utilizes materials indigenous to

the country will be able gradually to dispense with protection."

"Those that require to import their raw materials will always need protection."

"In some industries success may be achieved even without adequate protection, provided facilities are given the workers to perfect themselves in the practical and theoretical branches of their trade."

In our opinion the foregoing dicta indicate dementia præcox, a paranoic state of insanity, and a condition of mental irresponsibility beyond ordinary comprehension.

The position that *Industrial Canada* assumes and promulgates, as the organ of the Manufacturers' Association is that the home market is to be desired, and that tariff protection is a good thing, but that neither of them are nor can be of much value to the manufacturer unless he and his workmen have technical education.

Technical education it says, must come before a protective tariff: technical education must be had before any claim may be set up for the home market. A protective tariff may be a good enough thing in its way, but before it can be effective it must be preceded by a technical education. Protection can never be anything to a manufacturer more than a means to an end: technical education is absolutely essential to all economic production.

In our opinion no manufacturer in Canada—no member of the Association—will or can agree with *Industrial Canada* when it places tariff protection and the necessity of the home market anywhere than as the first and most important element to success. We do not discount nor depreciate the value of technical education, for we know that very few industries in Canada or elsewhere can hope to succeed unless technical knowledge is brought to bear in conducting their operations—a person would not know how to get under cover out of the rain if common sense were absent.

An adequate protective tariff is what Canadian manufacturers need and must have; and with adequate protection they will to reasonable extent possess the home market. Nor will they with protection lay awake nights worrying about their lack of technical education.

TRADE ENQUIRIES.

The Department of Trade and Commerce, Ottawa, issue a weekly publication in which reports are given from our commercial agents abroad looking to the cultivation and expansion of Canadian trade; and a scheme is introduced in which concerns in Great Britain and elsewhere make enquiries through the office of the High Commissioner in London and others regarding such trade. Any person in Canada who may be interested in these enquiries and, desiring further information, wish to be put in communication with the enquirers abroad—any who may be interested in the matter are instructed that information may be had by addressing the Superintendent of Commercial Agencies, the Department of Trade and Commerce, Ottawa. The enquiries mentioned in the publication are supposed to relate to trade that the enquirers desire to do in Canada; and the Canadian who wishes to learn particulars must first write to the Depart-

ment at Ottawa, from which the name and address of the enquirer abroad will be sent, by which means correspondence may be opened. Following are some of the enquiries recently published in the Department:—

"A large engineering firm is desirous of expanding their trade in all descriptions of iron and steel rails, rolled joists, blooms, slabs and billets."

"A manufacturing firm in the north of England making all kinds of wrought iron tubes and fittings for gas, steam and hydraulic purposes, desires to build up a connection with Canadian importers of these goods."

"An engineering firm will be pleased to quote for hot water pipes, fittings, gas and water pipes and fittings and flanged pipes and fittings of every description."

"A well-known British firm manufacturing high class solid drawn copper and brass tubes, desires representatives in Halifax, Quebec, Montreal, Toronto, Winnipeg and Vancouver. Customers should include ship-builders, engine builders, coppersmiths, plumbers, etc."

"A well known Leeds firm making a specialty of electrical dynamos and motors (either direct coupled or belt driven) and governors for large steam engines, asks to be referred to Canadian buyers of these goods."

"Engineering firm in north of England, transacting a large export trade in seamless steel oil cans, locomotive oilers, lamps, steel sanitary buckets, etc., all of which are made on the seamless principle, desires to get in touch with actual importers of the goods."

"A Leeds firm is desirous of introducing to the Canadian market their seamless steel elevator buckets, for all purposes, such as elevating grain, malt, flour, coal, sand, sewage, water, etc., and invites correspondence from Canadian firms interested in importing these goods."

The Government publication before us contains a large number—several dozen—enquiries similar to these here given, and the wonder is that reliable British business concerns, as the enquirers claim to be, know so little about business methods in Canada as to imagine that profitable results are at all likely to accrue to them from such advertising. It is true that such advertising is free in a certain sense, but of an expensive, misleading, and ineffective sort; and it is equally surprising that the Dominion Government should waste money in publishing such stuff, and the time of employes as well.

What do our British friends take us for? If they desire to establish business relations in Canada why do they not adopt such methods as their American, German and other competitors use? These people first publish the fact that they have things for sale that the consumers in Canada have use for, and then their commercial travellers visit every city, town, village and hamlet in the country, and they get the trade as our import returns show. Our British friends are not addicted to such methods, and they fail to get the business. Canadian buyers don't have to go abroad to find manufacturers and dealers who make the things wanted. In the days of old buyers had to run after the seller, and had to accept only such articles that were offered to them, but now-a-days if a manufacturer has anything to sell, he must hunt up his customer, and must give him just what he wants, or some one else will do so. Trade journal advertising is essential to trade.

TECHNICAL EDUCATION.

At the last reported meeting of the executive of the Canadian Manufacturers' Association the report of the Technical Education Committee was read; and it was

stated that the committee were investigating the kind of books purchased by the public libraries. It was felt that much of the trashy fiction at present purchased could be replaced with advantage by books on trade and industrial subjects. At the same meeting the treasurer presented a statement showing that the cash balance in his hands was \$19,318.51, being the largest in the history of the Association. We have searched through the report of this and other meetings of the executive council of the Association and can find no report of any expenditure for books of any description in which is taught the very foundation principle of tariff protection so essential to the very life of Canadian manufacturing industries. The Association is not in debt, and there is nearly \$20,000 cash in hands of the treasurer, but never a dollar has yet been appropriated to supplying public libraries, public schools, technical schools, colleges or any other institution of learning in Canada, nor even to the employes in factories and workshops with tariff literature.

Twenty thousand dollars would go a long way in this direction. How else can the treasurer get rid of the money? There is usually enough funds on hand to pay for excursions and jaunting trips, like that to Newfoundland that never eventuated, but nothing in the way of educational books and tracts regarding protection. If the executive council don't know where such books may be had we would have pleasure in sending them the addresses of the publishers.

A GRAND PROPOSITION.

News comes from Fort William, Ont., that a proposition has been made to that city looking to the establishment there of a shipbuilding plant to cost a million dollars, to give employment to 500 workmen; and another proposition looking to the establishment of a wire drawing plant to cost about \$200,000, and to give employment to 200 hands. The cost mentioned would be that incurred by the promoters, besides which the city itself would make large contributions.

There is no fresh water harbor in Canada more favorably located for the purposes indicated than Fort William. It is at the western extremity of Lake Superior, and an eastern terminus of a vast railroad system by which the grain of our great Canadian West is transferred to large steamers for transportation to ocean borne vessels for distribution to the purchasing countries of the old world.

There is no good reason why Fort William should not, in the very near future, rival any of the American lake cities as a shipbuilding centre. Every natural facility is there. Every requisite not already there can be placed there as readily and as cheaply as at any American lake city; and the success of the enterprise rests entirely with the Dominion Government. With similar encouragement shown to the Canadian industry as the United States Government shows to its own internal shipbuilding and transportation industries, and Canada would soon be the equal of that country in that respect.

But the Canadian industry must not be handicapped by many of the features which now confront it. As in the United States, the water borne trade of Canada must

not have to submit to the competition of the free trade commerce of Great Britain. Put Canadian built vessels on similar footing to those of the United States where no foreign competition is allowed. Protect our Canadian shipbuilding industry.

THE DANGER OF NEGLECT.

The surest way to lose a valuable thing is to forget its value and neglect its preservation. This fact is likely to come home with some force sooner or later to the producing interests of Canada, because of a disposition to regard the tariff as having been "taken out of politics," and, accordingly, to abate their zeal in behalf of protection as a permanent policy. A vigorous editorial in a recent issue of THE CANADIAN MANUFACTURER points out the dangers attendant upon this state of things, and draws a contrast between the vigor with which the claims of protection were pressed in former years and the do-nothing policy of the present day.

Eternal vigilance is the price of protection wherever free trade is militant and strenuous. This is as true of Canada as of the United States. THE MANUFACTURER in directing attention to the fact performs a bounden duty.

Neglect and indifference on the part of those whose interests are linked with protection are the strongest possible aid and encouragement to the enemies of protection. They always take advantage of that situation. They never sleep. The tariff is never out of politics. It is kept in politics by the "reformers," the "progressives" and the free traders. It is so in the United States. It cannot be otherwise in Canada.

Being always in politics, the tariff is always under discussion. But if the free traders, the "reformers" and the "progressives" do all the discussing, as is very likely to be the case, while the friends of protection remain silent, as is also very likely to be the case, protection must inevitably lose ground.

The American Protective Tariff League exists for the purpose of having something to say about the benefits and advantages of protection. It exists in spite of the apathy and indifference of many who withhold their support from it while enjoying the benefits of protection. It would be well for Canadian labor and industry if a similar organization were in active operation in the Dominion. From the conditions described by THE CANADIAN MANUFACTURER we infer that there is pressing need for such an organization.—The American Economist.

BETTER LATE THAN NEVER.

An important change has been made by the Government in the regulations governing the acquirement of coal-bearing lands in the West still under Government control, with a view to preventing any further alienation of Western coal areas to absolute control of private parties, and also with a view to securing the prompt development of all further areas opened to private enterprise, instead of having them held merely for speculative purposes by the purchasers. Hereafter, according to an order in Council, the Government will only lease rights to mine coal on all lands still comprising Crown domain in the West. Under the previous arrangement the lands acquired

by the Canadian Pacific Railway, the Hudson's Bay Company, the school lands, etc., were given without any proviso as to the Government's right to any coal found on them. Later the law was changed so as to allow the purchasers to buy the surface rights at \$3 per acre, and the coal rights at \$7 per acre, making a total of \$10 per acre for absolute control of all the lands in the coal-bearing areas. A royalty of ten cents per ton on all the coal mined was also required by the Government. Under these regulations, which have now been cancelled, many millions of acres of land have passed out of the control of the Government, and there has been complaint in the West because the coal-bearing areas are not being developed, but are being held for speculative purposes to the detriment of the settlers. It is believed, however, that as much coal bearing land remains still under Government control in Alberta, Saskatchewan and in the Peace River district as has been already alienated. It is proposed that hereafter a 21-year lease be granted to private individuals wishing to get control of coal-bearing lands, and that an annual rental be charged therefor by the Government. This rental will probably be one dollar per acre, and the lease will have to be taken out for a minimum area. This area will, it is said, be about 2500 acres, so that the annual rental cannot be less than \$2,500. This will, it is hoped, insure prompt development and meet the objections as to speculators holding coal lands for a raise in price without doing anything to develop them. It will also pave the way for future Government ownership and operation of coal mines, if it should be deemed advisable.

UP TO THE DOMINION GOVERNMENT.

The industrial good that could have been affected by the operation of the Dominion Export Duties Act through its discouragement of matter exportation may be wrought by Mr. Cochrane's measure, now before the Ontario Legislature, for the encouragement of the refining industry. A provincial bounty of six cents a pound on the refined product should induce the domestic smelters of nickel ore to carry on the treatment of the raw material until it issues as the pure metallic nickel.—The Mail and Empire.

It is no part of the duty of the Ontario Government, nor would it be feasible or workable or desirable for it to attempt to encourage the refining of nickel in this province. It is true that under the regime of the late provincial government a law was passed prohibiting the export of pine logs cut on Crown lands, with the result that the saw-mill and lumber industry was stimulated and encouraged. But there are thousands of acres of pine timber in Ontario growing on other than Crown lands, over the disposition of which the Ontario Government have no control whatever; and much of the timber cut in these are towed across the lakes to American ports and are cut into lumber in American mills. At one time an export duty was levied on Canadian logs carried to American mills for manufacture into lumber, but for political reasons, the restriction was removed. The owners of free Ontario logs are free to dispose of them as they please, but the Ontario Government have a right, and exercise it, of requiring all pine logs cut on Crown lands, to be

manufactured into lumber before they can be carried out of the country.

With nickel ore it is quite different. No nickel ore is mined in Ontario except from private lands, and the Ontario Government has no control whatever over the disposition of it. If the Ontario Government should engage in the nickel ore mining business, it would have a right to say that neither the ore or the matte should be exported but must be refined in the province, but it is not thus engaged, and that phase of the question needs no further discussion at this time. But if it were thus engaged it would have no right to impose an export duty, either upon its own product or upon the product of the private owners of the mines. The Dominion Government alone have a right to impose an export duty, having been authorized by the Dominion Parliament to do so.

Suppose, as suggested by the Mail and Empire, that the Ontario Government should attempt to encourage the nickel refining industry, by giving a bounty of six cents per pound upon the refined product, what good could be accomplished? The United States imposes a like duty of six cents per pound on imports of refined nickel, and it is not at all probable that it would purchase Ontario refined nickel upon which a bounty of 6 cents per pound had been paid, when it could in its own American works produce nickel, refined from Ontario ores, at less cost. Where could a demand abroad or at home be found for Canadian made nickelized armor plate handicapped with a bonus of six cents per pound, or \$120 per ton, in excess of its intrinsic value in competition with the American product? The value of the imports of refined nickel and manufactures of nickel into Canada amounts to only a few hundred thousand dollars a year, and the Ontario Government would find it to be an exceedingly unprofitable undertaking to bonus an industry to the extent of \$120 per ton of production of an article for which there would be no export demand under the handicap.

The only manner in which Canada can at present benefit from its wealth of nickel ore is to impose an export duty on it quite equal to the import duty imposed by the United States on refined nickel. Should that be done some of the benefit resulting from the presence of the ore in Canada would flow to Canada, and it is up to the Dominion Government to impose the duty.

TO BE REMEMBERED.

Toronto manufacturers should, at the next municipal elections, at which controllers and aldermen are to be elected, remember the discussion that occurred in the Toronto City Council a few days ago, and to bear in mind at that time the names of the men who sold themselves to the labor organizations.

The contract for city printing was under consideration and a petition was presented asking that the label of the allied printing trades be required on all stationery.

This is the way the Toronto daily papers reported the doings:

Ald. Wilson's resolution read as follows:

"That the Council of the Corporation of Toronto approve of the principle of placing the union label on all

city printing as a guarantee of fair wages and hours, and approved sanitary conditions, and that we request the firm securing printing contract for the next three years to place the label on all city printing."

Ald. McMurrich opposed the motion. He said:

"We represent not only those in the trade who use the union label, but those who do not wish to do so, and it would be an act of coercion to force them to use the label."

The Mayor—"We are not forcing them; we are only recommending this."

Ald. McMurrich—"The principle is not a right one; we should not shut out certain printers from doing business with the city."

Ald. McBride—"If it is illegal to force any firm to use the union label we have no right to request them, for that is the same thing. We might as well settle this question first as last."

Ald. Keeler—"Let the Board of Control deal with it first, as it is a question of policy. It is not a good thing to railroad things through Council. I move an amendment that it be sent to the Board of Control to consider."

Ald. Geary—"There is a certain amount of missionary work that the Council can indulge in, in favor of the union label, but I think it could well go to the Board of Control first."

Controller Hocken thought it would be well to pass the motion as it would be an expression of opinion of Council, and he would like to see this done.

Mr. James Simpson was the spokesman for the printers, and Mr. E. A. DuVernet appeared for the employers. The proceedings became lively at the close through a warm dispute between Mr. Rose and Mr. Simpson over the relative merits of union and non-union shops.

Mr. Simpson urged the Board to recognize the label by ordering it put on all the printing. This would encourage an improvement in the work done and would be perfectly fair to all. A union shop tended to better conditions for the working men all along the line. The printers, however, had no objection to the firm that was doing the printing now, as it was a union firm.

"It would be a great thing for a big municipality like Toronto," he said, "to endorse unionism in that way. If those who are opposed to this take it to the courts we are prepared for them."

Then came the argument that the case of Kelly v. Winnipeg upheld the right of the municipality to adopt the union label.

Mr. DuVernet before answering this point referred to the decision in the Crown Tailoring Company's action.

"It is seldom the Chancellor gets hot, but he did this time," he declared. "In his judgment he said it was beyond the power of the Board; that it was restricting competition and creating a monopoly, and he granted the injunction with costs against the city. Organized labor has gone to the utmost limit in Toronto and has been given all the privileges that the law allows."

The Kelly case, he declared, while allowing a corporation to create a special rate of wages for itself, prevented it from exacting any but the prevailing rate for outside work. "It is impossible for the city to use the label unless you first secure special legislation."

Mr. Chisholm, City Solicitor—"Mr. DuVernet has put the case fairly and exactly. In the Crown Tailoring Company's case the union label term was put in the specifications contrary to the advice of Mr. Fullerton. The present case cannot be distinguished from that in any point."

The Mayor—"Is your advice, then, that we have no legal right to require the union label on our printing?"

Mr. Chisholm—"There is no question as to that we cannot do it."

Controller Ward suggested sending on a recommendation to Council favoring the label.

Controller Hocken—"I am heartily in sympathy with what has been asked, but we must keep within our legal rights. I would be prepared to take the chance and do it if the Chancellor's decision against us were not already given. I will do all in my power to assist you in getting an amendment through the Legislature. If you get it there you will get the right for every city in Ontario."

"I was under the impression that the Winnipeg decision was given after the Crown Tailoring Company's," remarked Mr. Simpson.

"No," replied the City Solicitor, "the Manitoba case was thoroughly discussed at the Toronto one."

"That knocks the wind out of our sails," remarked a member of the deputation.

Non-unionism now asserted itself in the person of Mr. G. M. Rose, manager of Hunter, Rose & Co.

"It's a strange thing that this is brought up just at a time when we are negotiating with the printers for a new agreement. This is purely and simply a plan for coercing the employers. The best offices do not use the union label; it is no guarantee of quality. We used it some time ago, but threw it out because we were being dictated to how we should run our business."

Ald. Wilson—"I do not want to coerce; this is simply a matter of moral suasion. This would be a help in creating a little public opinion at the present time."

Ald. Wilson refused to withdraw his motion from Council. Ald. Keeler's amendment was defeated by a vote of 13 to 10, and the original motion carried by 18 to 5.

Amendment to refer to Board of Control:

For (10)—Vaughan, McGhie, Adams, McMurrich, E. Hales, Lytle, Whytock, Keeler, McBride, the Mayor.

Against (13)—Geary, J. J. Graham, Chisholm, Church, Wilson, R. H. Graham, James Hales, Bengough, Foster, Controllers Harrison, Hocken, Ward and Hubbard.

Motion to approve of union label:

For (17)—Geary, J. J. Graham, Chisholm, McGhie, Church, Wilson, R. H. Graham, E. Hales, J. Hales, Bengough, Foster, Keeler, Hocken, Harrison, Ward, Hubbard, the Mayor.

Against (5)—Adams, McMurrich, Lytle, Whytock, McBride.

EDITORIAL NOTES.

After all the jolting and re-jolting and readjustment of prices in the stock market during the past month the consoling facts remain that not a railroad property in the United States is really worth any less to-day than it was on March 1; that not one mine is turning out any less "pay" metal; that not an industry in the entire country has had its earning capacity impaired; that not one bond issue on property or credit anywhere between the two oceans will default its next regularly-due interest in consequence; and that no bank or trust company, no industrial or other corporation and no firm or individual has been made insolvent by the shock.

In the House of Commons a few days ago Hon. William Patterson, the Minister of Customs, stated that the value of sea borne imports landed at Canadian seaports, both Atlantic and Pacific, including Montreal, for transportation through Canada to points in the United States, amounted in the fiscal year 1906 to \$23,953,281. Of course all these goods are carried in bond, and shows to what large extent the United States uses the bonding

privilege. The Minister did not state the value of imports into Canada for home consumption through United States ports. And yet there are those in Canada who desire to have cancelled the arrangement by which this traffic is possible.

Though last year the foreign commerce of the United States, amounted to the magnificent total of \$3,000,000,000 the internal trade of the country, based on single transactions, was, according to the estimates of the Bureau of Statistics, \$25,000,000,000. Last year the products of manufactures were \$12,000,000,000; farm products \$6,000,000,000, and mineral products \$2,000,000,000. Of this total of \$20,000,000,000 of manufactured articles, farm products and mineral products, only \$1,800,000,000 were exported, or less than one-tenth.

Foreign-built vessels, purchased by Newfoundlanders, are admitted to British registry in Newfoundland duty free, while a Canadian purchasing a foreign vessel and seeking British registry in the Dominion pays a registration fee of 25 per cent. of the ship's value. He can secure British registry in Newfoundland by paying a fee of only 5 per cent. This is the reason given why so many foreign vessels purchased by Canadians seek British registry in Newfoundland.

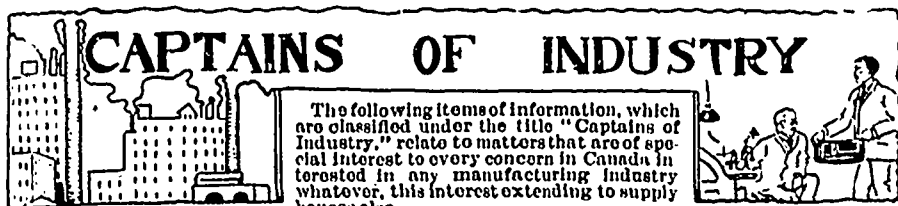
Toronto has been invited by the Jamestown Exhibition Company to name a date between April 26 and November 30 which shall be known at the exhibition as Toronto Day.

Mr. Charles Hyman, although far away, is not forgotten by his admiring colleagues, as witness the presentation to him by these free traders of 2½ per cent. more protection upon the sole leather which he makes.—Mail and Empire.

Does the protectionist Mail and Empire object to a little more protection to the sole leather industry of Canada because Hon. Mr. Hyman, a manufacturer of sole leather, happens to be a Minister of the Dominion Government?

A telegram from Halifax, N.S., dated March 20, says: The Dominion No. 4 coal mine in Glace Bay is idle, owing to the refusal of the men belonging to the Provincial Workmen's Association to go below the surface with non-union men. Eight hundred men are out on strike. At a meeting held by the P.W.A. a fortnight ago a motion was passed that if all the men working in the mines were not members of the Workmen's Association by March 19, a strike would be declared. The time was up yesterday, and as the full force of non-union men had not come "in," the men were ordered by their officers to stay at home to-day.

"O Liberty, what crimes are perpetrated in thy name." The "officers" of the P.W.A. are tyrants and oppressors and the men are only dumb, driven cattle, forced to do as they are told.



The following items of information, which are classified under the title "Captains of Industry," relate to matters that are of special interest to every concern in Canada in whatever in any manufacturing industry whatever, this interest extending to supply houses also.

The ratepayers of Stratford, Ont., voted favorably on two by-laws, one for \$12,000, guaranteeing the bonds of the Cline Furniture Co., to provide for an addition to the factory, and another for \$10,000, guaranteeing the bonds of the Kurtze, McLean Co., and granting exemption for ten years. The latter firm propose to manufacture acetylene gas plants and small motor vehicles.

The car shops of the Grand Trunk Railway Co., London, Ont., will be considerably enlarged.

Canada Furniture Manufacturers, Woodstock, Ont., will erect an addition 150x86 feet, to their factory at a cost of about \$15,000.

The Hedley Shaw Milling Co., having extensive mills in Oakville, Thorold and St. Catharines, Ont., have amalgamated with the Maple Leaf Milling Co., of Kenora, Ont., and the merger will make one of the largest milling companies in the Dominion. The new business will continue under the firm name of the Hedley Shaw Milling Co. The plant at St. Catharines, Ont., will be enlarged and a new mill will be built at Kenora, Ont., to have a capacity of 50,000 barrels per day.

The Safe Oil & Gas Co., Chatham, Ont., have been incorporated with a capital of \$150,000, to manufacture oil, gas, petroleum, etc. The charter members include W. Stanworth, J. T. O'Keefe and T. Drew, Chatham, Ont.

The Cobalt Concentrators, Limited, Cobalt, Ont., who have been organized to erect custom concentrators at Cobalt for the purpose of concentrating and reducing ores from the mines in the Cobalt silver district, have closed contract with the Ore Reduction Co., of Toronto, for the building and installation of ore concentrating and sampling machinery, having a capacity of 100 tons of crude ore per day. The total cost of the machinery installed is \$35,000.

The premises of the Singer Sewing Machine Co. and the Gurney Furnace Co., Yonge Street, Toronto, were damaged by fire March 20. Loss about \$6,000.

The Lakes Transportation Co., Toronto, have been incorporated with a capital of \$100,000, to build vessels, boats, barges, etc. The provisional directors include A. C. Thompson, W. H. Williams and W. A. Douglass, Toronto.

The Council, London, Ont., will be asked to issue debentures to the amount of \$25,000 for service and main extensions, and \$11,750 for spring extensions, making \$36,750 in all.

The ratepayers of Oakville, Ont., voted favorably on a by-law to raise \$15,000 for the erection of a first-class High School.

A waterworks and gas system will be installed in Deseronto, Ont., at a cost of about \$50,000.

The T. Eaton Co., Toronto, have taken out a permit for the erection of a building on the corner of Albert and Yonge Streets, at a cost of about \$170,000.

The premises of Messrs. Assaly & Co., the Powell House, the Commercial Hotel, and several other buildings, Iroquois, Ont., were destroyed by fire March 26. Loss about \$40,000.

A new school will be erected at Dresden, Ont., at a cost of about \$27,000.

The Hamilton Steel & Iron Co., Hamilton, Ont., will erect additions to their blast furnace and their open hearth steel plant, at a cost of about \$350,000.

The Confederation Life Association, Toronto, will erect an eight story building on the corner of Queen and Victoria streets, at a cost of about \$200,000.

A sewerage system will be installed in Aylmer, Ont., at a cost of about \$60,000.

The carriage shop of J. Wilson, Listowel, Ont., was destroyed by fire March 16. Loss about \$1,200.

One of the storehouses of the Riordan Paper Mills, Merriton, Ont., was destroyed by fire March 17.

Canada Consolidated Cobalt Syndicate, Toronto, have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include J. M. Ewing, A. G. Ross and W. S. Edwards, Toronto.

The grain elevator and cider mill of J. L. Schneider, Moorfield, Ont., was destroyed by fire recently.

Joseph Zuber, Berlin, Ont., will erect a new four story hotel at a cost of about \$75,000 on the site of the present Market Hotel.

The premises of the Iroquois Hotel, Sault Ste. Marie, Ont., were destroyed by fire recently. Loss about \$200,000.

The hardware store of Messrs. McKelvey & Birch, Kingston, Ont., was damaged by fire March 23, to the extent of about \$21,000.

The Hamilton & Fort William Navigation Co., Hamilton, Ont., have been incorporated with a capital of \$1,000,000, to manufacture steamboats, vessels, etc. The provisional directors include A. E. Carpenter, A. B. MacKay and G. Hope, Hamilton, Ont.

The premises of Victoria Hall, a high-class summer hotel, Niagara Falls, Ont., were destroyed by fire March 16. Loss about \$16,000.

The factory of the Manning Wood Fibre Co., Owen Sound, Ont., including considerable new machinery, was destroyed by fire March 17. Loss about \$6,000.

Electro Metals, Limited, Welland, Ont., have been incorporated with a capital of \$300,000, to manufacture metals, ores, etc. The provisional directors include D. Ross, G. C. Brown and B. J. McCormick, Welland, Ont.

Donnacona, Limited, Hamilton, Ont., have been incorporated with a capital of \$40,000, to manufacture steamboats, vessels, barges, etc. The provisional directors include W.

Southam, J. Milne, and A. B. Mackay, Hamilton, Ont.

Canadian Cutlery Co., Toronto, have been incorporated with a capital of \$150,000, to manufacture cutlery, tools, brushes, toilet cases, etc. The provisional directors include D. Eastman, G. P. Deacon and W. W. Stoddart, Toronto.

The Golden Peak Larder Lake Exploration & Mining Co., Toronto, have been incorporated with a capital of \$250,000, to carry on a mining, milling and reduction business. The provisional directors include D. W. Livingstone, J. Barnes, and J. E. Hearn, Toronto.

The People's Co-operative Association, Port Arthur, Ont., have been incorporated with a capital of \$40,000, to manufacture goods, wares, merchandise, etc. The provisional directors include R. Ferguson, G. W. Bell and W. H. Mills, Port Arthur, Ont.

Silver 9 Cobalt Mines, Limited, Ottawa, have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include J. W. Garvin, F. A. Scott and J. A. Carss, Ottawa.

Goderich Wheel Rigs, Limited, Goderich, Ont., have been incorporated with a capital of \$150,000, to manufacture carriages, wagons, bicycles, rattan furniture, etc. The provisional directors include G. C. Thomson, Toronto, C. S. Lloyd, Watford, Ont., F. C. Brandt, Elmira, Ont.

Tate Electrolytic Co., of Canada, Toronto, have been incorporated with a capital of \$150,000, to manufacture electrical instruments, machinery, appliances, etc. The provisional directors include A. O. Tate, F. A. Drake and W. W. Sloan, Toronto.

The Toronto Cartage, Limited, Toronto, have been incorporated with a capital of \$40,000, to carry on a general cartage, express, warehouse and storage business. The provisional directors include W. B. Stringer, J. J. McCabe and A. Waddell, Toronto.

The Cobalt Silver-Gold Pool Mining Co., Cobalt, Ont., have been incorporated with a capital of \$100,000, to carry on a mining, milling and reduction business. The provisional directors include A. Harrison, A. J. May and B. Gratton, Cobalt, Ont.

The Winnipeg-Cobalt Prospecting & Development Co., Kenora, Ont., have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include F. W. Rimer, R. H. Hayward and G. A. Henson, Winnipeg, Man.

Owen-Daveno Bed Co., Toronto, have been incorporated with a capital of \$50,000, to manufacture beds, lounges, sofas, furniture, etc. The provisional directors include W. Postlethwaite, T. P. Kent and W. J. Craig, Toronto.

Messrs. Reiner Bros. & Co., Wellesley, Ont., have been incorporated with a capital of \$100,000, to manufacture woolen and knitted goods, etc. The provisional directors include J. G. Reiner, E. K. Reiner and A. E. Reiner, Wellesley, Waterloo county, Ont.

Ed. Mack, Limited, Toronto, have been incorporated with a capital of \$40,000, to manufacture clothing, etc. The provisional directors include J. E. Mack, L. E. Thomas and N. B. Henry, Toronto.

The Chesterville Larder Lake Gold Mining Co., Chesterville, Ont., have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include J. T. Kearns, W. B. Lawson and W. J. Elliott, Chesterville, Ont.

St. Thomas Canning Co., London, Ont., have been incorporated with a capital of \$100,000, to carry on a canning, packing and preserving business. The provisional directors include H. T. Reason, B. V. Hole and G. E. Coleman, London, Ont.

Messrs. McClellan & Co., Bowmanville, Ont., have been incorporated with a capital of \$70,000, to manufacture goods, wares, merchandise, etc. The provisional directors include J. McClellan, W. Cann and T. C. Jewell, Bowmanville, Ont.

American Consolidated Mining Co., Toronto, have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include J. M. Ewing, M. L. Gordon and F. H. McCarthy, Toronto.

J. H. McKnight Construction Co., Toronto, have been incorporated with a capital of \$40,000, to construct sewers, bridges, railways, buildings, etc. The provisional directors include J. H. McKnight, J. Shields and W. E. Douglas, Toronto.

Le Roi Larder Lake Mines, Haileybury, Ont., have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include B. E. Cartwright, A. J. Murphy and G. F. Jackson, Haileybury, Ont.

The Floyd Silver Mines, Toronto, have been incorporated with a capital of \$2,000,000, to carry on a mining, milling and reduction business. The provisional directors include W. H. Blain, J. Fisher and E. M. Wilson, Toronto.

Canadian Smokeless Powder Co., Sherkston, Ont., have been incorporated with a capital of \$150,000, to manufacture smokeless powder, explosive compounds, etc. The provisional directors include J. C. Hurley, J. P. Fritz and W. Wilhelm, Sherkston, Ont.

Blind River Saddlery Co., Blind River, Ont., have been incorporated with a capital of \$25,000, to manufacture harness, saddles, trunks, valises, blankets, robes, etc. The provisional directors include J. J. Bierlein, L. Burke and W. McDougall, Blind River, Ont.

The Dowker Brick Co., Fort Frances, Ont., have been incorporated with a capital of \$40,000, to manufacture brick, tile, building materials, etc. The provisional directors include J. E. Arnold, W. F. Pratt, Fort Frances, Ont., A. Dowker, McIrvine township, Rainy River District, Ont.

Haileybury Townsite Mining Co., Sudbury, Ont., have been incorporated with a capital of \$750,000, to carry on a mining, milling and reduction business. The provisional directors include D. L. McKinnon, C. V. Price and P. J. Green, Sudbury, Ont.

Messrs. Taylor Bros., Carleton Place, Ont., have been incorporated with a capital of \$75,000, to carry on a general roofing, plumbing and tin-smithing business. The provisional directors include J. D. Taylor, C. F. R. Taylor and W. Taylor, Carleton Place, Ont.

W. J. Trethewey Co., Toronto, have been incorporated with a capital of \$1,000,000, to

carry on a mining, milling, and reduction business. The provisional directors include G. Verney, J. Osborne and C. M. Bartram, Toronto.

The Hamilton Rural Telephone Co., Cold-springs, Ont., have been incorporated with a capital of \$10,000, to carry on the business of a telephone company. The provisional directors include F. A. G. Nixon, W. E. Lacey, J. Thompson, Hamilton township, Ont.

The La Salle Development Co., Toronto, have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include M. Hunt, G. W. Wilkinson and S. J. Armstrong, Toronto.

Cobalt Syndicate of Montreal, Toronto, have been incorporated with a capital of \$600,000, to carry on a mining, milling and reduction business. The provisional directors include J. E. Day, J. M. Ferguson and E. V. O'Sullivan, Toronto.

The Federal Oil Co., Toronto, have been incorporated with a capital of \$200,000, to carry on a mining, milling and reduction business. The provisional directors include T. H. Barton, F. D. Byers and O. F. Taylor, Toronto.

The Cobalt Certainty Silver Mines, Toronto, have been incorporated with a capital of \$2,000,000, to carry on a mining, milling and reduction business. The provisional directors include H. L. Burnes, T. A. Silverthorn, F. H. Potts, Toronto.

The For' Automatic Fire Shutter Co., Niagara Falls, Ont., have been incorporated with a capital of \$40,000, to manufacture automatic fire shutters, fire protection appliances, equipment, etc. The provisional directors include R. P. Slater, F. E. Dalton, Niagara Falls, Ont., and W. W. Ford, Bridgeburg, Ont.

The Highland Lumber Co., Huntsville, Ont., have been incorporated with a capital of \$100,000, to manufacture lumber, timber shingles, laths, woodenware, etc. The provisional directors include O. D. Tait, E. C. Wainwright and H. L. Heath, Huntsville, Ont.

The Northern Electric & Mfg. Co. of Montreal, have just opened a sales office and warehouse in Kelly Building, Winnipeg, where they will carry a stock for Western Canada of telephones, line material and supplies.

The Midland Electric Co., of St. Peter St., Montreal, are moving to new offices and warehouse on Youville Sq.

The Tariff Commission's report states that the pottery industry shows that trade with Canada increased 100 per cent. in the last 25 years. The increase has been especially marked since Canada granted the preference. In Australia, where no preference has been granted, there has been a heavy decline.

The premises of the Strathroy Soda Water works, owned by R. Taylor, Strathroy, Ont., were destroyed by fire March 14. Loss about \$1,000.

The stock room of the Ingersoll Glove & Mitten Co., Ingersoll, Ont., was damaged by fire March 13.

The Seth C. Nutter Brewery, Cornwall, Ont., have been incorporated with a capital of \$500,000, to carry on a brewing and malting business. The provisional directors include

H. W. Prendergast, L. Gosselin, Montreal and W. Hibbard, Westmount, Que.

Work has been commenced on the new grand stand for the Toronto Industrial Exhibition.

The O'Boyle Bros. Construction Co., Saul Ste. Marie, Ont., have been awarded the contract by the Temiskaming Railway Commission for the construction of their new office building at North Bay, Ont.

Messrs. Chisholm & Birkett, Kingston, Ont., will erect a brick-making plant at Washburn, on the Rideau River. The head office of the company will be in Ottawa.

Natural gas was turned into the mains of the Chatham Gas Co., Chatham, Ont., on March 19 for the first time, the gas being brought from near Tilbury.

The Canadian Brass Mfg. Co., Galt, Ont., have been incorporated with a capital of \$40,000, to manufacture brass, brass goods, and articles, etc. The provisional directors include F. E. Brown, Galt, Ont., H. H. Tilling-paste and J. C. Raymond, Toronto.

The Port Milford Packing Co., Port Milford, Ont., have been incorporated with a capital of \$40,000, to carry on a packing and canning business. The provisional directors include G. S. Ackerman, D. J. Love and L. Minaker, South Marysburgh Township, Ont.

The Strong Drug Co., Haileybury, Ont., have been incorporated with a capital of \$20,000, to manufacture drugs, chemicals, etc. The provisional directors include N. B. Strong, J. E. Gardiner and J. Woodhouse, Haileybury, Ont.

The Electric Light Co., Carleton Place, Ont., have agreed to sell to the town their electric light plant and everything in connection with same, together with the water-power on the north side of the river, for the sum of \$40,000.

The enlargement to the plant of the Electric Light Co., Barrie, Ont., has been completed and the new equipment is now running in service. K. L. Aitken, consulting engineer, Toronto, made an extensive series of tests and all the apparatus has been accepted.

Surveys are now being made for the proposed extension of the Toronto and Northern Ontario Railway line from Cobalt to Sudbury, Ont.

The London Street Railway Co., London, Ont., will erect an addition to their building at a cost of about \$50,000.

The Canadian Pacific Railway Co. will erect an engine house at Kenora, Ont. at a cost of about \$100,000.

The Ottawa Street Railway Co., Ottawa, will widen the Somerset street bridge by sixteen feet.

The Lucky Strike Cobalt Silver Mining Co., Cobalt, Ont., have been incorporated with a capital of \$3,000,000, to carry on a mining, milling and reduction business. The provisional directors include F. A. Lewis, H. D. McCormick and D. A. Rose, Toronto.

The Ontario Interurban Electric Railway Co. will build an electric railway from Belleville across the Bay of Quinte bridge, through the township of Ameliasburg and Hallowell to Wellington, thence to Picton, Ont.

Tenders will be received up to April 10 for the furnishing of all materials and labour for a system of sewers for the town of Brantford.

Ont Willis Chipman, Toronto, is chief engineer.

Department of Public Works, Ottawa, invites tenders up to April 18 for the completion of the breakwater at Goderich, Ont.

Messrs. Hyslop Bros., Toronto, have taken out a permit to erect a two-story concrete garage at the corner of Victoria and Shuter Streets.

England's Premier Cobalt Mining Co., Toronto, have been incorporated with a capital of \$1,100,000, to carry on a mining, milling and reduction business. The provisional directors include J. T. Richardson, D. C. Ross and L. B. Spencer, Toronto.

Stratheona, Limited, Hamilton, Ont., have been incorporated with a capital of \$40,000, to build steamboats, vessels, barges, etc. The provisional directors include G. L. Staunton, G. Hope and A. B. MacKay, Hamilton, Ont.

Big Silver Mining Co., Toronto, have been incorporated with a capital of \$2,000,000, to carry on a mining, milling and reduction business. The provisional directors include H. L. Burns, T. A. Silverthorn and F. A. Potts, Toronto.

At the annual meeting of the Ontario Lantern & Lamp Co., Limited, Hamilton, Ont., the officers elected were:—President, W. H. Ginder; vice-president, F. W. Gates; secretary-treasurer, W. S. Moore. The company have almost completed a three story brick annex, 125x45 feet to their plant. The lower floor will be used for a shipping room, the second for plating, and the third will be equipped with automatic machinery for making all kinds of burners.

The Petrie Mfg. Co., Hamilton, Ont., are planning to build a factory in the United States. Since cream separators are on the free list here, and have a 25 per cent. duty in the States, Mr. Petrie claims it is more profitable to manufacture on the other side where both markets are available.

The Canadian Westinghouse Co., Hamilton, Ont., will add one story to the air brake plant this year. The foundations are being laid for a three story addition to the office building. The total cost of these enlargements is said to be in the neighborhood of \$80,000.

Geo. Foster & Sons, Brantford, Ont., will erect a four story grocery warehouse, 132x54 feet. It will be of concrete reinforced on the Kahn system.

The new buildings of the Canadian Ramapo Iron Works, Niagara Falls, Ont., are completed and machinery is being installed.

Henry Disston & Sons, Limited, will treble the capacity of their plant at Toronto for the manufacture of mill, gang, circular and band saws this year. The buildings recently commenced include a furnace room and tempering oven 90x26 feet, 2 stories, of brick, steel, and concrete, on Lombard Street, and a building, 70x52 feet, two stories, connecting the buildings on Lombard Street with those on Adelaide East. G. W. Gouinlock is the architect.

The Shipway Iron, Bell & Wire Mfg. Co., Toronto, have decided not to move their plant to Niagara Falls.

The Phillips Mfg. Co., Toronto, are building a new factory for the manufacture of moulding machine frames, mirror plates, etc., on

Carlaw Avenue. The buildings, which will be of brick and wood, two stories, will cover about two acres of ground. E. J. Lennox, Toronto, is the architect. The contract for wood-work has been let to Moir & Co., and for brick work to Page & Co., Toronto. Work will be completed about August 1.

McGregor & McIntyre, Limited, Toronto, structural steel workers, will build a one story steel and brick extension, 80x50 feet, to their shops, on Pearl Street. Plans are completed, and work will be commenced at once. A pneumatic rivetting plant and beam shears will be installed.

H. G. Vogel & Co., Montreal, are installing a sprinkler system for the Ontario Box Co., Hamilton.

The Parkin Elevator Co., Hamilton, Ont., will move their entire works to Hespeler, Ont., where they will manufacture all kinds of hoisting machinery. Work will be commenced at once on buildings as follows: machine shop, 240x60 feet; foundry, 75x75 feet; ornamental iron shop, 75x40 feet; electric shop, 75x40 feet; wood shop, 75x40 feet; all of brick, one story.

The Ellis Mfg. Co., Hamilton, Ont., manufacturers of knit goods, will add about \$10,000 in new equipment this year.

The Force Food Co., Hamilton, Ont., are installing new machinery at a cost of about \$3,000, for the manufacture of corn flakes.

The new spinning mill of the Penman Mfg. Co., at Paris, Ont., is almost completed, and machinery is being installed. The building is of brick, mill construction, three stories, 180x75 feet, and provision is made for future extension of 100 feet. A picker house, 115x80 feet, three stories, and a dye house, 120x115 feet, three stories, will be built this spring, to be ready for occupation by midsummer.

The Paris Plow Co., Paris, Ont., will erect an iron foundry, a pattern storage house, and an office building this spring.

The Brantford Hosiery Co., Brantford, Ont., are installing machinery for the manufacture of cashmere hosiery, to replace imported goods.

The Brantford Cordage Co., Limited, Brantford, Ont., will erect a one story brick building, 100x60 feet for the manufacture of rope and cordage next fall.

The Massey-Harris Co., Limited, Brantford, Ont., have virtually completed the extension to their main building commenced last October. Next summer an extension of 100 feet will be added to the foundry, and a new blacksmith shop, 215x75 feet, a one story steel building, will be built over the present building, which will afterwards be torn down.

James Mines, Limited, Toronto, have been incorporated with a capital of \$25,000, to carry on a mining, milling and reduction business. The provisional directors include W. R. P. Parker, G. M. Clark and J. A. McEvoy, Toronto.

Neal Baking Co., Windsor, Ont., have been incorporated with a capital of \$40,000, to manufacture confectionery, etc. The provisional directors include F. H. Neal, W. H. Neal and C. E. Neal, Windsor, Ont.

John Mann & Son, Brantford, Ont., will build a factory for the manufacture of sand lime bricks. They will build a bloom frame, which they will brick around with their own

bricks after the works are in operation. They expect to be in operation in May.

The Gould, Shapley & Muir Co., Limited, Brantford, Ont., will build a new machine shop, a wood working department, a storage warehouse, and an extension to their foundry this year at a total cost of about \$50,000. The removal of three frame and one brick dwellings now occupying the site of the proposed buildings will be begun at once.

Slingsby Bros., Brantford, Ont., will erect a four story brick addition 60x60 feet to accommodate new machinery for the manufacture of blankets, etc. Work will be begun this month.

The new plant of the American Radiator Co., at Brantford, Ont., will commence operation during April. It will be devoted exclusively to the manufacture of boilers.

Searfe & Co., Brantford, Ont., manufacturers of varnishes, Japans, and sizes, will erect a two story brick office building 35x18 feet; also an additional story, 55x40 feet, to part of their factory. Work will begin at once.

Electrical Specialties, Limited, Toronto, have been incorporated with a capital of \$300,000, to produce electricity for the purpose of lighting, heating, etc. The provisional directors include A. C. McMaster, G. R. Geary and F. D. Byers, Toronto.

The Canada Steel Goods Co., Hamilton, Ont., will build a 100x58 feet one story addition to their present building, to be used for cold rolling plant and pickling work; also a new two story building, 150x70 feet, to be used for storehouse and stockroom. In part of the new building gas furnaces will be installed for stamping. Stewart & Witton, Hamilton, are the architects.

The Hillman Copper Co., Sault Ste. Marie, Ont., have been incorporated with a capital of \$60,000, to carry on a mining, milling and reduction business. The provisional directors include H. A. McKinnon, W. Calder and E. J. Ewing, Sault Ste. Marie, Ont.

Buntin, Gillies & Co., Limited, Hamilton, Ont., wholesale paper dealers and manufacturers of paper specialties, expect to be settled in their new premises on John Street S., by May 1. The new building is five stories, 140x70 feet, brick mill construction, modern in every way.

R. S. Rider has been appointed secretary-treasurer of the Canadian Steel & Wire Co., Limited, Hamilton, Ont., to succeed A. B. Manship, who died in February.

Canadian Cannery, Limited, Hamilton, Ont., are erecting new factories at Belle River, Amherstburg, Waterford and Bloomfield. These buildings will be of cement, and will cost about \$12,000 each. Equipment for each will cost about \$8,000. The present buildings at Amherstburg and Waterford will be used for storage. Jos. Davis, Aylmer, Ont., is contractor for the Belle River and Amherstburg factories. An addition will also be made to the Aylmer Canning Co. factory, Hamilton, of a brick building, two stories and basement, 156x110 feet. Extensive repairs are being made to some of the other factories and a large amount of new machinery is being installed.

The Martin Pump & Machine Co., 541 Queen Street East, Toronto, are building a brick addition which will double the capacity of their shop.

J. W. Dulaney & Co., Toronto, have completed installing machinery in their new premises, 156 Duke Street, and are equipped for the manufacture of machinery, tools, dies, etc.

The Canadian General Electric Co., Toronto, will erect a five story, steel frame, head office building at the corner of Simcoe and King Streets. Messrs. Darling & Pearson are the architects.

The Carbon Paper & Ribbon Mfg. Co., Toronto, manufacturers of typewriter ribbons, stencil papers, stencil inks, etc., have purchased the three-story brick building at 176-178 Richmond Street West, and expect to move into the new premises about July 1. The rapidly increasing business, domestic and foreign has forced them to seek larger quarters.

The Majestic Brass Mfg. Co., Toronto, have about completed installing their machinery in their factory at 34 Adelaide Street West, for the manufacture of brass and bronze goods, electro-plating, brass and copper plating, small machine work, etc. H. E. Evans is manager, Alex. Dingwall, secretary-treasurer.

The Harvey Quilting Co., Limited, Pearl Street, Toronto, manufacturers of comforters and feather and down goods, are installing new machinery at a cost of about \$1,500, increasing their capacity about 30 per cent.

Gerhard Heintzman Co., Limited, Toronto, are spending about \$70,000 on their plant this year. A new five story brick building on the corner of Sherbourne and Duke Street, is just completed. The old four story building next will be replaced by a new five story brick building, giving 225 feet frontage on Sherbourne Street, when completed.

Stadacona, Limited, Hamilton, Ont., have been incorporated with a capital of \$40,000, to construct steamboats, vessels, etc. The provisional directors include W. Southam, J. Milne and C. E. Doolittle, Hamilton, Ont.

The Campbell-MacLaurin Lumber Co., Montreal, have been incorporated with a capital of \$100,000, to manufacture lumber, timber, shingles, lath, ties, doors, sashes, etc. The charter members include A. H. Campbell, New York City, A. MacLaurin, Montreal, and N. G. Larmouth, Ottawa.

The E. W. Wetzel Co., Toronto, have been incorporated with a capital of \$20,000, to manufacture silks, cottons, wearing apparel, etc. The provisional directors include E. W. Wetzel, E. Lipper and J. C. MacGowan, Montreal.

The International Steel Co., of Canada, Montreal, have been incorporated with a capital of \$500,000, to manufacture machinery electrical and steam devices, etc., and carry on the business of machinists and engineers. The charter members include A. R. Oughtred, M. A. Phelan and E. G. Place, Montreal.

Phoenix Mines, Limited, Montreal, have been incorporated with a capital of \$200,000, to carry on a mining, milling and reduction business. The charter members include A. H. Duff, J. A. Walker and R. T. Heneker, Montreal.

Messrs. F. X. St. Charles & Co., Montreal, have been incorporated with a capital of \$200,000, to carry on a brewing and malting business. The charter members include

F. X. St. Charles, C. Raymond and A. Germain, Montreal.

Messrs. T. Lessard & Co., Montreal, have been incorporated with a capital of \$95,000, to build elevators, warehouses, factories, mills, etc. The charter members include T. Lessard, O. Parent and A. Charbonneau, Montreal.

The Stewart Bottling Co., Montreal, have been incorporated with a capital of \$40,000, to manufacture chemicals, mineral waters, etc. The charter members include W. Stewart, C. S. Stewart, and A. T. Stewart, Montreal.

The Dominion Government have purchased the Montreal Gazette building for \$200,000, and will erect a new postoffice.

The Canadian Pacific Railway Co. have given out a statement in regard to the new lines that will be under construction this year by the company. This statement shows that altogether the company has in hand extensions amounting to 958 miles of new lines, while the double tracking comprises nearly 1,500 miles, including 426.7 miles from Winnipeg to Fort William, Ont., and 108 miles from St. Anne's to Smith's Falls, Ont.

Lachute Knitting Co., Argenteuil, Que., have been incorporated with a capital of \$20,000, to manufacture wool, cotton, textiles, etc. The charter members include H. R. Hammond, W. Howard and T. Griffith, Lachute, Que.

The Alliance Mfg. Co., St. Louis de Mile End, Que., have been incorporated with a capital of \$140,000, to manufacture silk, wool, cotton, linen, etc. The charter members include J. A. McGee, W. York and J. G. Fisher, Montreal.

The United Quebec Cigar Co., Quebec City, have been incorporated with a capital of \$20,000, to manufacture cigars, tobaccos, etc. The charter members include N. Lechasseur, F. Lavoie and C. J. Laberge, Quebec City.

The building on Notre Dame St., Montreal, owned by D. Morrice, Sons & Co., and occupied by the Canada Tag & Label Printing Co., and the Hudson Bay Knitting Co., was damaged by fire March 21. Loss about \$100,000.

The Roman Catholic church, Marieville, Que., was destroyed by fire March 27. Loss about \$80,000.

The General Hospital building, Montreal, is to be replaced by a large new building on the same location at a cost of about \$500,000.

The foundry of Messrs. Garth & Co., Maison-neuve Street, Montreal, was damaged by fire March 14. Loss about \$8,000.

D. K. McLaren, Limited, Montreal, have been incorporated with a capital of \$250,000, to manufacture belting, factory and mill supplies, machinery, etc. The charter members include D. K. McLaren, W. F. McLaren and R. M. W. McLaren, Montreal.

Metcalf Engineering, Limited, Montreal, have been incorporated with a capital of \$25,000, to construct elevators, bridges, railways, machinery, etc. The charter members include V. J. Hughes, H. Rolph and C. F. Larkin, Montreal.

The Brompton Pulp & Paper Co., have been reorganized and have bought out the Royal Paper Mills Co., of East Angus, Que., whose plant has been closed down for some

months. The plant, it is understood will be started in a month or so.

The Lakeland Portland Cement Co., Lakeland, Ont., have decided to erect a branch factory in Montreal, Que., and have placed an order with the Canadian General Electric Co. for the electrical equipment.

The Canadian Fire Engine Co., London Ont., are considering moving their plant to Ville St. Louis, Que.

The John McDougall Caledonian Iron Works, Montreal, have received an order from the city of Montreal for the supply of a large quantity of cast iron specials.

Bode's Gum Co., Montreal, have been incorporated with a capital of \$20,000, to manufacture confectionery, gums, extracts, etc. The charter members include L. Gosselin, Montreal, H. B. Temple and J. W. Willett, Westmount, Que.

Messrs. Renaud, King & Patterson, Montreal, have been incorporated with a capital of \$99,000, to manufacture furniture, carpet-office fixtures, etc. The charter members include A. Renaud, R. King and A. Leclair, Montreal.

The Rexford Bishop, Limited, Montreal, have been incorporated with a capital of \$100,000, to carry on a general contracting and contracting business. The charter members include W. I. Bishop, W. C. Strachan and W. G. Mitchell, Montreal.

L. H. Belanger, Limited, Montreal, have been incorporated with a capital of \$20,000, to manufacture confectionery, cartoons, wood cases, boxes, etc. The charter members include F. X. R. Lanthier, L. H. Belanger and H. L. Auger, Montreal.

The Opasatica & Chibogomo Development Co., Montreal, have been incorporated with a capital of \$100,000, to carry on a mining and developing business. The charter members include G. A. Robinson, M. M. J. Flanagan and S. R. Tarr, Montreal.

Dominion Electric Mfg. Co., Montreal, have been incorporated with a capital of \$20,000, to manufacture machinery, electrical appliances and devices, controllers, scientific instruments, tools, etc. The charter members include P. Lahee, A. Morn and A. R. Hall, Montreal.

The Lacoste Ship-Brake Co., Montreal, have been incorporated with a capital of \$45,000, to manufacture ship-brakes, machinery, etc. The charter members include G. N. Ducharme, S. D. Vallieres and W. C. Strachan, Montreal.

Consumers Co-Operative Brewing Co., Montreal, have been incorporated with a capital of \$1,000,000, to carry on a brewing and malting business. The charter members include W. Kearney, J. M. Campbell, and T. M. Tansey, Montreal.

The St. George Pulp Co., St. Stephen, N.B., will shortly call for tenders for the erection of a steel and concrete sawmill, 147 to 150 feet Department of Public Works, Fredericton, N.B., invite tenders up to April 8 for the construction of one metal superstructure of 78 feet from centre to centre of 11 feet girders over Cushing's Canal, St. John county, N.B.

A waterworks system will be installed at Grand Falls, N.B., at a cost of about \$200,000. An air compressor plant having a daily capacity of 2,000,000 gallons will be installed at Berlin, Ont., at a cost of about \$7,000.

The Halifax & Suburban Electric Co., Halifax, N.S., have decided to build an electric tramway from Halifax through Rockingham and Bedford to Waverley, N.S. W. Chisholm, G. E. Boak and M. E. Keefe, Halifax, are directors.

Amherstburg, N.S., invite tenders up to April 9 for a new town pump.

The Winnipeg Lakes Electric Railroad Co. Winnipeg, Man., will build electric lines from Winnipeg to Lakes Manitoba and Winnipeg, and to Portage la Prairie. The capital of the company has been increased from \$50,000 to \$5,000,000. T. G. Haig, Winnipeg, is among the directors.

Messrs. Barber & Ellis, wholesale envelope manufacturers and paper dealers of Toronto and Brantford, Ont., have secured premises in the Miller & Richard building, Winnipeg, Man., and will open a branch.

One thousand miles of telephone lines will be built in the Province of Manitoba this year, the work beginning within sixty days.

A company has been formed in Regina, Sask., with a capital of \$100,000, to take over the foundry business of Reid Bros. The directors include J. F. L. Embury, J. A. Kerr, J. Reid and E. C. Osborn, Regina, Sask.

The plant of the Edmonton Bulletin, Edmonton, Alta., was destroyed by fire March 7. Loss about \$50,000.

Natural gas has been struck near Medicine Hat, Alta., at a depth of 1,200 feet.

An electric railway may be built to run east from Innisfail to Mayton, Alta. A. Kaefer, Innisfail, Alta., is interested.

It is stated that the Canadian Northern Railway Co. will build a line from Humboldt to Saskatoon, Sask.

A union station will be erected at Saskatoon, Sask.

Work has been commenced on the new steel bridge over the Bow River, Calgary, Alta.

P. J. Stephens invites tenders for the construction of a 60,000 bushel elevator at Orlow, Sask.

R. C. Laurie, secretary, Battleford, Sask., invites tenders up to April 15 for work as follows: (a) All labor and materials necessary for construction of waterworks main force, distribution system and intake; (b) all labor and materials necessary for construction of sewer system, (c) the supply and erection of 200-gallon elevator tank; (d) the supply and erection of waterworks pump; (e) the supply and erection of return tubular boiler; (f) the supply and erection of electric lighting system; (g) the supply at Battleford of cast iron traps and catch basins.

The National Trust Co., Toronto, are erecting a building in Saskatoon, Sask., at a cost of about \$25,000.

The McLaughlin Carriage Co., Oshawa, Ont., will erect a four story warehouse in Calgary, Alta.

A municipal telephone system will be installed at Calgary, Alta., at a cost of about \$50,000.

Sanitary sewalks will be constructed at Moose Jaw, Sask., at a cost of about \$100,000. A gravity water supply system will be installed at a cost of about \$90,000.

The electric light system, Battleford,

Sask., will be improved at a cost of about \$23,000.

A 600-kilowatt gas producer engine will be installed in Edmonton, Alta. at a cost of about \$12,000.

The grist mill of G. A. Werner, Mundare, Alta., was destroyed by fire recently.

The Saskatoon Milling & Elevator Co., Saskatoon, Sask., are contemplating erecting a new mill having a capacity of 500 barrels.

It is stated that the new incinerator being installed at Vancouver, B.C., will not be large enough and that a second one will have to be installed.

An addition will be erected to the court house, Vancouver, B.C., at a cost of about \$30,000.

The Pacific Hotel, Greenwood, B.C., was destroyed by fire March 14. Loss about \$5,000.

FINANCIAL.

The United Empire Bank and the Dominion Bank may open branches in Berlin, Ont.

The Royal Bank of Canada have opened a branch on Cordova Street, Vancouver, B.C.

A branch of the Union Bank of Halifax has been opened at Dominion, C.B.

The Bank of Toronto will erect a new building in Montreal at a cost of about \$75,000.

La Banque Nationale has opened branches at St. Pascal, Kamouraska county, and at Shawinigan Falls, Que.

The Royal Bank of Canada and the Bank of Nova Scotia will open branches in Regina, Sask., shortly.

The Farmers Bank of Canada have opened branches in Belleville and Trenton, Ont.

BRICK PLANT FOR VANCOUVER.

A Berg & Son, Toronto, have sold a complete sand-lime brick plant to the Silicia Brick & Lime Co., Victoria, B.C. This plant is the second sold to this firm by A. Berg & Son, the former plant having been installed a year ago at Beausjour, Man., this sale thus being direct testimony to the efficiency of Berg plants as installed under guarantee and under the direction of Mr. Berg. The Victoria plant is to have a capacity of 20,000 bricks.

VARNISH TURPENTINE.

A new substance called Varnish Turpentine is now being offered to Canadian manufacturers and painters as a material for making varnish, thinning paint, or for any purpose for which ordinary spirits turpentine is used, by the Defiance Mfg. & Supply Co., 97 Adelaide St. East, Toronto.

This firm is the Canadian branch of a large United States concern which has developed an improved process for manufacturing turpentine and which has had its product on the United States market for over fourteen years, becoming very prominent in that market during the last few years, owing to improvements in the refining process and to the way the product has stood tests by large users in recent years.

It is well known that the price of spirits turpentine has been forced up by forest fires

and shortage of labor in the turpentine belt in the south and the great consuming demand in all parts of the country and it is the opinion of experts that these conditions will become more marked in the next few years.

The Defiance Mfg. & Supply Co. emphasize their confidence in varnish turpentine by offering to ship a barrel on trial, "the same to be returnable at their expense if not superior to spirits of turpentine on any work or test."

NEW ALMONTE FIRM.

The Mississippi Iron Works, of Almonte, Ont., the property of Young Bros., of that place for thirty-two years, have changed hands. The entire plant, water power and good will of the business have been bought by three young men who will add new life and energy to the old established business. The new proprietors are H. C. Bowland, D. Williams and Wm. Glover, who assumed ownership on March 1. Besides the lines already manufactured in this plant, the new firm will take up the manufacture of various specialties. The plant comprises a solid three story stone building with a first-class water power and includes a foundry, machine shop, blacksmith shop and wood working department.

COBOURG BOARD OF TRADE.

A Board of Trade has been organized in Cobourg, Ont. The following officers were elected:

President—A. J. Hewson.

Vice-President—T. S. Chatterson.

Secretary-Treasurer—E. W. Hargraft.

A committee of twelve business men were elected as a council to confer with the officers. To this committee six more men will be added at a subsequent meeting.

WILL MAKE GRINDING MACHINERY.

W. B. McLean & Co., of Montreal, have bought the entire stock, patterns, castings, etc., of the Goddard Machine Co., of Holyoke, Mass., which include a variety of grinding and polishing machines. It is the intention of the firm to go into the manufacture of these at an early date. In addition the firm will turn out a line of vises and machine shop specialties.

PUBLICATIONS.

Blotter: Issued by W. B. McLean & Co., of Montreal, illustrating a caliper and centre and giving four reasons why a machine shop should use Slocomb micrometer calipers.

THE SOUTHERN CALIFORNIA NEW TRAIN.—BEST ROUTE.

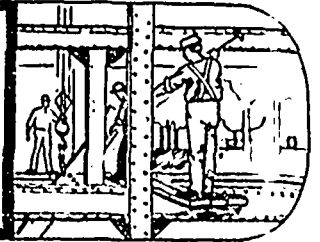
The Los Angeles Limited, electric lighted, new from the Pullman shops, with all latest innovations for travel comfort, leaves Chicago 10.05 p.m. daily, arrives Los Angeles 4.45 p.m. third day via Chicago, Union Pacific & North-Western Line and the Salt Lake Route. Pullman drawing room and tourist sleeping cars, composite observation car, dining cars, a la carte service. For rates, sleeping car reservations and full particulars, apply to your nearest agent or address B. H. Bennett, 2 East King St., Toronto.

Some one asked Thomas A. Edison, "Don't you believe that genius is inspiration?" "No," he replied, "genius is perspiration."



Construction and Equipment

Giving information regarding modern materials and methods for the construction of factories, mills, etc., and about machinery and power appliances for their equipment.



An Innovation in Roller Bearings.

TWO CANADIANS INVENT BEARING HAVING OUTSTANDING SUPERIOR FEATURES.

Since the subject of bearings in general is of paramount importance to the manufacturing interests of Canada, the question of a new bearing of particular merit may be expected to arouse considerable interest. For some time past Messrs. Joseph Dove-Smith

parallel bearing makes it practically and theoretically correct. It is fool-proof, such that reversing it does not affect it in any way. When the load comes on, each of these rollers will take its own centre, distributing the load directly and uniformly. Already these bearings have been made in sizes from $\frac{1}{2}$ in. to $3\frac{1}{2}$ in.

with the taper of the conical surfaces of the load-bearing rollers and a V-shaped groove extending from the inner edges of its tapered ends to the median line of its peripheral surface, with the apex of the V-shaped groove aligned with the apex of the conical surface of the adjacent load-bearing roller, a retaining ring at each end of the load-bearing and spacing rollers and fastening bolts locking the retaining rings together.

GENERAL DESCRIPTION

For a better understanding of this bearing

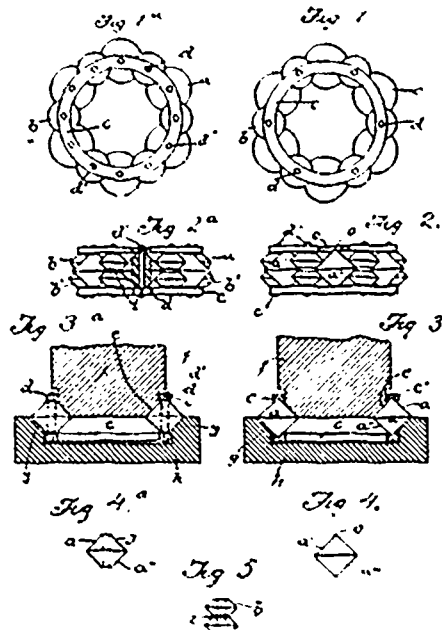


FIG. I.—SPECIFICATION DRAWING.

and F. E. Lauer, of Standard Bearings, Limited, Niagara Falls, Ont., have been quietly developing an invention in this direction which bids fair to exercise considerable influence in the future.

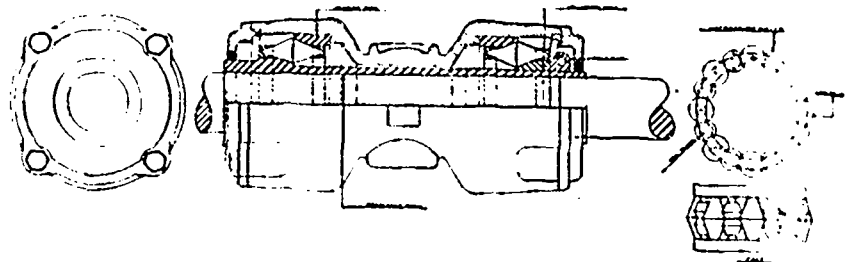


FIG. III.—LINE SHAFT BEARING.

This new bearing which is known by the name of the D. S. & L. bearing, is capable of being used as an end thrust or foot-step bearing, or for any kind of shafting or axle. It

reference may be made to Fig. 1, showing the various details of this invention.

Fig. 1, is a plan view, of the anti-friction bearing, showing the retaining rings, load-bearing and spacing rollers, and fastening bolts.

Fig. 1a, is a plan view of a modification of the construction shown in Fig. 1.

Figs. 2 and 2a, are side elevations of the anti-friction bearing shown in Figs. 1 and 1a.

Fig. 3, is a vertical section through the anti-friction bearings, shown in Fig. 1, combined with a shaft or axle and the load-resisting element.

Fig. 3a, is a sectional view of the construction shown in Fig. 1a.

Fig. 4 is a detail view of one of the load-bearing rollers shown in Fig. 2.

Fig. 4a, is a detail view of one of the load-bearing rollers shown in Fig. 2a.

Fig. 5 is a detail view of one of the spacing rollers. Like letters of reference refer to parts throughout the specification and drawings.

The anti-friction bearing shown in the accompanying drawing is particularly designed for end thrust, and footstep, bearing purposes and may be described as consisting essentially of a series of load-bearing rollers, a series of spacing rollers, intermediate the load-bearing rollers, a retaining ring at each end of the load-bearing and spacing rollers and fastening bolts *d* securing and locking the retaining rings together.

The peripheral surface of the load-bearing roller *a* has the shape of a cone tapering from the middle of its peripheral surface towards the ends at an angle preferably of forty-five (45°) degrees to the

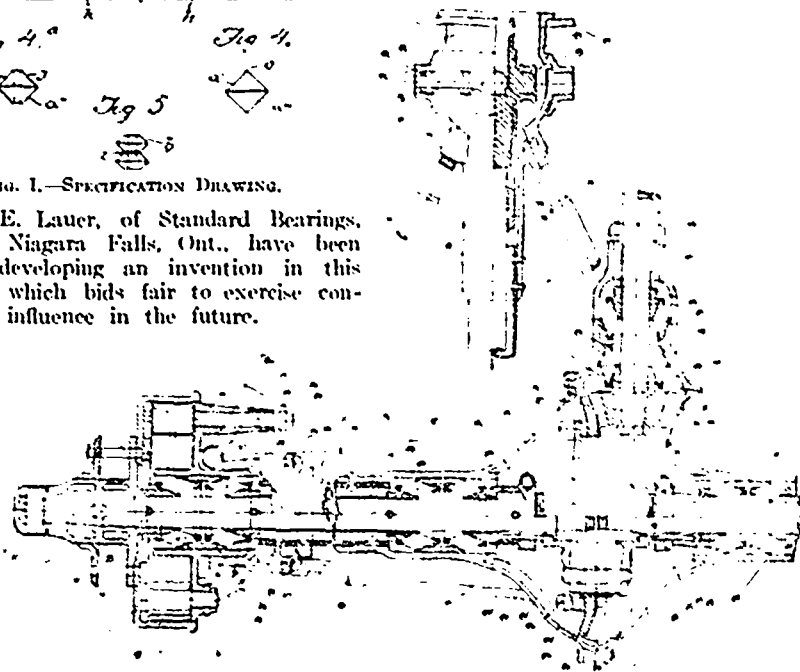


FIG. II.—REAR AXLE FOR AUTOMOBILE.

The bearing itself is a double cone of which the bearing surfaces are always parallel. It is perfectly adjustable mechanically and is in perfect control of the operator. It occupies a smaller space than any other bearing. The fact of the double cone rollers running as a

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respectively the correspondingly shaped surface *e* of the shaft *f* and the correspondingly shaped contracting surface *g* of the load-resisting element *h*, with which the load-bearing rollers co-act in the performance of their functions.

As shown in the drawings, the load-bearing rollers *a* are separated by intervening spaces in which are located the spacing rollers *b*, the

bolts are passed through their central bores and through the retaining rings.

When the anti-friction bearing is operatively employed, the cone surfaces *a* of the load-bearing rollers *a* engage with the cone surface *e* of the shaft *f* and the cone surfaces *a*: of the load-bearing rollers engage with the correspondingly tapered cone surface *g* of the load-resisting element *h*. The cone

all thrust both ways. Thus all lateral motion is taken up without the use of the special end thrust bearing in any part of it. In addition to this it opens itself to perfect adjustment such as any ordinary mechanic may handle. By slackening a cap screw shown in the drawing the operator can adjust the entire axle, which consists of four bearings. This is impossible with the annular bearing.

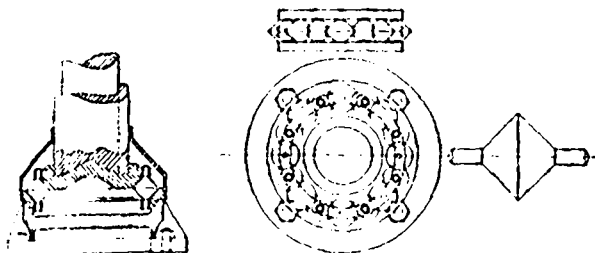


FIG. IV.—FOOT-STEP BEARING FOR MILL MACHINE.

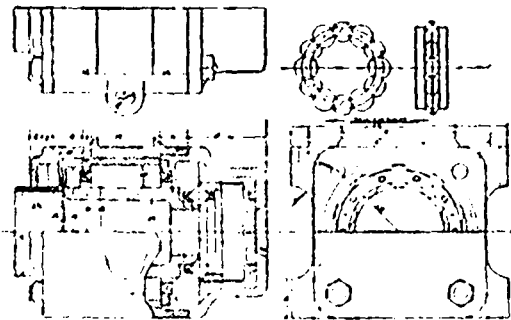


FIG. VII.—MARL CAR BEARING.

ends *b*: of which are tapered to correspond with the taper of the conical surfaces *a*; *a* of the load-bearing rollers *a*. Extending from the inner edges of the tapered ends *b*: to the median lines of the peripheral surfaces are V-shaped grooves *i*, the angularity or slope of the faces of which corresponds to that of the conical faces of the load-bearing rollers.

surfaces *a* constitute the bearing for the end of the shaft *f* and provide it with an anti-friction raceway during its revolutions, and the load resisting element maintains load-bearing rollers positioned against the contacting surface of the shaft *f*, and sustains the load thereon, and receives the impact caused by the end thrust of the shaft.

Fig. III. illustrates a line shaft bearing. A sleeve is placed along the shaft either in two short sections, or one covering the length of the bearing. One end of this sleeve is threaded and a lock nut used, as shown. At one end it is connected to the sleeve and at the other is free to move. The lock nut itself is the adjustment. It is shown that jamming is consequently impossible as is the case with a single cone.

ITS WIDE APPLICATION.

In Fig. II. is shown an illustration of the

In Fig. IV. is shown a bearing designed for

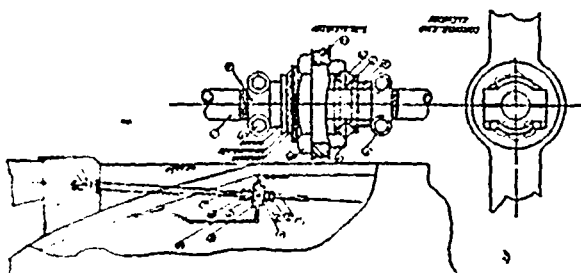


FIG. V.—THRUST BEARING FOR LAUNCH.

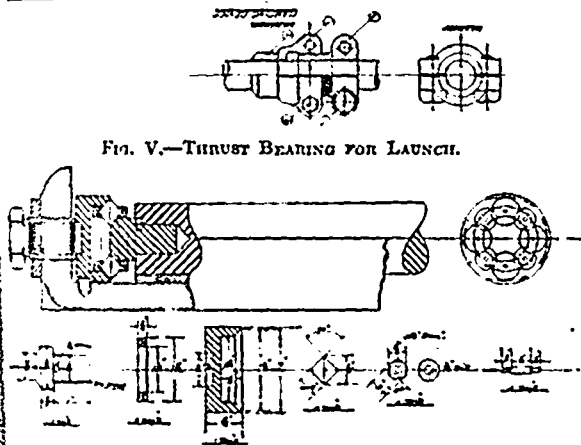
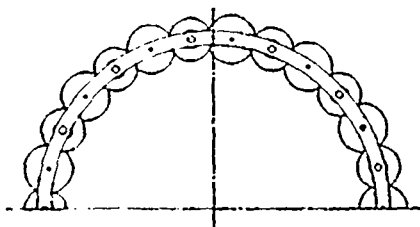


FIG. VI.—END THRUST FOR LATHE.

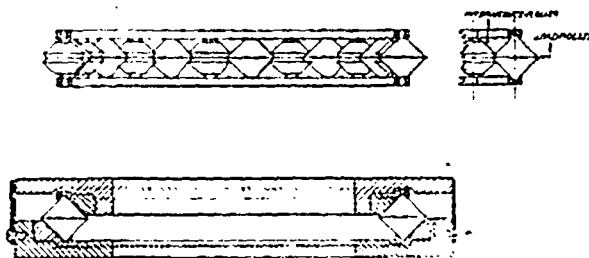


FIG. VIII.—D-S. AND L. BEARING.
6" Path, 1 1/2" Space.

are journaled in conical seats *c*: in the lining rings, and the fastening bolts *d* passed through the central bores *j* of the rollers, and through the retaining rings, to which they are secured preferably with nuts or rivet heads *d* to securely hold the bearing and spacing rollers in their adjusted condition but as shown in Figs. 2 and 3a, the load-bearing and spacing rollers are centrally bored, and the fastening

rear axle for an automobile. In view of the fact of the extreme importance of the bearing on the driving axle of an automobile, here will it have one of its widest applications. A view shown represents it being applied to a 1 3/8 in. shaft. Heretofore a roller bearing has generally been used for the load and a ball bearing for the thrust. This bearing takes the place of both, simplifies the mechanism, reduces the number of parts, and takes up

a 4 in. vertical shaft for very heavy work. The particular installation in question is being used in a marl washing mill. It is run in clean water instead of oil and is thus kept free from clay or other injurious substances. Its application is an ingenious one, and shows the capabilities of the bearings for the widest variety or range of work. The roller in this case on its biggest periphery is 2 1/2 in. in diameter. It is also adjustable.

A thrust bearing for a launch is shown in Fig. V. It can be placed on the shaft and be adjusted without altering the shaft in any way. A special clamping device, as shown in the drawing, is used. In this case the bearing was applied to the shaft with the boat in water without any difficulty. The bearing is supported by the bracket that may be placed wherever convenient in the boat, as shown in the left of the drawing. With the shaft disconnected from the engine the bearing is slid on without further trouble. The lower view shows the bearing used with divided shaft in the manner of an ordinary countershaft.

A firm who had enormous difficulty with the end thrust of lathe running at high speed were helped out of their difficulty by means of one of these bearings, shown in Fig. VI, which is now in operation on a 1½ in. spindle. The cap screw on the left shows the method of adjustment.

Fig. VII. illustrates the bearing used with a marl car. In this circumstance a parallel bearing was used for the load and a separate set for the end thrust. Since this was designed it has been demonstrated with one set, which will serve both purposes. Previously the great difficulty with all bearings has been the imperfect end thrust, and the idea of this bearing was to overcome this difficulty. However, the additional value was at once seen, and for this work a single pair would have answered as well as the two shown. There has been designs since for this work, to be used exactly as automobile bearings, described above.

Fig. VIII. shows the very small space occupied by this bearing, even for a large shaft. In the illustration shown the diameter is 6 in. and the space occupied but 1½ in.

A NEW MACHINE.

A new machine has been designed by Mr. Dove-Smith, in which all these bearings will be turned out as nearly perfect as such a machine will do the work. Then they will be taken care of by the newly designed machine mentioned. It consists of a magazine into which the cones are fed and all passing through this are rolled until assuming the exact size required, to one-thousandths of an inch. Being automatically discharged through a machine they are thus turned out as nearly perfect as mechanism can be made. This rolling process is really a hardening process as well.

The official report on mining in Quebec Province in 1905 has just appeared. The leading product was asbestos, the 48,960 tons having been valued at \$1,476,450; followed by 25,575 tons of copper ore worth \$128,850; 8,528 tons of chromic iron ore worth \$104,565; 189 tons of mica at \$95,460; 12,373 tons of iron ore at \$35,268; 19,220 tons of asbestic at \$31,100; 1,475 tons of phosphate at \$8,875; calcined ocher to the value of \$22,675. Stone quarries made up the balance of the \$3,750,300 mining output.

The McKinnon Dash & Metal Works Co., of St. Catharines, Ont., are increasing the capacity of their malleable plant by one-third, necessitating the employment of a largely increased staff. They have lately commenced the manufacture of electric welded chain, being the only firm in Canada to make chain by this process.

A Magnificent New Plant.

MODERN WORKS OF THE FROST & WOOD CO., SMITH'S FALLS, ONT.

Destroyed by fire a year ago, the plant of Frost & Wood Co., Limited, that has arisen from the ruins, now equipped and in full running order, is a credit to the manufacturing interests of the Dominion of Canada.

EXTENT OF THE PLANT.

Profiting by their experience with the recent fire, the directors of the company determined to build their new plant as nearly fire-proof as modern ingenuity could make it. The construction is in strict conformity with the rules of the Fire Underwriters' Association.

A few figures will be of interest to show the extent of the company's premises. Situated on the banks of the Rideau River, they have nearly a quarter of a mile of water-front, a large part of which is docked, furnishing exceptional facilities for receiving raw materials, fuel, etc., and for shipping their finished product to all points that can be reached advantageously by boat during the season of navigation, direct connection being had with Montreal, Ottawa and Kingston.

A siding three-quarters of a mile long connects the works with the main line of the Canadian Pacific Railway and a series of spurs to the different buildings permits the delivery of raw materials right to the storage warehouses, and the loading of machines direct from the company's mammoth machine warehouses, enabling them to handle, expeditiously, a heavy volume of tonnage, annually calling for the switching of several thousand cars.

Several acres are devoted to lumber yards, the company carrying at all times a heavy stock of lumber of all descriptions, to be utilized in the various machines manufactured.

The total floor area of the building is approximately 350,000 square feet, or in excess of 8 acres.

FIRE PROTECTION.

The buildings are protected by three different systems:

First, by the town system of waterworks, with ten yard hydrants, five of which are equipped with hose houses, 200 feet of hose stored in each, with all the necessary accessory equipment to aid the firemen in their work: axes, lanterns, extra nozzles, etc.

Second. Located in the power house is an underwriters' fire pump, which is kept under steam continuously night and day, having a capacity of 1,000 gallons per minute and which can be put into action at a moment's notice. It is connected directly with the boilers and has a capacity sufficient to provide four steady hose streams, giving complete security against a possible scarcity of town water. Another feature of interest about the company's system of waterworks is the fact that they have so arranged their main pipes that should anything happen the town pumping station and in that way leave the town unprotected, the Frost & Wood Co. could pump water enough from their system to the town mains to meet the demand until such time as the town could repair its damaged pumps.

Third. By an automatic sprinkler system, which in itself is apparently absolute pro-

tection against the spread of any localities. The mechanism of this system makes an interesting study. The source of supply is a 50,000 gallon tank, erected on an elevated tower, and every section of the plant is provided with pipes on which are situated distances of ten feet, a series of spray heads.

CONSTRUCTION OF THE BUILDINGS.

The buildings throughout are solid brick, built on stone and concrete foundations. One series of buildings includes a two-story office and an immense four-story extras warehouse and machine warehouse with a total floor space of 120,000 square feet. In this warehouse is stored a large portion of the season's output, and its close proximity to the spur tracks of the Canadian Pacific Railway makes shipping very convenient.

The main manufacturing building is two stories high, built in the form of the letter "U," and contains the tool room, machine shop, woodworking and painting departments. The floor space here is 150,000 square feet. Each wing is 65 feet wide and the building, were it not U-shaped, would be 550 feet long. In design, it is built on the very latest plans of modern mill construction and is splendidly lighted on all sides.

The grey iron foundry is a separate building, 300 feet long by 80 feet wide, and this is a fire proof pattern vault 150 feet high, three stories high. The forge department is built along the bank of the river, and is 160 feet long, by 75 feet wide. A portion of this building is of three stories and the section of one story. The power house is isolated from the rest of the plant and is a two-story building, equipped with the latest and best power equipment.

THE POWER PLANT.

The power house is situated close to the river, and is entirely apart from the other portions of the works. It contains the most up-to-date equipment for developing power, light and heat, in the most economical manner. The boiler room has a battery of four boilers, and contains everything that engineering science can suggest for obtaining the best results. Each boiler is equipped with a super-heater and has three independent sources of water supply. A water heater raises the temperature of the water to the boiling point.

The steam engines used to drive the generators are Beliss & Moreau vertical high speed compound, self-lubricating type condensors. They are direct coupled to three-phase alternating current dynamos with exciters on the main shaft. These dynamos were specially manufactured for the company by the Canadian Westinghouse of Hamilton.

The switch-board, from which the electrical energy is distributed to the various departments, consists of six massive panels of blue Vermont marble. The panels carry all the instruments and apparatus necessary for regulating and measuring the output. There is also a transfer panel, two power feed panels, and a control panel. The gauge board is of the same marble and has mounted upon it the necessary

steam, water, air and vacuum gauges. This arrangement of the switchboard and gauge-board allows the operator to see at a glance the exact condition of all the various units under his charge. This electrical energy is transmitted to the manufacturing departments and there utilized by motors which range from 7½ to 75 h.p. each. The different departments are run on what is known as the group drive system, that is, a series of machines is supplied with power from one motor. Also located in the power house is the air compressor, furnishing compressed air to all departments of the plant, which is used for lifting heavy weights by means of air-lifts, thus doing away with a great deal of heavy manual labor.

HEATING.

The buildings throughout are heated by hot air blown through conveyers by large fans and distributed to all parts of the plant by the Sturtevant system of hot air heating. There are two distinct units for generating this current of air. One unit takes care of half the building and the second unit looks

manufacturing establishments through the country, because it has proven that it will provide heat economically and in sufficient quantity to meet any factory requirement.

LIGHT.

In the winter time, and when it is necessary to run overtime, it is absolutely essential that the company have a perfect system of lighting. To that end, they have installed an extensive system of arc and incandescent lights, and at present are using 150 arc lights and over 500 incandescent lamps.

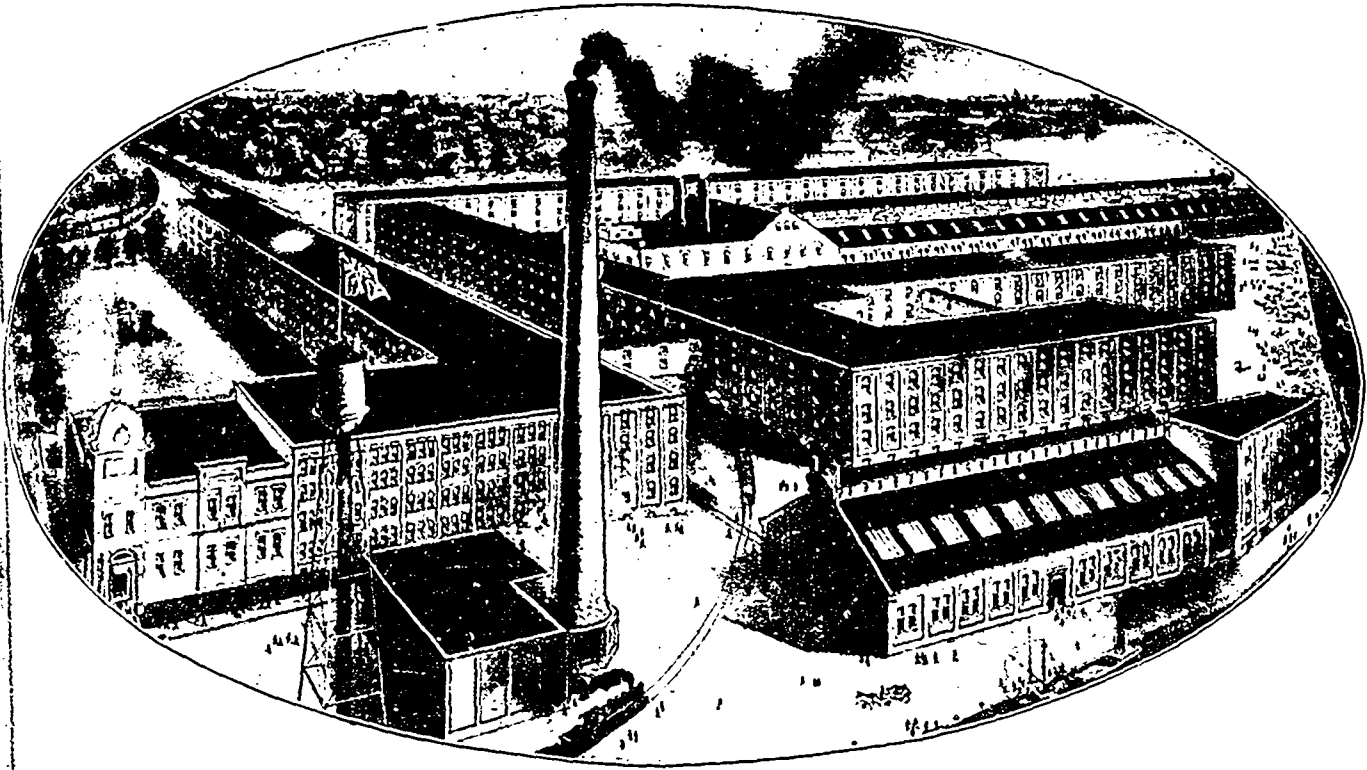
WOOD WORKING DEPARTMENTS.

The wood working department is situated in the main building. One wing of the floor is reserved for the storage of raw materials, such as bar iron, steel, etc., and the other side for the storage of gray iron and malleable castings. In huge bins, sub-divided into small compartments, are thousands of different castings, each one of which bears a distinct number. A perfect system of keeping track of the location and quantity of these castings is in vogue in this department.

machines and punches, each doing its part toward the completion of the metal portions of the different machines. Hundreds of piles of castings are seen in all stages of construction. The screech of a boring or reaming machine mingles with the resonant blows of the bench hand's hammer, and one wonders how any tab can be kept on the work that is going through the shop. Still, on closer observation, one finds that a casting at one bench is taken to another and binders are tested. They are also set up and operated by the power of the shop, and bundle after bundle, in fact a small harvest, of straw was put through them and tied, convincing the inspectors that the binding attachment would do its work satisfactorily.

THE GREY IRON FOUNDRY.

The equipment of the foundry is directly in accordance with all other parts of the plant. In agricultural work, the large majority of the castings are small. Wheels for binders and reapers, mower frames and mower wheels, however, are larger and heavier, and to handle them expeditiously, the moulders use an



NEW PLANT FROST & WOOD CO., LIMITED, SMITH'S FALLS, ONTARIO.

for the balance. A steam pipe conveying the steam connects each unit to the boilers in the power house, and this steam not only drives the auxiliary engine which drives the fans, but heat a series of coils which warm the air that the fans distribute. By this system a certain temperature can at all times be maintained throughout the buildings, thus doing away with the old-time trouble of heating one portion and freezing the other, as was generally the case when steam pipes were ranged around the walls and heat obtained in that way. Each conveyor pipe is provided with a number of openings through which the warm air passes into the shops and these openings are provided with small doors which permit the shutting off of any part if heat is not required there. This method of heating is being installed in the largest

The wood working department is a noisy one, planers, rip-saws, band-saws, matchers and boring-machines all contributing their quota to the noise.

The large saws are all self-feed machines, and once a board is put on the table, the mechanism of the saw carries it through until the required cut is made. Everything is done by machinery, and done quickly.

A feature of the wood working department is the total absence of shavings and sawdust. By a system of fans, the shavings and sawdust are sucked into pipes, blown through an immense tube to the power house, and are there consumed under one of the boilers.

MACHINE SHOP.

The machine shops of the company are a veritable hive of industry. When one enters them he sees a maze of drills, lathes, boring

overhead travelling crane, with an air-lift attachment. This equipment facilitates work very materially, and saves a lot of heavy manual labor. Two cupolas and a brass furnace are required to handle the volume of work.

Different grades of work require different compositions of iron and the foundry chemist has to determine just what mixture is suitable for each class of work. For instance, plow points manufactured by the company are made of a different quality of iron from that used in a mower wheel, and when this iron is poured into the moulds, it is specially chilled by a process which makes the points hard and tough.

Throughout the foundry many moulding machines are seen. These machines save a great deal of time and labor, and turn out an astonishing amount of work each day.

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER

Half a Million to be Spent on C.P.R. Shops

AT WINNIPEG.

WORK TO BEGIN ON ALL NINE BUILDINGS THIS SPRING.

It was stated by the officials of the Canadian Pacific Railway that the improvements to the Winnipeg shops of the company would be very much larger and more important than had previously been announced.

The amount to be expended will be double the highest estimate that has been previously made, and instead of a quarter of a million,

engaged, and the work will be carried forward with all possible speed. The full list of shops on which work will be done during the season is as follows:

Passenger car shops, present size, 100 by 241 feet.

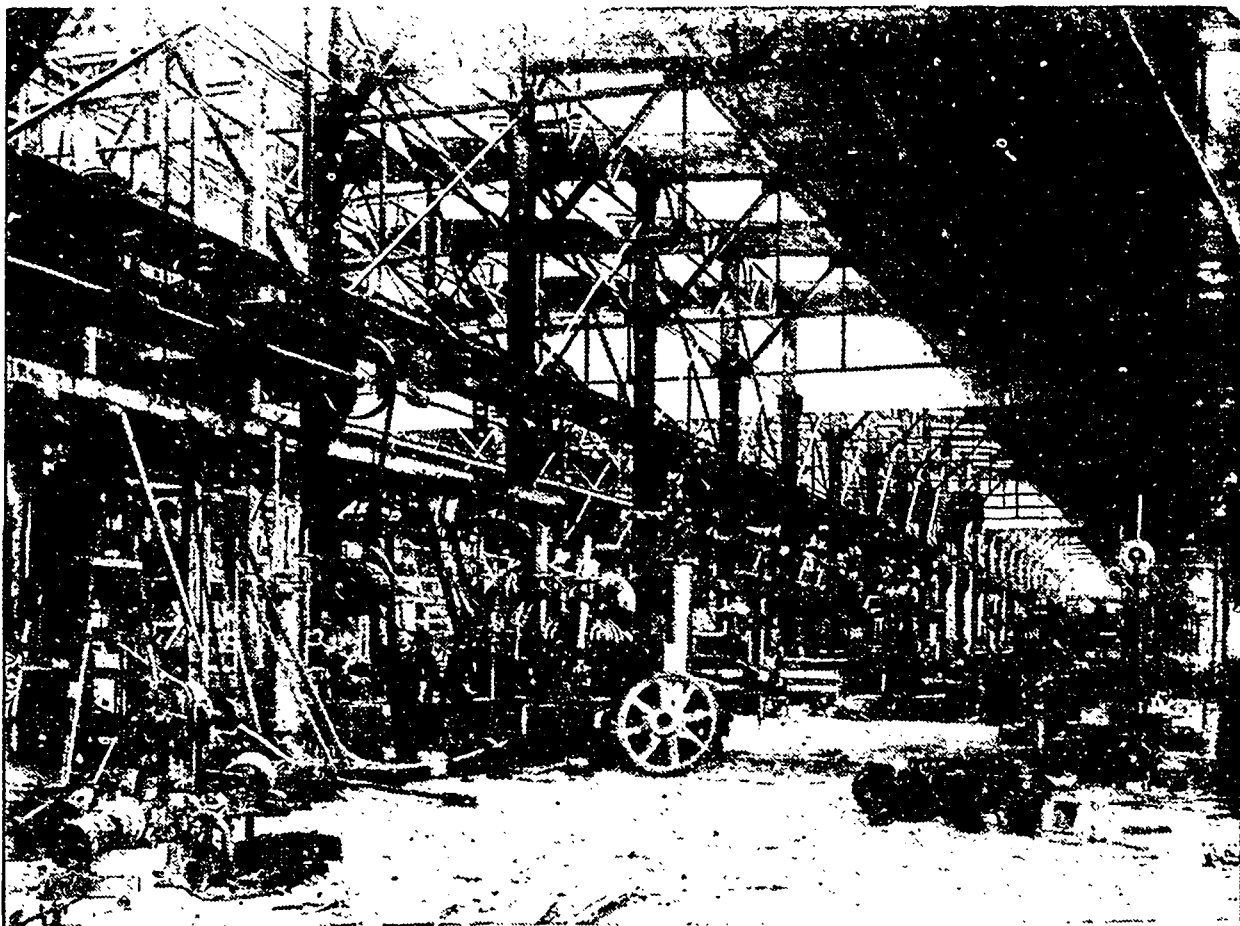
Freight car shops, 313 by 102 feet.

Planing mill, 217 by 102 feet.

Locomotive shop, 794 by 165 feet.

Foundry, 122 by 92 feet.

each year increased, until to-day, the returns from the municipal department show over twelve and a half millions of dollars worth of new buildings for one year. Bank clearings point to the amount of business that Winnipeg puts through. The clearings were in 1906 over \$504,000,000, an increase of over 50 per cent. over 1905, and an increase that no other city on the North American Continent can show. The population keeps on increas-



A CORNER IN BIG SHOP, C.P.R.

the expenditure to be made by the company on the shops alone will exceed half a million.

The development of the business of the corporation in the West during the past two years has exceeded all the expectations of even the most experienced of the officials of that company. Every department of the big shops is declared to be already overtaxed for space, and the developments of the present year will render the situation still more difficult.

There are in all nine buildings in the collection at the shops, and it is stated that work will be begun on all of these as soon as the season opens, and all will be more or less enlarged, a large force of men will be

General stores and offices, 254 by 86 feet.
Dry kiln, 86 by 42 feet.
Power house, 126 by 100 feet.

MARVELLOUS GROWTH.

Five years ago the rush for Canadian lands by settlers from the United States commenced Winnipeg's history making record. It was thought that the growth in the year following was only spasmodic, even the optimistic believers in Winnipeg did not think that it would continue at this pace.

Each year following has been greater than the last, not only has the population grown from 40,000 in 1898, to 110,000 to-day, but the amount of money spent in buildings has

ing, and real estate steadily advances in value, and business of all kinds flourishes without the needless boom that is usually back of development that is so rapid in other places.

Now that the future of Winnipeg, as one of the foremost cities on the continent has been established, it is necessary that more manufacturers locate there. The daily requirements are too large even for food stuffs to be filled from local sources. The importation is too great, and while each year more manufacturers open up they do not come fast enough, and there is no decrease in importation of all kinds of articles that can be manufactured on the ground.

A Model Coal Plant.

A coal crushing and conveying equipment, in many respects a model one, is illustrated and described herewith.

The coal receiving track extends along the front of the boiler house as shown in the accompanying sectional sketch, a steel track hopper being provided near one end of the

The chain is constructed with large self-oiling flanged roller with chilled tread, the rollers being placed at the chain joints and working over steel thimbles which encase the inch steel pins.

The conveyor inscribes the basement and boiler room in a plane parallel to the boiler

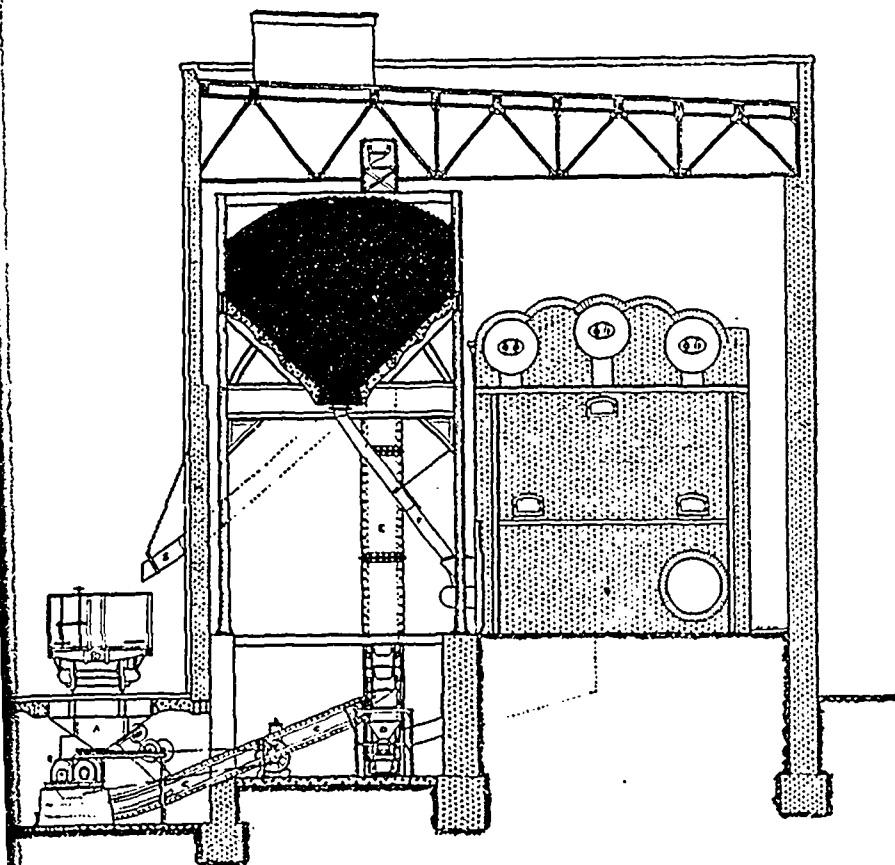


FIG. I.—SECTIONAL VIEW OF BOILER HOUSE.

building for receiving coal from hopper cars. In the basement extension beneath the track hopper is located a 24 inch double roll coal crusher uniform feed from hopper, to crusher being insured by a reciprocating roller bearing plate feeder. An inclined cross conveyor, 24 inches wide, receives the coal from the crusher, delivering it to a loading hopper located over the main conveyor is of a continuous steel apron type 30 inches wide, 5 inches deep, mounted on two strands of 6 inches pitch roller chain and operates at a speed of 35 F.P.M. Provision is made so that when slack coal is received it need not be passed through the crusher but is delivered direct from the track hopper to the cross conveyors.

The steel loading hopper over the main conveyor is equipped with a Jeffrey automatic bucket loader; the boiler being of simple and heavy construction and having a wide range of adjustment both in the amount of the charge to each bucket as it passes under but also in respect to relative position of the receiving bucket.

The main conveyor is of the pivoted or gravity bucket type, consisting of a continuous series of 15 inch x 24 inch malleable iron buckets, supported on steel trunnions between two strands of 24 inch pitch steel chain.

fronts, the overhead track passing through the trusses but supported from the bunkers. The verticle legs of the conveyor are inclosed in steel castings.

The conveyor has a basement drive, as shown in Fig. 4, the driving equipment being located at the foot of the down run.

The usual traveling tripper is provided over bunkers, it being arranged to be operated from the floor. The crushing and conveying equipment is driven by two Westinghouse junior engines, 25 h.p. respectively, belt connected. The equipment has a normal operating capacity of 40 tons of coal per hour and a storage capacity of about 600 tons. A new feature in connection with the main conveyor is a continuous automatic chain oiling device, thus making extra provision for perfect lubrication of chain joints. The bunkers are a modified type of steel armoured concrete construction, consisting of a concrete body supported and reinforced by a heavy steel frame of channels, I beams and rods. The inside facts of the concrete was given smooth granoliths surfacing, while the outside is faced with arched corrugated m giving the whole a very pleasing appearance.

Mr. George S. Rider & Co., Cleveland, were the consulting engineers in charge; the crushing and conveying equipment was constructed and installed by the Jeffrey Mfg. Co., Columbus, Ohio.

THE USE OF COKE AS A FUEL IN THE BRICK INDUSTRY.

By GEO. A. T. LONG.*

I have just gotten out a few of the points on the coke question, which I will read here and will be glad to explain anything to you afterwards.

We have given the matter of the use of coke in manufacturing brick considerable attention and from our investigation, we believe that it is the most economical and satisfactory fuel for the purpose for which it is used, that it is now possible to secure. In burning brick, as we understand the process, at the start it is necessary to drive the water smoke off and gradually bring the temperature up to a certain point before beginning with the heavy coal fires, and it is in this initial stage of the work that the coke is used, and for this purpose it makes an ideal fuel, as it is smokeless and does not stop up

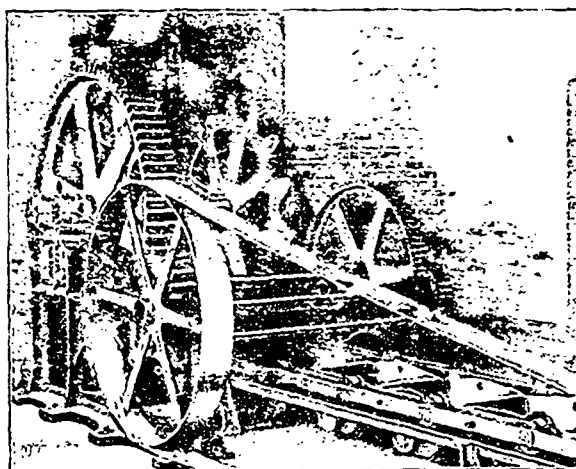


FIG. II.—AT THE DRIVING POINT.

the flues or discolor or destroy the brick by the openings from the fire.

At Detroit, Michigan, there are several brick plants that run the year round, and after experimenting with oil, wood, coal and coke they have demonstrated that Solvay

*Wisconsin Clayworkers' Association Convention.

coke gives better satisfaction and costs considerably less than oil or wood, and does not clog up the flues or discolor the brick, as the coal does, and it has been adopted almost exclusively by the plants there for the purpose of drying and heating the brick. Previous to the adoption of coke they always

for drying the brick. We had a direct heat and dried 800,000 bricks a day, and the coke cost only 12½ cents, where in the steam dryer it cost us 35 cents and we were smoking the brick also with coke, but I think coke would come into more general use if the price was not shoved up. The price of coke has gone

for the next twelve months, for their supply. A Member: I would like to ask the gentleman what is the price of coke as compared with the price of hemlock slabs. How many tons would fire a thousand brick, and how many cords of slabs.

Mr. Long: I will say this, that the man in charge of a plant, told me the other day that he used to use wood and that he found that a ton of coke would go as far as two cords of hardwood.

President Wilson: I would suggest that you ask Mr. Vogt that question.

A Member: Will Mr. Vogt explain the number of tons of coke used and soft coal in burning a certain number of brick and the number of cords of wood in burning the same number of brick?

Mr. Vogt: I only know from our books that the cost of drying the brick in the direct heat with coke, the price being \$3.50, was only 12½ cents, and before, when we used coal it was 25 cents, and in the steam dryer it was 35 cents. We dry about 100,000 brick per day on the average and so it can be figured out pretty closely how many tons of coke could be used at 12½ cents per thousand, or \$3.50 per ton.

President Wilson: Is there any one present who has made a comparison along that line other than Mr. Vogt? I think that drying with coke is a rather new thing and very few of us have had any experience, except Mr. Vogt.

Mr. Hilker: We are operating at Racine, three different yards, and for the last two years we have been using coke for water-smoking our brick. In the two yards we use about three tons of coke for 24 hours in a kiln of 230,000 brick. In one of our yards we water-smoke our brick about three weeks. We use on the average, three tons of coke

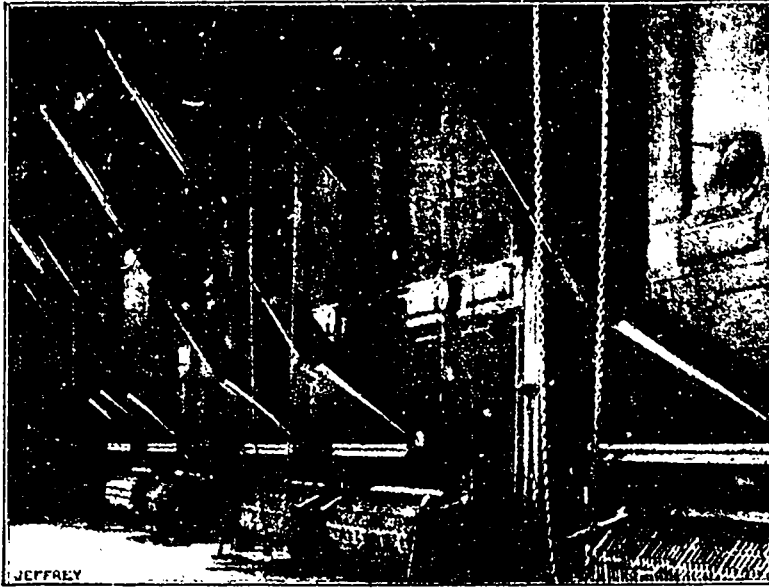


FIG. III.—BOILER FRONT SHOWING THE COAL CHUTES CONNECTING WITH THE COAL BUNKERS OVERHEAD.

used wood, but the high price of wood at the present time makes it out of the question to use this, and the cost of oil is 30 per cent. higher than coke. At the Detroit kilns they fire with coke for about 48 hours at the beginning, and then change to soft coal. The reason for this, I understand, is that the coal gives a quicker and more penetrating heat owing to the flame that comes from it, and the brick heat much faster from the use of the coal fire than from the coke, which gives very little flame.

The man in charge of the Clippert plant at Detroit, told me that they had tried all kinds of experiments with different fuels, and had finally changed all their kilns so as to burn coke and coal, and that they have had no trouble since doing this. They have been using Solvay coke now for three years. While coming through Detroit from Toronto, Mr. Clippert took me out and showed me through his plant. He said that after starting the fire, he only required one man, and got a uniform heat, and it took at least four men to fire the kilns with coal.

One point about the coke is that in driving off the water smoke, the high carbon has a tendency to form a gas, which it distributes without discoloration, but it is not sufficient to finish the brick.

The coke contains from 88 to 92 per cent. fixed carbon.

DISCUSSION.

Mr. Sanborn: I would like to ask the gentleman what kind of a grate he uses.

Mr. Long: Just the ordinary grate, the same as we use for ordinary coal. We use the smaller coals—nut or pea. The fire box is built outside the kiln.

Mr. Vogt. I have had some experience with the use of coke and we found it very satisfactory and cheap, that is, especially

up with the coal and wood.

Mr. Long: I might say in reply to you, that the price to-day is about \$1 per ton less than it is produced for at the mine—that is

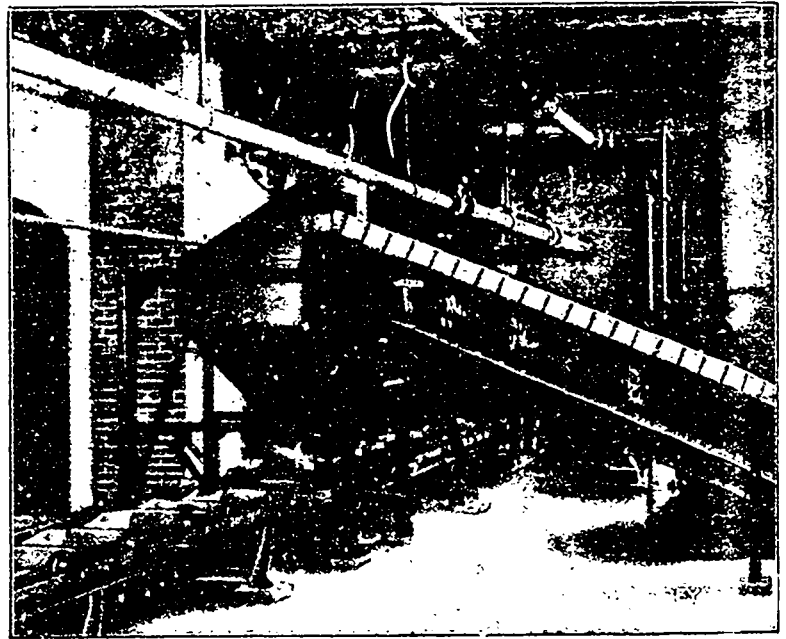


FIG. IV.—UNDER THE BOILER ROOM, SHOWING LOADING HOPPER WITH ITS AUTOMATIC FEEDING DEVICE, WHICH LOADS THE BUCKETS WITHOUT SPILLING.

the coke that can be used for the burning of brick, nut-size, because it holds its heat so much longer. I think the price to-day is \$4.50 as against \$6.00 on the regular coke at the mine. So that our price, if I am not mistaken, when contract is made with the brick manufacturers, will be \$3.50 per ton

for every 24 hours and get out 200,000 brick and we find it much cheaper and much better than wood because it is a dry heat. Most of us brick manufacturers find a great deal with firing brick with coal is that when we water-smoke, it clogs up the kiln, but we have never had this experience with coke.

Patents as a Factor in a Manufacturing Business.

By EDWIN J. PRINDLE, M.E., LL.M., of the New York Bar, New York

Four important papers, by Edwin J. Prindle, of the New York Bar, which have been made up in pamphlet form from the original article in The Engineering Magazine, form a valuable contribution to the literature of patent law, and on account of their great interest to technical men in general, they demand more than a passing notice.

The titles of the papers are as follows:

- I. Their Influence in Making Markets and Commanding Success.
- II. What Protection a Patent Affords
- III. Patent Knowledge needed before assuming a New Product.
- IV. Patent Relations of Employer and Employee.

After stating that patents have been one of the most important factors in the growth of the United States from a group of poverty stricken, non-manufacturing dependencies to the greatest manufacturing country in the world, the writer mentions a number of large manufacturing companies in the United States as prominent examples of the efficient use of patents in controlling competition, and building up a large business. As showing the attitude of the courts towards patents, a recent decision to the following effect is quoted:

"Within his domain, the patentee is czar. The people must take the invention on the terms he dictates or let it alone for seventeen years. This is a necessity from the nature of the grant. Cries of restraint of trade and impairment of the freedom of sales are unavailing, because for the promotion of the useful arts the constitution and statutes authorize this very monopoly." The object of the papers is not to make the manufacturer his own lawyer, but to give him a better idea of the nature of a patent; of the protection it affords; of the great adaptability of patents to different commercial conditions and forms of transactions; of some of the many ways in which the courts will thwart attempts to get the benefit of an invention without the consent of the patentee, of what must be known to the patents of others when putting out a new product and of how to secure a monopoly of such product, if that is possible; and of the line between the manufacturer's right and those of his employee.

DIFFERENT KINDS OF INVENTIONS.

There are four different classes of inventions for which patents are granted. First: Arts or processes, which are any series or steps of operations for accomplishing a physical or chemical result; for instance, the art of casting car-wheels which consists in causing a jet of molten metal to enter the mould in a tangential direction to give the metal a whirling motion, so that the heavy sand metal will flow to the rim of the wheel and the cinders and bubbles will be displaced to the center and will thus not occur on the rim. The patentability of a process is not at all dependent on whether or not the apparatus by which it is carried out is new. The apparatus may also be patentable. The second class of inventions includes machines which include, broadly, any assemblage of elements having a law of action of its own. The third class of inventions, manufactures,

includes everything made by the hand of man which is not in the second class, such as a knife or a pencil. The fourth class is compositions of matter, such as illuminating gas, a soap or a tool steel. The composition may be either a mechanical mixture or a chemical composition. A new combination of old elements is patentable if it produces a new or improved result, or an old result in a new way. A new form of an element of a combination that is old as a whole may be patentable. Improvements and additions to old machines may be patentable. Even a new use of an old device, machine or process is sometimes patentable.

THE RIGHTS OF A PATENTEE.

A patent gives the patentee the right to exclude everyone else from making, using or selling his invention. If, however, his invention happens to embody the principle of some invention that is covered by a previous patent even though the latter patent covers a much improved device, the owner of the previous patent, while his patent is in force, can prevent the making, using or selling of any embodiment of the latter invention using the earlier principle, but the earlier patentee can be prevented by the later patentee from making the improved form of the invention.

The measure of the grant of the invention is determined by clauses at the end of the patent, which are termed "claims." There is no piece of English composition that is more generally misunderstood than the claim of a patent. Many people suppose that the more a claim says, the more it covers, while paradoxically the less it says the more it covers. This is made clear by a series of examples of claims which cannot be here repeated. The matter is also illustrated by likening a claim to a bill of sale giving title to cattle on a large Texas ranch. These must be read in full to be appreciated. If it were to give title to "all the short-horn Durham steers having one white forefoot and three red feet," the purchaser would get very few cattle. If, however, the bill of sale gave title to "all the live stock" on the ranch, the purchaser would not only get all the short-horn steers with only one white foot, but he would get all the steers of every description, and all the heifers, bulls, horses and pigs that might be there. What a claim should do is to seek to cover only so much of the particular embodiment of the invention shown in the patent as is essential to the practice of the invention, and to leave out all details which can be omitted or varied without departing from the principle. The claim is said to be like giving one title to everything that can be found that will fit into a box. Now, if no particular kind of a box were specified, the grantee would have a very valuable monopoly. Everything that would go into a square or a round box, or an oval box, or a star-shaped box would be his. But if the box were stated to be a "round box having a pin set up in the center of its bottom and extending up to a level with the top of the box" it is evident nothing could be put into the box but round things having a hole

through the middle, and the grantee would have a very much less desirable monopoly.

The patent grants the right to exclude all others from making, using or selling the patented article. These are the only ways in which an invention is capable of commercial enjoyment. Each of these three ways is a separate monopoly, and may by proper instruments be granted or sold separately. For instance, the patentee of a machine could grant to a manufacturer exclusive right to make the machines for him at a stipulated price and could prevent him from using them or selling them to others. The patentee could then grant to a jobber the exclusive right to sell the machines, reserving proper compensation to himself, and the jobber could be prevented from either making or using the machines. The exclusive right to use the machines could then be granted to a given consumer, who in turn would have no right to make or sell machines. The right to make, or that to sell, or that to use, can be granted for certain restricted territories instead of the entire United States. For instance, a patentee of machines for making concrete building blocks sells his machines to one person only in each city or county, and neither the patentee nor anyone else can use machines of that kind in the given city or county afterward. The right to use an invention for each of several industries can be sold. For instance a patentee of a process of making watch dials, not only sold the exclusive right to make watch dials by that process, but he sold to a separate company the exclusive right to use the process in making enameled signs under the same patent. A patentee can grant the right to make a limited number only of machines, and the making of a larger number can be restricted. The patentee can regulate the length of time that a specimen of the invention is to be used, or the price at which the patented things are to be sold, and the quality of the materials to be used. The patentee can require that the materials used by the machine shall be bought only by him. He can lease the machine, retaining the ownership and requiring payment in royalties. Similar restrictions can be imposed upon the other classes of inventions. The manner is illustrated, by a variety of examples, in which a court will interpret the claim of a patent in determining whether or not a given machine complained of is an infringement. The broad principle is that a patentee is entitled not only to the specific form shown in his patent or stated in his claims, but is also entitled to control the making, using or selling of every equivalent construction. This term "equivalent" the courts have defined to mean every construction which performs the same function in substantially the same way as the elements of the claim. This is a rather elastic definition, but enables the courts to do equity, in that they give it wide scope in the case of an invention representing a substantial advance in the art, and give it a restricted meaning in the case of inventions which are only slight improvements. The courts can be induced to give the claim a restricted meaning where the one who is sued shows, by the prior art, that the

invention was only a slight improvement in the art. If one of the elements of a claim is omitted, infringement of the claim is avoided.

REMEDIES FOR INFRINGEMENT.

There are three remedies for the infringement of a patent. An injunction can be obtained, restraining the further manufacture, use or sale of the patented invention. The damages which the patentee has suffered through lost sales can be recovered, and the profits which the infringer has made can also be recovered, although the burden is on the patentee of proving what the profits were.

There are three forms of direct patent protection which it is possible to use to obtain a monopoly of a new product, and one form of indirect protection. The first and best protection would be that of a patent on the product itself, in order to obtain which the product must have been the original invention of the applicant for the patent, and must have been invented before it was known or used by others in this country, and he must not have allowed more than two years to have elapsed after the first printed description of it has been published, before filing his application for patent. There are other requirements, but these are the most important ones. When the original patent on a product is about to expire, it is often sought to extend the monopoly by improving the product, and taking out a new patent. Under these circumstances, however, the new patent only covers the improvement, and the original form becomes public property, on the expiration of the original patent. This point, as are most statements made in the papers, is illustrated by concrete examples. If the product could be so greatly improved as to completely or largely supplant the old form, then a patent on the improved product would practically extend the monopoly.

The second way in which the product can be protected is to patent a process of making that product, by which the product can be made either of a quality that is superior to any similar product on the market, or by which it can be made cheaper than any other product of the same quality. If the process covers the only possible way of making the improved product, or the only possible way of making the product cheaper, a patent on the process is as good protection as a patent on the product itself, for it prevents competition. The patent on the product covers the product, whatever may be the process or machine used in manufacturing. The patent on the process covers the process, whatever may be the apparatus used in practicing the process. It is, of course, desirable to patent both the product and the process, if possible.

The third way of protecting the product would be to invent a machine or apparatus which would make a product of better quality or of less cost than those already on the market.

The fourth way to protect the product would be to tie it up with some other patent. For instance, there was a fastener for fastening buttons on shoes, on which fastener there was no patent. These fasteners were driven by hand tools. A machine was invented for driving these fasteners by the mere movement of a treadle, the machine being so simple that it could be sold to shoe dealers throughout the country, as well as to manufacturers. The button-setting machine was sold only under licenses which permitted its use

only with button fasteners purchased of the manufacturers of the machine. These licenses were upheld by the courts, and the machine practically drove the hand-setting tools out of the market. Thus the patent on the machine practically gave a monopoly on the button fastener itself.

It is not sufficient simply to determine whether the new product, machine or process can be patented, but it is also necessary to have an investigation made to see whether there is any valid existing patent covering any principle or feature that is used in the new product, process or machine, because if the manufacture, use or sale of the new invention would involve the use of the principle of the prior patent, the prior patentee could enjoin the use of such invention. One does not acquire the right to use a patented invention by improving that invention enough so that the improver is entitled to a patent. He must either acquire the right from the earlier patentee to make the improved form, or wait until the earlier patent is dead.

EMPLOYER AND EMPLOYEE.

In treating the patent relations of employer and employee, three principal points are considered. First, who in the eyes of the law is the actual inventor of a particular invention; because a patent is valid only when granted in the name of the actual inventor. Mere ownership of the right to the patent, or the furnishing of money to develop it, does not entitle a person to patent an invention in his own name. Many an inventor, however, is not a mechanic, and many an employer, while able to conceive the principal features of an invention, may not be sufficiently practical to work out the details of the invention. If, then, he employs some one else to work out the details, the employer is regarded by the law as the inventor, and not the employee, and in case of a controversy between the two, the presumption is in favor of the employer, and the employee must show by convincing proof that he made the invention before his claim can be entertained. Several specific illustrations are given. In order that the employer may be regarded as the inventor by the law, it is necessary that he do more than merely to suggest the desirability of an invention for a given purpose. He must show, at least in a general way, how the machine for instance, is to be constructed. In some factories it is the custom to patent every invention in the name of the president of the company. The dangers of this procedure are pointed out, and it is shown that if the real facts of the inventorship were brought out, such a patent, where the invention is made by an employee, and not by the president, would be declared invalid.

THE RIGHTS OF AN EMPLOYER.

Where an employer employs clever men and has them instructed in the details of his business, he lays himself peculiarly open to the possibility that the employee may make inventions which will seriously hurt his business, if he had to compete with them. It, therefore, becomes exceedingly important to consider what are the employer's rights under these circumstances. The mere fact that an inventor was in the employ of another when he makes an invention does not give the employer any claims upon the invention. If, for instance, the employee make an invention out of working hours, and in his

own home, and does not use the time, material or employes of his employer in perfecting the invention, the employer, in the absence of a contract, has no claim whatever on the invention, even though it relates to the employer's business. If, however, the employee makes an invention in the shop of his employer and perfects it there, using his employer's time and material, and the assistance of his fellow employes in perfecting the invention, the employer has what is called a "shop right" or license to make and use the invention in his own shops, and to sell the article so made. This, however, does not give the employer a right to the patent itself, that is, the right to prevent others from making, or using, or selling the patented invention. The employee can license his employer's competitors to make and use and sell the said invention, but he cannot sue his employer. If the employer wants to ensure that he shall have the title to patents or inventions relating to his business that may be made by his employes, he must have a contract with the employes, specifically providing that he shall have such right. A number of instances of such contracts are related, and some of the contracts themselves are quoted in the papers. The courts have held that such contracts are valid even though the employee is not to receive higher wages than he would probably otherwise have received.

THE LEAD OF A LEAD PENCIL AND A COPPER ROOF CATCH WIRELESS MESSAGES.

According to the Cleveland Enquirer, Father Odenbach, head of St. Ignace College, Cleveland, has discovered a method whereby he can intercept wireless telegraph messages by means of the copper roof on the college, some steel pins and the lead of an ordinary pencil.

While listening to the sounder connected with the ceronograph on the top of the college by which lightning is recorded, Father Odenbach, who had substituted the lead pencil and pins for the usual expensive coherent instrument, heard the sounder tick off some Morse code characters. Investigation showed that he had intercepted messages received at the Clarke Wireless Telegraph Company's station, Cleveland, which came from the Detroit office.

At first the scientist did not understand the message, but he studied the code and finally was able to detect a few letters. Later he called in a telegraph operator, and the latter was able to take the message. It was found that the copper roof of the college, on which are stationed several weather recording machines, was a much better recorder than the poles and wires used at the regular wireless station.

The lightning recording instrument is so arranged that the sounder in the laboratory connected with the machine on the roof ticks when lightning flashes. It was through this machine that wireless messages were obtained. The regular station use coherent that are very expensive and need constant attention, and Father Odenbach's discovery of the lead-pencil pin method is deemed important.

In connection with the above interesting article it may be worth mentioning that the Dixon Co. have for some time manufactured for the Alphans Canadian Chimney Construction Co. graphite pencils for the lightning rods.

J. B. HALL

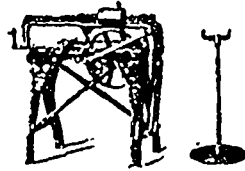
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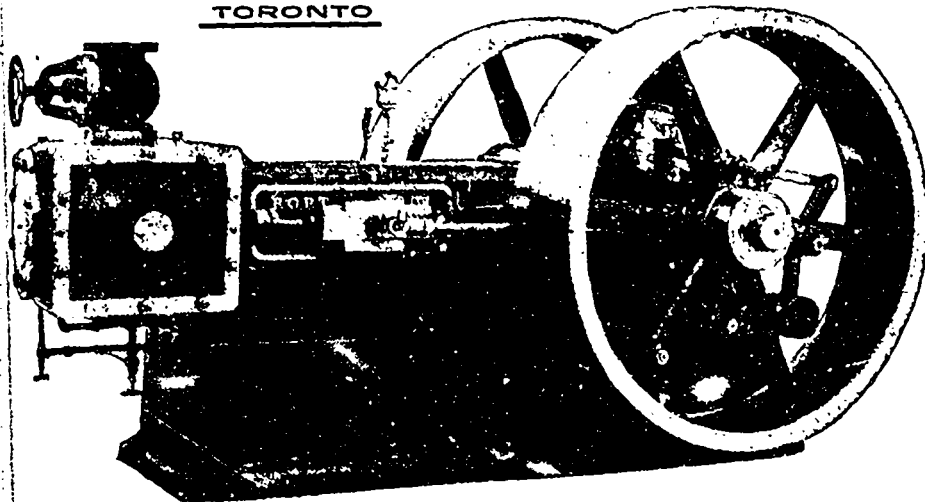
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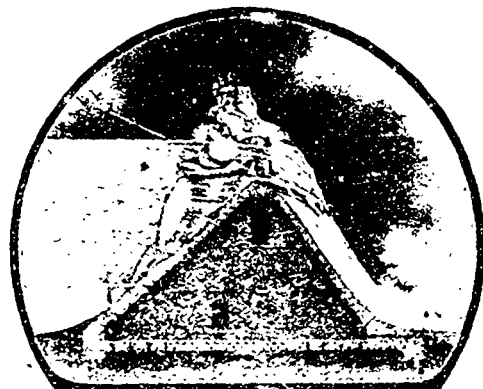
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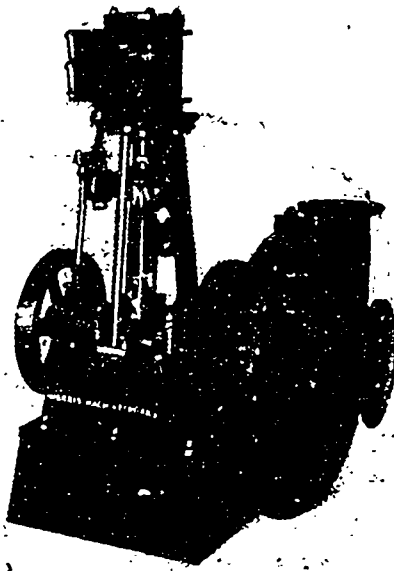
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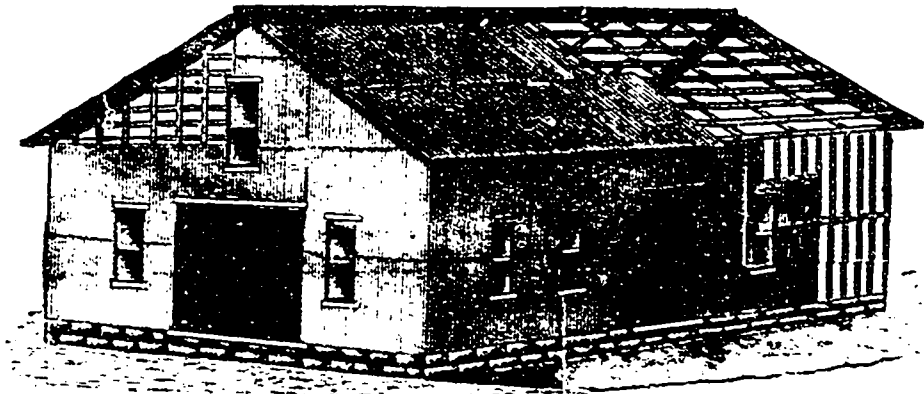
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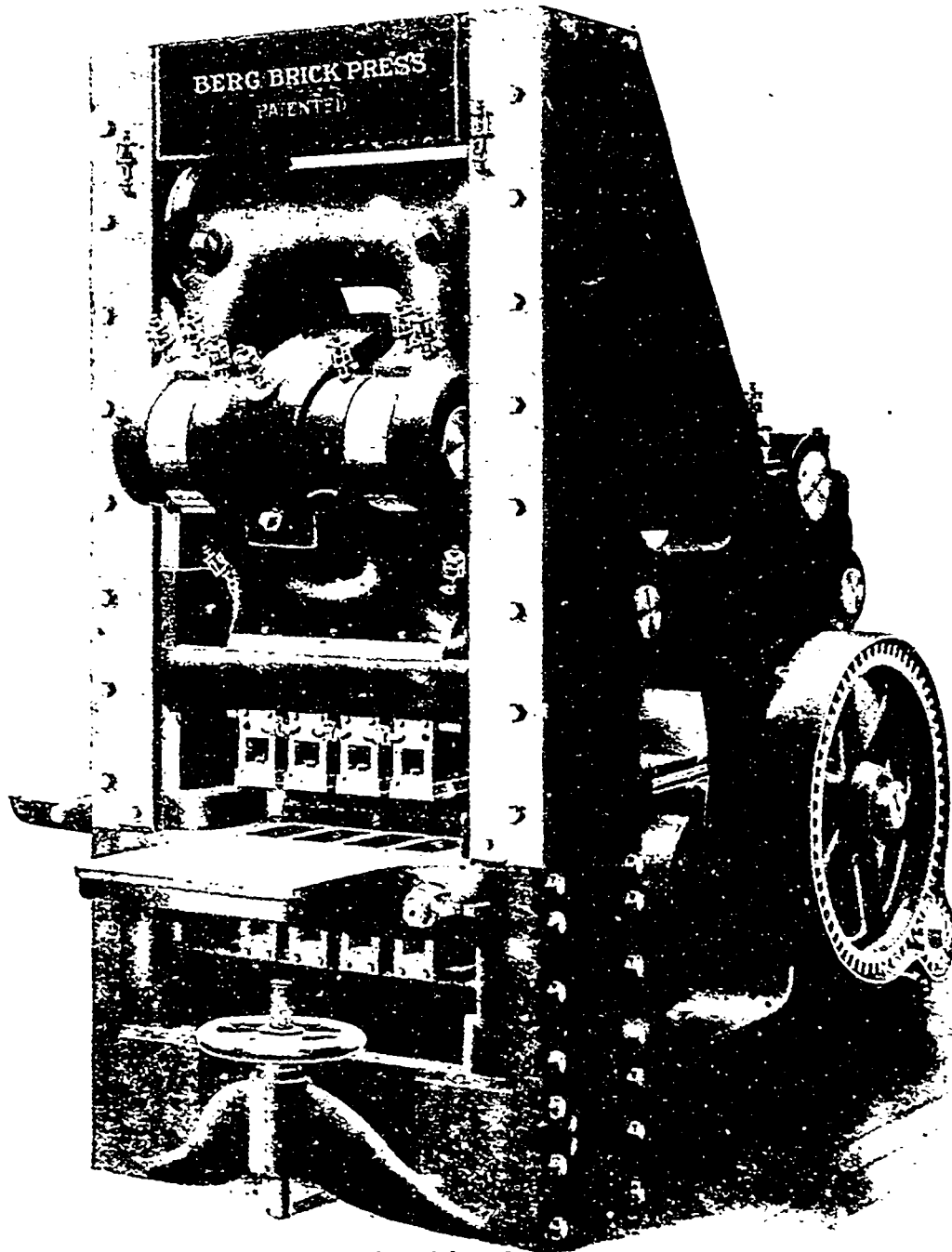
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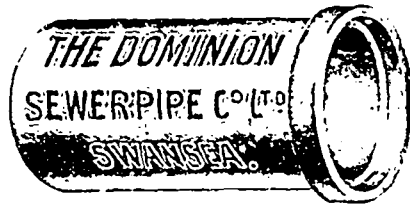
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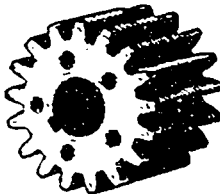
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60"x17' 6", 54 1/2" tubes, plug hat dome	10
63"x14", 61 3/4" tubes, plug hat dome	10
60"x13' 9", 84 3/4" tubes, plug hat dome	10
60"x15' 4", 80 3/4" tubes, plug hat dome	10
60"x12', 74 3/4" tubes, plug hat dome	10
56"x14' 4", 64 3/4" tubes, plug hat dome	10
56"x12', 60 3/4" tubes, plug hat dome	10
48"x13' 6", 44 3/4" tubes, plug hat dome	10
48"x15' 6", 52 3/4" tubes, plug hat dome	10
46"x13', 53 3/4" tubes, plug hat dome	10
48"x13' 10", 52 3/4" tubes, plug hat dome	10
48"x13' 6", 42 3/4"x12" tubes, manhole dome	10
44"x13' 9", 48 3/4"x12" tubes, plug hat dome	10
44"x14", 51 3/4" tubes, plug hat dome	10
44"x14' 6", 40 3/4" tubes, plug hat dome	10
44"x12', 46 3/4" tubes, plug hat dome	10
44"x11' 9", 42 3/4" tubes, manhole dome	10
44"x11' 6", 43 3/4" tubes, manhole dome	10
44"x11' 4", 46 3/4" tubes, manhole dome	10
44"x11' 3", 30 3/4" tubes, manhole dome	10
30"x12', 2 1/2" tubes, no dome	10
38"x15', 34 3/4" tubes, plug hat dome	10
38"x13', 33 3/4" tubes, plug hat dome	10
38"x12', 26 3/4" tubes, manhole dome	10
36"x12', 26 3/4" tubes, plug hat dome	10

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12" x 16" plain slide valve, L.H.	10
11" x 24" plain slide valve.	10
10" x 24" plain slide valve, L. Hd.	10
0" x 22" plain slide valve, R. Hd.	10
10" x 12" plain slide valve, L.H.	10
0" x 10" centre crank, Dutton, N.E.W.	10
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0" x 10" Leonard centre crank.	10

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No. 6 Horizontal Centrifugal, Morris.	50
No. 5 Horizontal Centrifugal, Morris.	50
No. 3 Vertical Centrifugal, Morris.	50
New No. 0 Taber Rotary Pump.	10
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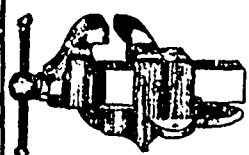
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All advertisers are invited to send in full list of lines sold by them. We desire to keep this index thoroughly up-to-date, but this will be impossible unless each advertiser sees to it that he is represented under each heading he is entitled to.

<p>Abrasives Williams, A. R. Machinery Co., Toronto.</p>	<p>Antimony Syracuse Smelting Works, Montreal.</p>	<p>Belting (Cotton) Dominion Belting Co., Hamilton, Ont.</p>
<p>Accountants Neff, A. C. & Co., Toronto. Viau, Henri, Montreal.</p>	<p>Anvils and Vises Leslie A. C. & Co., Montreal.</p>	<p>Greey, Wm. & J. G., Toronto. McLaren, L. K., Montreal and Toronto.</p>
<p>Acids Canada Chemical Co., London, Ont. Nichols Chemical Co. of Canada, Montreal.</p>	<p>Architects Parke, R. J. Toronto.</p>	<p>Petrie, H. W., Toronto. Sadler & Haworth, Montreal and Toronto.</p>
<p>Air Compressors Allis-Chalmers-Bullock, Limited, Montreal. Canada Foundry Co., Toronto. Canadian Rand Drill Co., Sherbrooke, Que. Darling Bros., Montreal. Smart-Turner Machine Co., Hamilton, Ont.</p>	<p>Automatic Gear Cutting Machines Becker-Brainard Milling Machine Co., Hyde Park, Mass.</p>	<p>Belting (Leather) Greey, Wm. & J. G., Toronto. McLaren, D. K., Montreal and Toronto. Petrie, H. W., Toronto.</p>
<p>Alkali Winn & Holland, Montreal.</p>	<p>Axles Nova Scotia Steel & Coal Co., New Glasgow, N.S.</p>	<p>Belting (Rubber) Greey, Wm. & J. G., Toronto. Gutta Percha & Rubber Mfg. Co., Toronto. McLaren, D. K., Montreal and Toronto. Petrie, H. W., Toronto.</p>
<p>Alum Leslie, A. C. & Co., Montreal. Nichols Chemical Co. of Canada, Montreal.</p>	<p>Babbitt Metal Greey, Wm. & J. G., Toronto. Petrie, H. W., Toronto. Syracuse Smelting Works, Montreal.</p>	<p>Belting and Supplies Bristol Co., Waterbury, Conn. Dominion Belting Co., Hamilton, Ont. Greey, Wm. & J. G., Toronto.</p>
<p>Aluminum Northern Aluminum Co., Pittsburg, Pa. Syracuse Smelting Works, Montreal.</p>	<p>Banks Bank of Hamilton, Hamilton, Ont.</p>	<p>Gutta Percha & Rubber Mfg. Co., Toronto Jeffrey Mfg. Co., Columbus, Ohio. McLaren, D. K., Montreal and Toronto. Petrie, H. W., Toronto. Williams, A. R. Machinery Co., Toronto.</p>
<p>Angles, Beams and Girders Bourne-Fuller Co., Cleveland, Ohio. Canada Foundry Co., Toronto. Nova Scotia Steel & Coal Co., New Glasgow, N.S.</p>	<p>Bar Iron and Steel Bourne-Fuller Co., Cleveland, Ohio Leslie, A. C. & Co., Montreal. London Rolling Mills, London, Ont. Union Drawn Steel Co., Hamilton, Ont.</p>	<p>Blast Furnace Brick Dunbar Fire Brick Co., Pittsburg, Pa. Elk Fire Brick Co., St. Mary's, Pa. Hamilton Facing Mill Co., Hamilton, Ont. Harbison-Walker Refractories Co., Pittsburg, Pa. Pennsylvania Fire Brick Co., Beech Creek, Pa. Stowe-Fuller Co., Cleveland, Ohio.</p>
<p>Aniline Colors and Dyewood Extracts Benson, W. T. & Co., Montreal. Brunner, Mond & Co., Norwich, England. Canada Chemical Mfg. Co., London, Ont. Cassella Color Co., New York City. McArthur, Corneille & Co., Montreal. Nichols Chemical Co. of Canada, Montreal. Winn & Holland, Montreal.</p>	<p>Belt Dressing Greey, Wm. & J. G., Toronto. Petrie, H. W., Toronto. Sadler & Haworth, Montreal and Toronto. Williams, A. R. Machinery Co., Toronto.</p>	<p>Bleaching Powder Winn & Holland, Montreal.</p>
<p>Annealing Muffles and Furnaces (Wire) Leslie, A. C. & Co., Montreal. Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.</p>	<p>Belt Fasteners Bristol Co., Waterbury, Conn. McLaren, D. K., Montreal and Toronto. Petrie, H. W., Toronto. Sadler & Haworth, Montreal and Toronto. Williams, A. R. Machinery Co., Toronto.</p>	<p>Blowers Hamilton Facing Mill Co., Hamilton, Ont. Sheldons, Limited, Galt, Ont. Sturtevant, B. F. Co., Boston, Mass.</p>

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Leslie, A. C. & Co., Montreal.

Boiler Compounds
Canada Chemical Mfg. Co., London, Ont.
Hamilton Facing Mill Co., Hamilton, Ont.

Boiler Coverings
Mica Boiler Covering Co., Montreal.

Boiler Inspection
Boiler Inspection & Insurance Co., Toronto.
Canadian Casualty & Boiler Insurance Co., Toronto.

BOILERS (See Engines and Boilers)

Bolts and Nuts
London Rolling Mills, London, Ont.
Morrow, John, Screw, Limited, Ingersoll, Ont.

Borax
Leslie, A. C. & Co., Montreal.

Brick Machinery
Bechtels, Limited, Waterloo, Ont.

Building and Paving Brick
Dunbar Fire Brick Co., Pittsburgh, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Hubbison-Walker Refractories Co., Pittsburgh, Pa.
Pennsylvania Fire Brick Co., Beech Creek, Pa.
Stowe-Fuller Co., Cleveland, Ohio.

Building Iron and Steel
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Expanded Metal & Fireproofing Co., Toronto.

Builders' Materials
Albert Mfg. Co., Hillsboro, Ont.
Canada Foundry Co., Toronto.
Expanded Metal & Fireproofing Co., Toronto.
Guthrie, John J., Toronto.
Ontario Lime Association, Toronto.
Rockona, Limited, Galt, Ont.

Burlap (Decorative)
Dominion Oil Cloth Co., Montreal.

Business Methodizers
Max Heard, Montreal.

Cables
Greening, B. Wire Co., Hamilton, Ont.
Leips Eugene F. Electrical Works Montreal.

Calcium Chloride
Winn & Holland, Montreal.

Canada Plates
Leslie, A. C. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Caps
McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Card Clothing
Loren, D. K., Montreal and Toronto.

Cast Iron Pipe
Canada Foundry Co., Toronto.
Central Pipe Foundry Co., Montreal.
McCullough, John, Caledonian Iron Works Co., Montreal.

Castings (Gray Iron, Malleable Iron and Brass)
Greig, Wm. & J. G., Toronto.
Green Engine Co., Walkerville, Ont.
McCullough, John, Caledonian Iron Works Co., Montreal.
McKinnon Dash & Metal Works Co., St. Catharines, Ont.
Wright, Jas., Brass Mfg. Co., Toronto.
Smart-Turner Machine Co., Hamilton, Ont.

Cement
Ontario Lime Association.
Mica Boiler Covering Co., Montreal.

Cement Machinery
Allis-Chalmers-Bullock, Limited, Montreal.
Greig, Wm. & J. G., Toronto.
McCullough, John, Caledonian Iron Works Co., Montreal.

Centrifugal Pumping Machinery
Smart-Turner Machine Co., Hamilton, Ont.

Chain Making Machinery (Welded Coil Chain)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Channels
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Leslie, A. C. & Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Charcoal Pig Iron
Canada Iron Furnace Co., Montreal.
McCullough, John, Caledonian Iron Works Co., Montreal.

Chemicals
Canada Chemical Co., London, Ont.
Leslie, A. C. & Co., Montreal.
Nichols Chemical Co. of Canada, Montreal.
Winn & Holland, Montreal.

Chemists
Heys, Thomas & Son, Toronto.

Chemists' Machinery
Greig, Wm. & J. G., Toronto.

Clay Working Machinery
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
Bechtels, Limited, Waterloo, Ont.
Berg, A. & Sons, Toronto.
Greig, Wm. & J. G., Toronto.

Coal, Coke and Charcoal.
Bourne-Fuller Co., Cleveland, Ohio.
Hamilton Facing Mill Co., Hamilton, Ont.

Coal Cutting Machines
Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Jeffrey Mfg. Co., Columbus, Ohio.

Coal Tipples
Jeffrey Mfg. Co., Columbus, Ohio.

Coil Chains
Greening, B. Wire Co., Hamilton, Ont.
Leslie, A. C. & Co., Montreal.

Coke Oven Brick
Dunbar Fire Brick Co., Pittsburgh, Pa.
Stowe-Fuller Co., Cleveland, Ohio.

Collection Agency
Petrie, H. D., Hamilton, Ont.

Collectors (Pneumatic)
Greig, Wm. & J. G., Toronto.
Sturtevant, B. F. Co., Hyde Park, Mass.

Condensers
Smart-Turner Machine Co., Hamilton, Ont.

Connecting Rods.
Canada Forge Co., Welland, Ont.

Contractors' Machinery
Allis-Chalmers-Bullock, Limited, Montreal.
Gartshore, John J., Toronto.
McCullough, John, Caledonian Iron Works Co., Montreal.
Smart-Turner Machine Co., Hamilton, Ont.

Contractors' Plants
Allis-Chalmers-Bullock, Limited, Montreal.
Petrie, H. W., Toronto.
Smart-Turner Machine Co., Hamilton, Ont.
Williams A. R. Machinery Co., Toronto.

Conveying Machinery
Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Greig, Wm. & J. G., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
McCullough, John, Caledonian Iron Works Co., Montreal.
Perrin, William R. & Co., Limited, Toronto.
Smart-Turner Machine Co., Hamilton, Ont.

Copper Materials
Greening, B. Wire Co., Hamilton, Ont.
Phillips, Eugene F. Electrical Works, Montreal.
Syracuse Smelting Works, Montreal.

Covers
McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Cranes (Electric and Hand Power)
Babcock & Wilcox, Montreal.
Smart-Turner Machine Co., Hamilton, Ont.

Crankshafts
Canada Forge Co., Welland, Ont.

Crayons
Lowell Crayon Co., Lowell, Mass.

Crucibles
Dixon, Joseph, Crucible Co., Jersey City, N.J.
Hamilton Facing Mill Co., Hamilton, Ont.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.
Syracuse Smelting Works, Montreal.

Crucible Caps
Hamilton Facing Mill Co., Hamilton, Ont.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Crucible Covers
McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Outer Grinding Machines
Becker-Brainard Milling Machine Co., Hyde Park, Mass.

Dashes
McKinnon Dash & Metal Works Co., St. Catharines, Ont.

Dies (Socket, Sewer Pipe and Tile)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Directories
Kelly's Directories, Limited, Toronto

Draw Ronches (Wire)
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Dredges
Allis-Chalmers-Bullock, Limited, Montreal.

Drill Chucks
Krug & Crosby, Hamilton, Ont.

Drills
Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Petrie, H. W., Toronto.

Drills (Pneumatic and Rock)
Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Jeffrey Mfg. Co., Columbus, Ohio.

Drop Forgings
Globe Machine & Stamping Co., Cleveland, Ohio

Drop Forging Dies
Globe Machine & Stamping Co., Cleveland, Ohio.

Dry Battery Filler
International-Acheson-Graphite Co., Niagara Falls, N.Y.

Dry Kiln Apparatus
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Dust and Shavings Separators
Greig, Wm. & J. G., Toronto.
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Dye Stuffs and Chemicals
Benson, W. T. & Co., Montreal.
Brunner, Mond & Co., Northwich, England.
Canada Chemical Mfg. Co., London, Ont.
Cassella Color Co., New York City.
Leslie, A. C. & Co., Montreal.
McArthur, Cornelia & Co., Montreal.
Nichols Chemical Co. of Canada, Montreal.
Winn & Holland, Montreal.

DYNAMOS (See Motors and Dynamos)

Electric Meters and Transformers
Packard Electric Co., St. Catharines, Ont.

Electric Mine Locomotives
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.

Electric Transformers
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Electrical Supplies
Bristol Co., Waterbury, Conn.
Canadian General Electric Co., Toronto.

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(CONTINUED).

Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jones & Moore Electric Co., Toronto.
Morrisson, Jas., Brass Mfg. Co., Toronto.
Packard Electric Co., St. Catharines, Ont.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Electrodes

International-Acheson-Graphite Co., Niagara Falls, N.Y.

Elevators and Conveyors

Darling Bros., Montreal.
Greay, Wm. & J. G., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.

Elevator Insurance

Canadian Casualty & Boiler Insurance Co., Toronto.

Emery and Emery Wheels

Forman, John, Montreal.
Hamilton Facing Mill Co., Hamilton, Ont.
Petrie, H. W., Toronto.

Engineers (Chemical)

Heys, Thomas & Son, Toronto.
Hunt, Robert W. & Co., Chicago, Ill.

Engineers (Civil)

Parke, R. J. Toronto.

Engineers (Consulting)

Aitken, K. L., Toronto.
Electrical Construction Co., London, Ont.
Fensom, C. J., Toronto.
Hunt, Robert W. & Co., Chicago, Ill.
Marion & Marion, Montreal.
Parke, R. J., Toronto.
Perrin William R. & Co., Limited, Toronto.

Engineers (Contracting)

Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Electrical Construction Co., London Ont.
Fensom, C. J., Toronto.
Greay, Wm. & J. G., Toronto.
McDougall, John, Caledonian Iron Works Co., Montreal.
Robb Engineering Co., Amherst, N.S.

Engineers (Electrical)

Aitken, K. L., Toronto.
Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Ltd., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Crocker-Wheeler Co., St. Catharines, Ont.
Electrical Construction Co., London, Ont.
Fensom, C. J., Toronto.
Jones & Moore Electric Co., Toronto.
Marion & Marion, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Engineers (Mechanical)

Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
Electrical Construction Co., London, Ont.
Fensom, C. J., Toronto.
Greay, Wm. & J. G., Toronto.
McDougall, John, Caledonian Iron Works Co., Montreal.
Hunt, Robert W. & Co., Chicago, Ill.
Kerr Engine Co., Walkerville, Ont.
Marion & Marion, Montreal.
Robb Engineering Co., Amherst, N.S.
Sheldons, Limited, Galt, Ont.
Smart-Turner Machine Co., Hamilton, Ont.

Engineers (Mill and Hydraulic)

Fensom, C. J., Toronto.
Greay, Wm. & J. G., Toronto.
Smart-Turner Machine Co., Hamilton, Ont.

Engineers (Mining)

Heys, Thomas & Son, Toronto.
Mills, S. D., Toronto.

Engineers and Contractors

Greay, Wm. & J. G., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
Smart-Turner Machine Co., Hamilton, Ont.

Engineers' Supplies

Morrison, Jas., Brass Mfg. Co., Toronto.

Engines and Boilers

Allis-Chalmers-Bullock, Limited, Montreal.
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Goldie & McCulloch Co., Galt, Ont.
Morris Machine Works, Baldwinsville, N.Y.
McDougall, John, Caledonian Iron Works Co., Montreal.
Petrie, H. W., Toronto.
Robb Engineering Co., Amherst, N.S.
Sheldons, Limited, Galt, Ont.
Smart-Turner Machine Co., Hamilton, Ont.

Sturtevant, B. F. Co., Boston, Mass.
Williams, A. R. Machinery Co., Toronto.

Engravers

Canadian Manufacturer, Toronto.
Jones, J. L. Engraving Co., Toronto.

Exhaust Fans

Greay, Wm. & J. G., Toronto.
Hamilton Facing Mill Co., Hamilton, Ont.
Sheldons, Limited, Galt, Ont.
Sturtevant B. F. Co., Boston, Mass.

Exhaust Heads

Darling Bros., Montreal.
Sheldons, Limited, Galt, Ont.
Sturtevant B. F. Co., Hyde Park, Mass.

Exhausters

Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Hyde Park Mass.

Factory Sites

(See Factory Locations.)

Fans

Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Hyde Park, Mass.

Feed Water Heaters

Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Pittsburg Filter Mfg. Co., Pittsburg, Pa.
Robb Engineering Co., Amherst, N.S.
Smart-Turner Machine Co., Hamilton, Ont.

Feed Water Purifiers

Pittsburg Filter Mfg. Co., Pittsburg, Pa.

Files

Spence, R. & Co., Hamilton, Ont.

Fillet (Pattern)

Hamilton Facing Mill Co., Hamilton, Ont.
Sadler & Haworth, Montreal and Toronto.

Filters (Oil)

Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Perrin William R. & Co., Limited, Toronto.

Filters and Filtering Systems (Water)

Babcock & Wilcox, Limited, Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.
Pittsburg Filter Mfg. Co., Pittsburg, Pa.

Financial

Bradstreet's, New York City.
Dun, R. G. & Co., Toronto.
Neff, A. C. & Co., Toronto.
Petrie, H. D., Hamilton, Ont.

Fire Brick and Clay

Dunbar Fire Brick Co., Pittsburgh, Pa.
Elk Fire Brick Co., St. Mary's, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Harbison-Walker Refractories Co., Pittsburg, Pa.
Leslie, A. C. & Co., Montreal.
Ontario Lime Association, Toronto.
Pennsylvania Fire Brick Co., Becho Creek, Pa.
Stowe-Fuller Co., Cleveland, Ohio.

Fire Escapes

Darling Bros., Montreal.

Flour Mill Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Goldie & McCulloch Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.

Forges and Blowers

Canada Foundry Co., Toronto.
Greay, Wm. & J. G., Toronto.
Hamilton Facing Mill Co., Hamilton, Ont.
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Forgings

Canada Forge Co., Welland, Ont.

Founders

Canada Foundry Co., Toronto.
Goldie & McCulloch Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.
Kerr Engine Co., Walkerville, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.
Robb Engineering Co., Amherst, N.S.
Smart-Turner Machine Co., Hamilton, Ont.

Foundry Facings and Supplies

Hamilton Facing Mill Co., Hamilton, Ont.
International-Acheson-Graphite Co., Niagara Falls, N.Y.

Fuel Economizers

Babcock & Wilcox, Limited, Montreal.
Sturtevant, B. F. Co., Hyde Park, Mass.

Furniture (Lodge, Opera and School)

Canadian Office & School Furniture Co., Preston, Ont.

Galvanizing

Ontario Wind Engine & Pump Co., Toronto.

Galvanizing and Tinning Machinery and Furnaces (Wire)

Greay, Wm. & J. G., Toronto.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

Gas Blowers and Exhausters

Sturtevant, B. F. Co., Hyde Park, Mass.

Gas and Gasoline Engines

Economic Power, Light & Heat Supply Co., Toronto.
Morrison, T. A. & Co., Montreal.
Smart-Turner Machine Co., Hamilton, Ont.

Gauges (Recording Pressure)

Bristol Co., Waterbury, Conn.

Morrison, Jas., Brass Mfg. Co., Toronto.

Gauges (Steam)

Morrison, Jas., Brass Mfg. Co., Toronto.

Petrie, H. W., Toronto.

Williams, A. R. Machinery Co., Toronto.

Gauges (Water)

Babcock & Wilcox, Limited, Montreal.

Morrison, Jas., Brass Mfg. Co., Toronto.

Generating Sets

Sturtevant, B. F. Co., Hyde Park, Mass.

Generators

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
Phillips, Eugene F., Electrical Works, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Gloves, Mittens and Moccasins

Storey, W. H. & Son, Aton, Ont.

Glycerine

Winn & Holland, Montreal.

Government Notices

Factory Inspectors.
Minister of Agriculture.

Graphite

Dixon, Jos. Crucible Co., Jersey City, N.J.
Hamilton Facing Mill Co., Hamilton, Ont.
International-Acheson-Graphite Co., Niagara Falls, N.Y.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.
Morrison, Jas., Brass Mfg. Co., Toronto.

Hack Saws

Krug & Crosby, Hamilton, Ont.

Hames

McKinnon Dash & Metal Works Co., St. Catharines

Hardware

Butterfield & Co., Rock Island, Que.
Gartshore, John J., Toronto.
Globe Machine & Stamping Co., Cleveland, Ohio.
Morrow, John, Screw, Limited, Ingersoll, Ont.

Heating and Ventilating Apparatus

Darling Bros., Montreal.
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

High Pressure Blowers

Sturtevant, B. F. Co., Hyde Park, Mass.

Hoisting Engines

Allis-Chalmers-Bullock, Limited, Montreal.

Hoists (Chain and Pneumatic)

Canadian Rand Drill Co., Sherbrooke, Que.

Hose (Fire and Pneumatic)

Gutta Percha & Rubber Mfg. Co., Toronto.

Hydrants

Kerr Engine Co., Walkerville, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.

Hydraulic Accumulators

Canadian Boomer & Boschert Press Co., Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.

Perrin, Wm. R. & Co., Limited, Toronto.

Smart-Turner Machine Co., Hamilton, Ont.

Hydraulic Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Canada Foundry Co., Toronto.
Canadian Boomer & Boschert Press Co., Montreal.
Darling Bros., Montreal.
Greay, Wm. & J. G., Toronto.
McDougall, John, Caledonian Iron Works Co., Montreal.

Perrin, William R. & Co., Limited, Toronto.

Petrie, H. W., Toronto.

Smart-Turner Machine Co., Hamilton, Ont.

Hydro-Electric Plants

Allis-Chalmers-Bullock, Limited, Montreal.

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Injectors

Canada Foundry Co., Toronto.
Morrison, Jas., Brass Mfg. Co., Toronto.
Williams, A. R. Machinery Co., Toronto.

Insulated Wires and Cables

Phillips, Eugene F., Electrical Works, Montreal.

Insulation, Sound and Cold Storage

Mica Boiler Covering Co., Montreal.

Iron and Steel Specialties

Armstrong Mfg. Co., Bridgeport, Conn.
Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Leslie, A. C. & Co., Montreal.
London Rolling Mill Co., London, Ont.
Lysaght, John, Limited, Bristol, England and Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Petrie, H. W., Toronto.
Union Drawn Steel Co., Hamilton, Ont.

Iron and Steel Inspection

Hunt R. W. & Co., Chicago, Ill.

Lamps—Electric

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Forman, John, Montreal.
Packard Electric Co., St. Catharines, Ont.

Lathes

Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

Lathes (Wood-working)

Goldie & McCulloch Co., Galt, Ont.
Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

Linoleum

Dominion Oil Cloth Co., Montreal.

Lubricators

Hamilton Facing Mill Co., Hamilton, Ont.
Morrison, Jas., Brass Mfg. Co., Toronto.

Machinists

Fisher Bros., Toronto.
Goldie & McCulloch Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.
Kerr Engine Co., Walkerville, Ont.
Krug & Crosby, Hamilton, Ont.
Robb Engineering Co., Amherst, N.S.
Smart-Turner Machine Co., Hamilton, Ont.

Machinists' Supplies

Armstrong Mfg. Co., Bridgeport, Conn.
Butterfield & Co., Rock Island, Que.
Goldie & McCulloch Co., Galt, Ont.
Gutta Percha & Rubber Mfg. Co., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
Morrow, John, Screw, Limited, Ingersoll, Ont.
Petrie, H. W., Toronto.

Machine Tools

Becker-Brainard Milling Machine Co., Hyde Park, Mass.
Darling Bros., Montreal.
Petrie, H. W., Toronto.

Malleable Castings

McKinnon Dash & Metal Works Co., St. Catharines, Ont.
Smith's Falls Malleable Castings Co., Smith's Falls, Ont.

Marine and Stationary Engines and Boilers

Allis-Chalmers-Bullock, Limited, Montreal.
Smart-Turner Machine Co., Hamilton, Ont.

Mechanical Draft

Babeock & Wilcox, Limited, Montreal.
Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Metal Stamping

Globe Machine & Stamping Co., Cleveland, Ohio

Metallurgists

Mills, S. D., Toronto.

Mica Coverings

Mica Boiler Covering Co., Montreal.

Mill Machinery and Supplies

Allis-Chalmers-Bullock, Limited, Montreal.
Armstrong Mfg. Co., Bridgeport, Conn.
Becker-Brainard Milling Machine Co., Hyde Park, Mass.
Darling Bros., Montreal.
Gartshore, John J., Toronto.
Goldie & McCulloch Co., Galt, Ont.

Greay, Wm. & J. G., Toronto.
Gutta Percha & Rubber Mfg. Co., Toronto.
Hay, Peter Knife Co., Galt, Ont.
Jeffrey Mfg. Co., Columbus, Ohio.
Morrow, John, Screw, Limited, Ingersoll, Ont.
McDougall, John, Caledonian Iron Works Co., Montreal.

McLaren, D. K., Montreal and Toronto.
Petrie, H. W., Toronto.
Robb Engineering Co., Amherst, N.S.
Sadler & Haworth, Montreal and Toronto.
Smart-Turner Machine Co., Hamilton, Ont.
Spence, R. & Co., Hamilton, Ont.

Milling Cutters and Machines

Becker-Brainard Milling Machine Co., Hyde Park, Mass.

Mining Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Gartshore, John J., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
McDougall, John, Caledonian Iron Works Co., Montreal.
Perrin, William R. & Co., Limited, Toronto.
Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

Motors and Dynamos

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
Petrie, H. W., Toronto.
Sturtevant, B. F. Co., Hyde Park, Mass.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Motors (Electric)

Sturtevant, B. F. Co., Hyde Park, Mass.

Moulding Sand

Hamilton Facing Mills Co., Hamilton, Ont.

Moulders Supplies.

Hamilton Facing Mill Co., Hamilton, Ont.

Municipal Filtration Plants (Water)

Pittsburg Filter Mfg. Co., Pittsburg, Pa.

Nickel

Canadian Copper Co., New York, N.Y.
Orford Copper Co., New York, N.Y.

Nozzles

McCullough-Dalzell Crucible Co., Pittsburg, Pa.
Morrison, Jas., Brass Mfg. Co., Toronto.

Office and Bank Fittings

Canadian Office & School Furniture Co., Preston, Ont.

Oils and Lubricants

Dixon, Jos. Crucible Co., Jersey City, N.J.
Hamilton Facing Mill Co., Hamilton, Ont.
Imperial Oil Co., Petrolia, Ont.
Queen City Oil Co., Toronto.

Oil Cloth

Dominion Oil Cloth Co., Montreal.

Paint Pigment

International-Acheson-Graphite Co., Niagara Falls, N.Y.

Paints and Colors

Berry Bros., Walkerville, Ont.
McArthur, Cornelle & Co., Montreal.

Paint and Color Machinery.

Greay, Wm. & J. G., Toronto.

Paper Manufacturers

Barber, Wm. & Bros., Georgetown, Ont.
Toronto Paper Mfg. Co., Cornwall, Ont.

Patents

Budden, Hanbury A., Montreal.
Fotherstonhaugh & Co., Toronto.
Marion & Marion, Montreal.

Perforated Metals

Globe Machine & Stamping Co., Cleveland, Ohio.
Greening, B. Wire Co., Hamilton, Ont.

Personal Accident

Canadian Casualty & Boiler Insurance Co., Toronto.

Phosphorizers

McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Pig Iron

Bourne-Fuller Co., Cleveland, Ohio.
Canada Iron Furnace Co., Montreal.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Syrausac Smelting Works Montreal.

Pipe (Riveted, Iron and Steel)

Babeock & Wilcox, Limited, Montreal.
McDougall, John, Caledonian Iron Works Co., Montreal.

Pipe Threading Machines

Armstrong Mfg. Co., Bridgeport, Conn.
Butterfield & Co., Rock Island, Que.
Morrison, Jas., Brass Mfg. Co., Toronto.
Petrie, H. W., Toronto.

Pipe Coverings

Mica Boiler Covering Co., Montreal.

Pipes and Tubes

Bourne-Fuller Co., Cleveland, Ohio.
Canada Foundry Co., Toronto.
Montreal Pipe Foundry Co., Montreal.

Plaster

Albert Mfg. Co., Hillsborough, N.B.

Plates

Bourne-Fuller Co., Cleveland, Ohio.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Plumbago

Hamilton Facing Mills Co., Hamilton, Ont.
International-Acheson-Graphite Co., Niagara Falls, N.Y.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Pneumatic Separators

Sheldons, Limited, Galt, Ont.
Sturtevant, B. F. Co., Hyde Park, Mass.

Pneumatic Tools

Allis-Chalmers-Bullock, Limited, Montreal.
Canadian Rand Drill Co., Sherbrooke, Que.
Hamilton Facing Mill Co., Hamilton, Ont.

Pointer Rolls (For Rods and Wire)

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Power Plants—Equipments

Allis-Chalmers-Bullock, Limited, Montreal.
Babeock & Wilcox, Limited, Montreal.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Darling Bros., Montreal.
Economic Power, Light & Heat Supply Co., Toronto.
Electrical Construction Co., London, Ont.
Goldie & McCulloch, Galt, Ont.
Gutta Percha & Rubber Mfg. Co., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
Jones & Moore Electric Co., Toronto.
McDougall, John, Caledonian Iron Works Co., Montreal.
Packard Electric Co., St. Catharines, Ont.
Perrin, Wm. R. & Co., Limited, Toronto.
Petrie, H. W., Toronto.
Phillips, Eugene F., Electrical Works, Montreal.
Robb Engineering Co., Amherst, N.S.
Sadler & Haworth, Montreal and Toronto.
Smart-Turner Machine Co., Hamilton, Ont.
Sturtevant, B. F. Co., Boston, Mass.
Toronto & Hamilton Electric Co., Hamilton, Ont.

Presses (Tile, Sewer Pipe, Nozzles and Sleeves)

Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Presses (Baling, Celluloid, Clider, Die, Filter Vulcanizing)

Canadian Boomer & Boschert Press Co., Montreal.
Perrin, Wm. R. & Co., Limited, Toronto.

Presses (Hydraulic)

Canadian Boomer & Boschert Press Co., Montreal.
Perrin, Wm. R. & Co., Limited, Toronto.

Pulleys

Darling Bros., Montreal.
Goldie & McCulloch Co., Galt, Ont.
Greay, Wm. & J. G., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
McDougall, John, Caledonian Iron Works Co., Montreal.
Petrie, H. W., Toronto.
Smart-Turner Machine Co., Hamilton, Ont.

Producer Gas Plants

Economic Power, Light & Heat Supply Co., Toronto.
Producer Gas Co., Toronto.

Pumps and Pumping Machinery

Allis-Chalmers-Bullock, Limited, Montreal.
Canada Foundry Co., Toronto.
Canadian Boomer & Boschert Press Co., Montreal.
Darling Bros., Montreal.
Downie Pump Co., Downieville, Pa.
Goldie & McCulloch Co., Galt, Ont.
Kerr Engine Co., Walkerville, Ont.
Morris Machine Works, Baldwinville, N.Y.
McDougall, John, Caledonian Iron Works Co., Montreal.
Ontario Wind Engine & Pump Co., Toronto.
Perrin, Wm. R. & Co., Limited, Toronto.
Petrie, H. W., Toronto.
Smart-Turner Machine Co., Hamilton, Ont.

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Punches and Shears
 Globe Machine & Stamping Co., Cleveland, Ohio.
 Petre, H. W., Toronto.

Purifiers
 Babcock & Wilcox, Limited, Montreal.
 Goldie & McCulloch Co., Galt, Ont.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Purifying and Softening Systems (Water)
 Babcock & Wilcox, Limited, Montreal.
 Darling Bros., Montreal.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Railroads
 Chicago & North-Western Ry., Toronto and St. Paul, Minn.

Railway Supplies
 Algoma Steel Co., Sault Ste. Marie, Ont.
 Allis-Chalmers-Bullock, Limited, Montreal.
 Garsshore, John J., Toronto.
 Greening, B. Wire Co., Hamilton, Ont.
 Gutta Percha & Rubber Mfg. Co., Toronto.
 Nova Scotia Steel & Coal Co., New Glasgow, N.S.
 Phillips, Eugene F. Electrical Works, Montreal.

Reamers
 Butterfield & Co., Rock Island, Que.

Rivets
 Bourn-Fuller Co., Cleveland, Ohio.
 London Rolling Mills, London, Ont.

Rock and Ore Crushers
 Allis-Chalmers-Bullock, Limited, Montreal.

Rolling Mill Engineers
 Bourn-Fuller Co., Cleveland, Ohio.

Rolls, Chilled Iron and Sand Cast.
 Greig, Wm. & J. G., Toronto.

Roofing
 Bourn-Fuller Co., Cleveland, Ohio.
 Sturtevant, B. F. Co., Galt, Ont.

Rotary Blowers
 Sturtevant, B. F. Co., Hyde Park, Mass.

Rubber Goods
 Gutta Percha & Rubber Mfg. Co., Toronto.

Rubber Packing
 Gutta Percha & Rubber Mfg. Co., Toronto.

Rubber Washing Tubs
 Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Rural Mail Boxes
 Globe Machine & Stamping Co., Cleveland, Ohio.

Saddlery Hardware
 McKinnon Dash & Metal Works Co., St. Catharines, Ont.

Safes and Vaults
 Goldie & McCulloch Co., Galt, Ont.

Salammoniac
 Leslie, A. C. & Co., Montreal.
 Winn & Holland, Montreal.

Sal Soda
 Winn & Holland, Montreal.

Saw Mill Machinery
 Allis-Chalmers-Bullock, Limited, Montreal.

Screws
 Greig, Wm. & J. G., Toronto, Limited, Ingersoll, Ont.

Screw Plates
 Armstrong Mfg. Co., Bridgeport, Conn.
 Butterfield & Co., Rock Island, Que.

Second-Hand Machinery
 Krug & Crosby, Hamilton, Ont.

Sewer Pipes.
 Dominion Sewer Pipe Co., Swansea, Ont.
 Lime Association, Toronto.

Shafting
 Bourn-Fuller Co., Cleveland, Ohio.
 Canada Forge Co., Welland, Ont.
 Goldie & McCulloch Co., Galt, Ont.
 Greig, Wm. & J. G., Toronto.
 Mfg. Co., Columbus, Ohio.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Nova Scotia Steel & Coal Co., New Glasgow, N.S.
 Petre, H. W., Toronto.
 Smart-Turner Machine Co., Hamilton, Ont.

Shear Knives
 J. Peter Knife Co., Galt, Ont.

Sheets (Iron and Steel)
 Bourn-Fuller Co., Cleveland, Ohio.
 Leslie, A. C. & Co., Montreal.
 Smart-Turner Machine Co., Bristol, England, and Montreal.

Sheet Metal Goods
 Globe Machine & Stamping Co., Cleveland, Ohio.

Sheet Metal Stamping
 Globe Machine & Stamping Co., Cleveland, Ohio.

Shovels.
 Canada Facing Mill Co., Hamilton, Ont.

Signal Contacts
 International-Acheson-Graphite Co., Niagara Falls, N.Y.

Silicate of Soda
 Winn & Holland, Montreal.

Smoke Stacks
 McDougall, John, Caledonian Iron Works Co., Montreal.

Robb Engineering Co., Amherst, N.S.
 Smart-Turner Machine Co., Hamilton, Ont.

Soda Ash
 Winn & Holland, Montreal.

Solder
 Globe Machine & Stamping Co., Cleveland, Ohio.
 Syracuse Smelting Co., Montreal.

Special Machinery
 Allis-Chalmers-Bullock, Limited, Montreal.
 Fisher Bros., Toronto.
 Globe Machine & Stamping Co., Cleveland, Ohio.
 Greig, Wm. & J. G., Toronto.
 Krug & Crosby, Hamilton, Ont.
 Smart-Turner Machine Co., Hamilton, Ont.

Speed Recorders
 Bristol Co., Waterbury, Conn.

Sprinkler Insurance
 Canadian Casualty & Boiler Insurance Co., Toronto.

Stamps and Stencils
 Globe Machine & Stamping Co., Cleveland, Ohio.

Steam, Hot Blast Apparatus
 Sheldons, Limited, Galt, Ont.
 Sturtevant, B. F. Co., Hyde Park, Mass.

Steam Pumps
 Allis-Chalmers-Bullock, Limited, Montreal.
 Canada Foundry Co., Toronto.
 Darling Bros., Montreal.
 Goldie & McCulloch Co., Galt, Ont.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Petrie, H. W., Toronto.
 Smart-Turner Machine Co., Hamilton, Ont.
 Williams, A. R. Machinery Co., Toronto.

Steam Separators
 Babcock & Wilcox, Limited, Montreal.
 Darling Bros., Montreal.
 Morrison, Jas., Brass Mfg. Co., Toronto.
 Robb Engineering Co., Amherst, N.S.
 Sheldons, Limited, Galt, Ont.
 Smart-Turner Machine Co., Hamilton, Ont.

Steam Shovels
 Allis-Chalmers-Bullock, Limited, Montreal.

Steam Specialties
 Darling Bros., Montreal.
 Morrison, Jas., Brass Mfg. Co., Toronto.
 Sheldons, Limited, Galt, Ont.
 Sturtevant, B. F. Co., Hyde Park, Mass.

Steam Valves
 Babcock & Wilcox, Limited, Montreal.
 Darling Bros., Montreal.
 Kerr Engine Co., Walkerville, Ont.
 Morrison, Jas., Brass Mfg. Co., Toronto.
 Petrie, H. W., Toronto.
 Williams, A. R. Machinery Co., Toronto.

Steel Balls
 Algoma Steel Co., Sault Ste. Marie, Ont.
 Drummond, McCall & Co., Montreal and Toronto.
 Garsshore John J., Toronto.

Steel Shafting
 Canada Forge Co., Welland, Ont.
 Darling Bros., Montreal.
 Goldie & McCulloch Co., Galt, Ont.
 Greig, Wm. & J. G., Toronto.
 Leslie, A. C. & Co., Montreal.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Stocks and Dies
 Armstrong Mfg. Co., Bridgeport, Conn.
 Butterfield & Co., Rock Island, Que.
 Morrison, Jas., Brass Mfg. Co., Toronto.
 Petrie, H. W., Toronto.

Stoppers
 McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Structural Steel
 Bourn-Fuller Co., Cleveland, Ohio.
 Canada Foundry Co., Toronto.

Sulphate of Alumina
 Nichols Chemical Co. of Canada, Montreal.

Sulphate of Ammonia
 Winn & Holland, Montreal.

Suspension Furnaces
 Continental Iron Works Co., New York City.

Switchboards
 Allis-Chalmers-Bullock, Limited, Montreal.

Systematizers
 Vian, Henri, Montreal.

Tanks (Oil and Water)
 Canada Foundry Co., Toronto.
 Goldie & McCulloch Co., Galt, Ont.
 McDougall, John, Caledonian Iron Works Co., Montreal.

Ontario Wind Engine & Pump Co., Toronto.

Taps and Dies
 Butterfield & Co., Rock Island, Que.
 Globe Machine & Stamping Co., Cleveland, Ohio.

Tees
 Bourn-Fuller Co., Cleveland, Ohio.
 Canada Foundry Co., Toronto.

Textile Manufacturers
 Dominion Oil Cloth Co., Montreal.
 Storey, W. H. & Sons, Acton, Ont.

Thermometers (Recording)
 Bristol Co., Waterbury, Conn.
 Morrison, Jas., Brass Mfg. Co., Toronto.

Tin
 Leslie, A. C. & Co., Montreal.
 Syracuse Smelting Works, Montreal.

Tool Steel
 Bourn-Fuller Co., Cleveland, Ohio.
 Leslie, A. C. & Co., Montreal.

Traps (Steam)
 Morrison, Jas., Brass Mfg. Co., Toronto.
 Sheldons, Limited, Galt, Ont.
 Sturtevant, B. F. Co., Hyde Park, Mass.

Trucks
 Greig, Wm. & J. G., Toronto.
 McDougall, John, Caledonian Iron Works Co., Montreal.
 Sheldons Limited Galt, Ont.

Trucks (Railway)
 Canada Foundry Co., Toronto.

Trucks (Wire Mill Supplies)
 Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Tubs (Cleaning and Coating Wire)
 Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Tumbling Barrels
 Globe Machine & Stamping Co., Cleveland, Ohio.
 Petrie, H. W., Toronto.
 Smart-Turner Machine Co., Hamilton, Ont.

Turbines
 Allis-Chalmers-Bullock, Limited, Montreal.
 Canada Foundry Co., Toronto.

Upright Drills
 Krug & Crosby, Hamilton, Ont.

Valves
 Babcock & Wilcox, Limited, Montreal.
 Canada Foundry Co., Toronto.
 Canadian Boller & Bosclett Press Co., Montreal.
 Kerr Engine Co., Walkerville, Ont.
 Morrison, Jas., Brass Mfg. Co., Toronto.
 Petrie, H. W., Toronto.
 Smart-Turner Machine Co., Hamilton, Ont.
 Williams, A. R. Machinery Co., Toronto.

Valves (Rubber)
 Gutta Percha & Rubber Mfg. Co., Toronto

Varnishes
 Berry Bros., Walkerville, Ont.

Ventilators
 Darling Bros., Montreal.
 Sheldons, Limited, Galt, Ont.
 Sturtevant, B. F. Co., Boston, Mass.

Wagon and Carriage Wood Work
 Hore, F. W. & Son, Hamilton, Ont.

Washers or Hollnders (Cleaning Rubber)
 Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.

Water Purifying Chemicals
 Canada Chemical Mfg. Co., London, Ont.

Water Softening Plants
 Pittsburg Filter Mfg. Co., Pittsburg, Pa.

Wheelsbarrows.
 Hamilton Facing Mill Co., Hamilton, Ont.

Whiting
 Leslie, A. C. & Co., Montreal.

Windmills
 Ontario Wind Engine & Pump Co., Toronto.

Wire Mill Supplies
 Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio

Wire
 Greening, B. Wire Co., Hamilton, Ont.
 Leslie, A. C. & Co., Montreal.
 Phillips, Eugene F. Electrical Works, Montreal.

Wire Cloth
 Greening, B. Wire Co., Hamilton, Ont.
 Greig, Wm. & J. G., Toronto.
 Winn & Holland, Montreal.

Wire Drawing Machinery
 Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio

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 Goldie & McCulloch Co., Galt, Ont.
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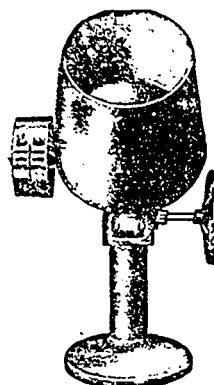
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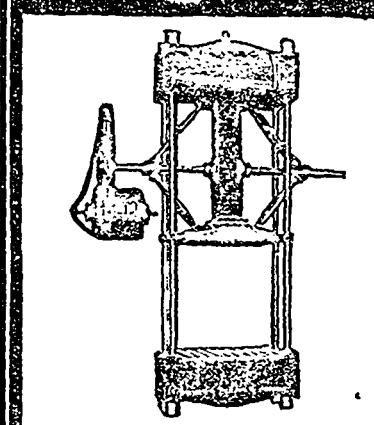
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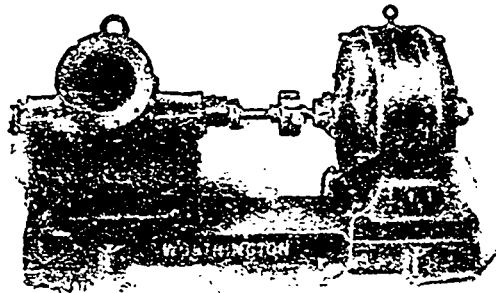
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