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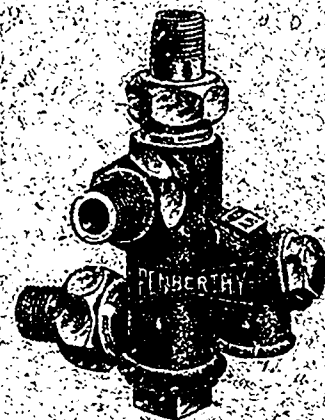
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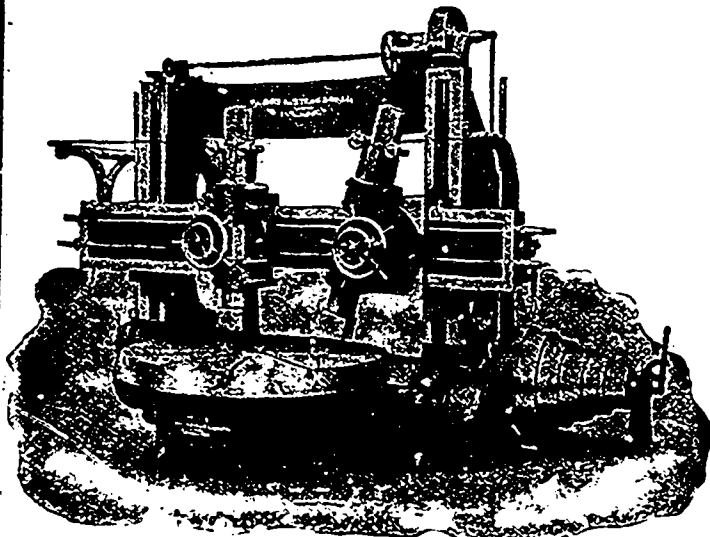
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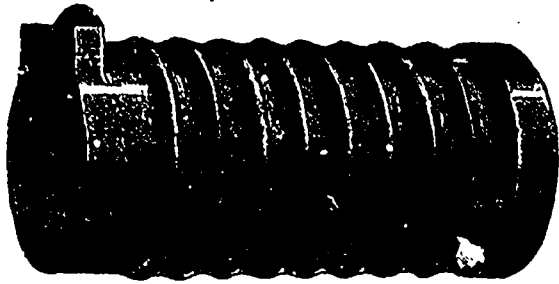
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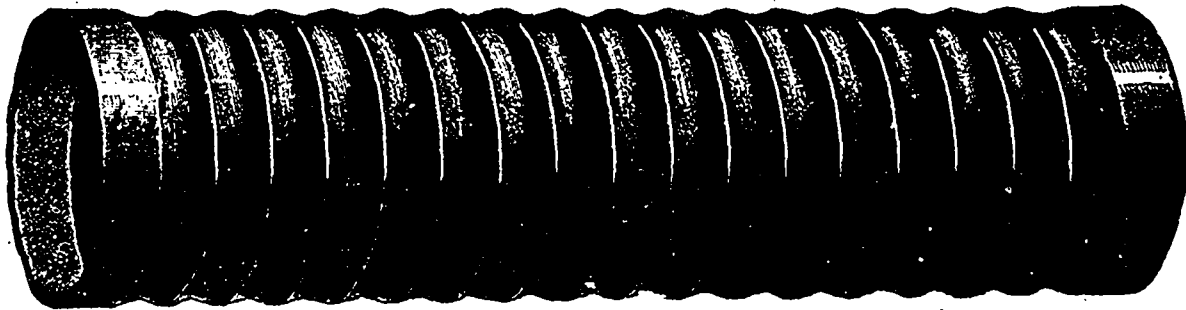


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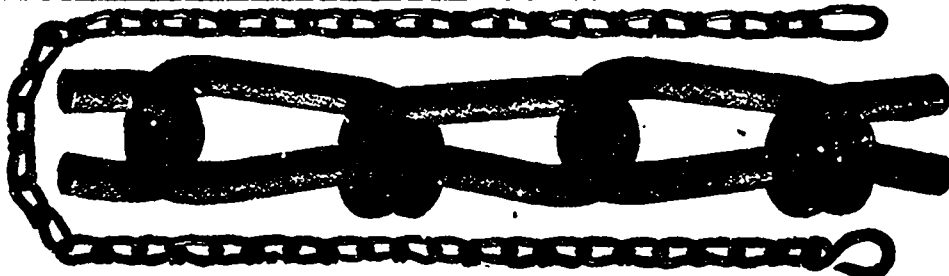
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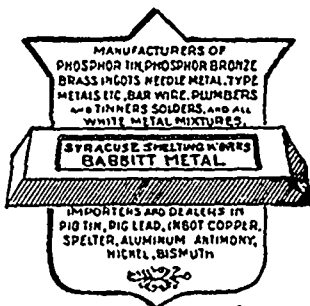
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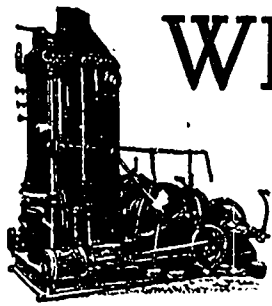
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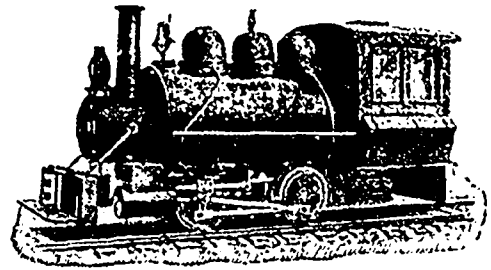
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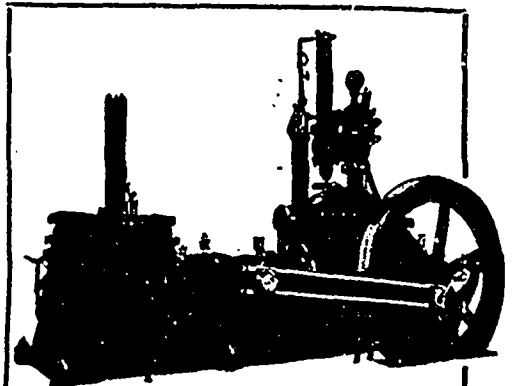
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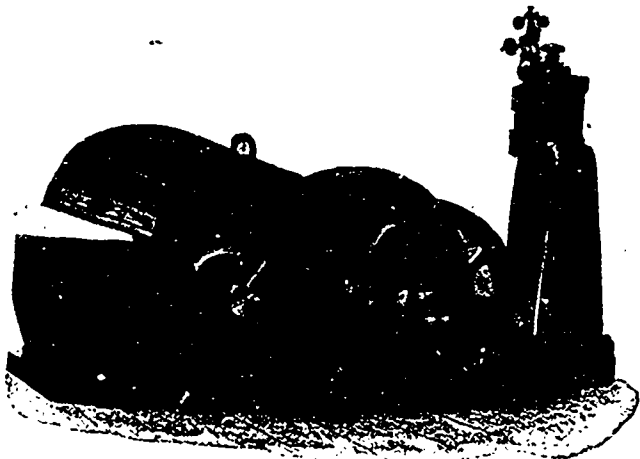
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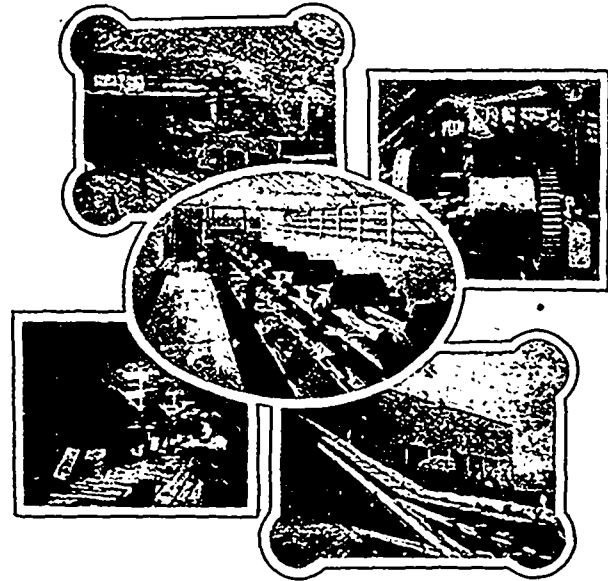
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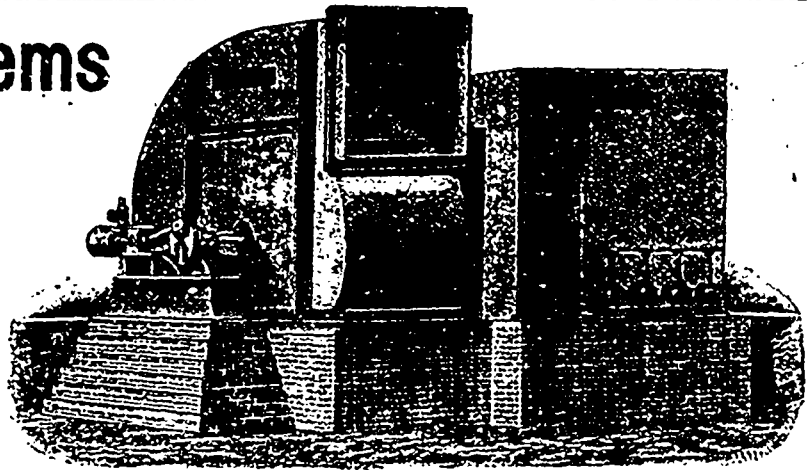
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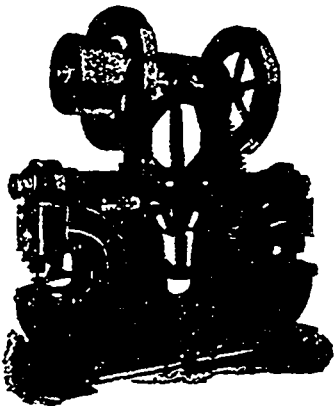


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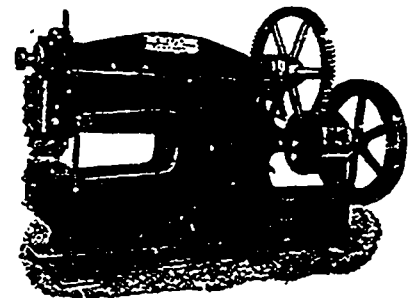
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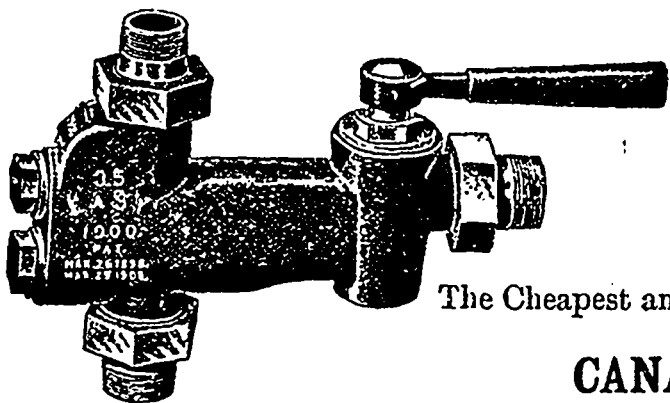


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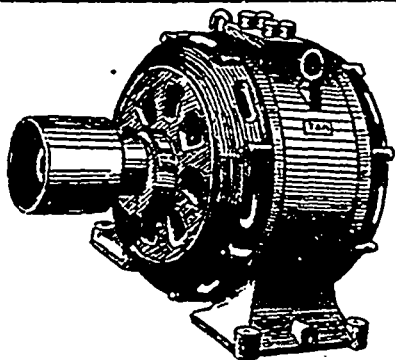
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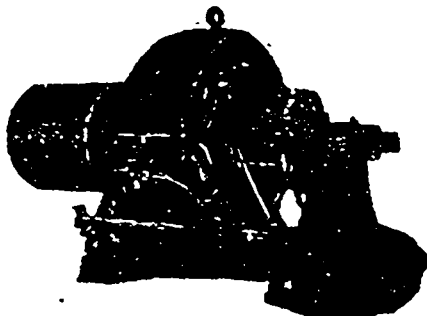
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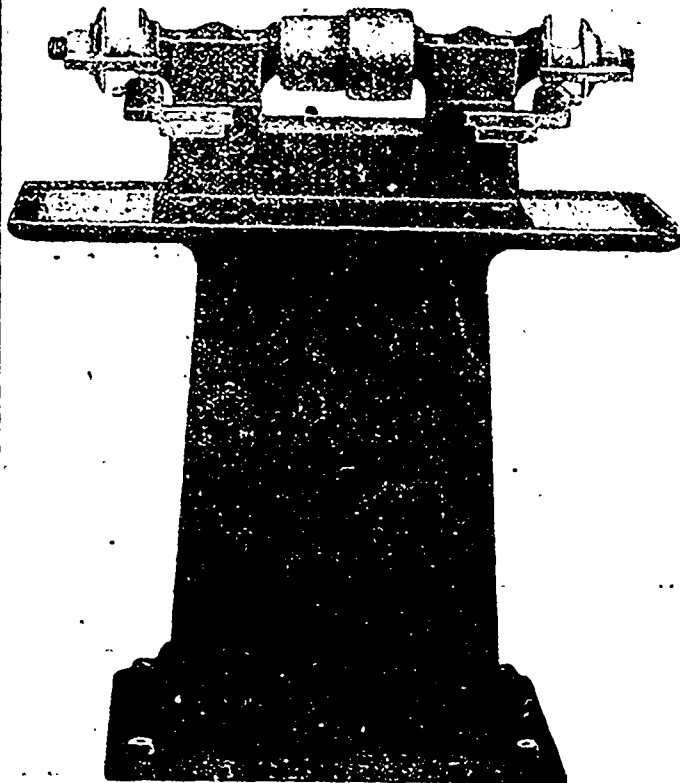
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FREE COAL.

Mr. W. K. McNaught is chairman of the tariff committee of the Canadian Manufacturers' Association, and any opinion publicly expressed by him may be fairly taken to be the opinion of the Association also. Mr. McNaught is also editor of *The Trader*, a most excellent journal, from the March issue of which we reproduce the following :

We notice that the Board of Trade in the city of London, Ont., at a meeting held on February 5th, unanimously voted a resolution requesting Hon. C. S. Hyman of that city to use his influence in inducing the Dominion Government to do away with the duty on soft coal coming into Canada. While it is true that the exemption of soft coal from duty would be a great benefit to the manufacturers of Ontario and the western part of Quebec, it is also true that the taking off of this duty might seriously jeopardize the coal mining industries in the Maritime Provinces, more especially if the present rate of duty on coal of 60 cents per ton were retained by the United States. Coal is probably one of the articles which might be placed on the free list of both the United States and Canada with considerable advantage, but it would be manifestly unfair to the coal miners of Canada to allow American coal into Canada duty free, while Canadian coal was charged such a heavy duty when going into the United States. If our miners are willing to have reciprocity in coal with the United States, and the government of that country are willing to make such an agreement, we do not for a moment imagine that any person in Canada would have any objection to this being done, but under present conditions it seems as though the removal of the duty on American coal coming into Canada, while at the same time a heavy duty is exacted on our coal going into the United States, would be a blow at our national policy which would be most adverse to the best interests of this country. However, we have no idea that such a thing will be done, as the Minister of Finance comes from the section of Canada which will be most affected by such an action.

We quite agree with Mr. McNaught that placing soft coal on the free list would be a great boon to the manufacturers of Central and Western Canada ; but we fail to observe why doing so would injure the coal mining industry of Nova Scotia. That province is a large exporter of soft coal, and were there no duty on the article it is not at all probable that similar coal from West Virginia would ever be brought into competition with Nova Scotia coal in

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the Maritime Provinces. Coal is one of the natural products which might well be included in the free list. Ontario manufacturers, who are large consumers of coal, are seriously handicapped by the duty taxed upon it, and from which they should be relieved. Mr. McNaught thinks that for the general good of Canada no duty should be imposed upon coal, but he does not explain why our manufacturers should not be relieved of the duty—why the duty should be retained—because the United States imposes a duty on coal going into that country.

We observe, too, that he is quite in favor of reciprocity in coal—if Nova Scotia miners are willing—in fact he says that he cannot imagine that any person in Canada would have any objection to this being done.

Of course untaxed coal would give cheap fuel to our manufacturers, and it must be a revelation to them to be told by the chairman of the tariff committee of the Association that because a duty is imposed upon coal imported into the United States, cheap fuel to them would be a blow at the national policy, and most adverse to the best interests of Canada.

The question of fuel is an interesting and important one to our manufacturers. The imports of mineral fuel into Canada in the fiscal year ending June 30, 1903, and the value thereof were as follows :

	Tons.	Value.
Bituminous and Slack	3,862,295	\$8,197,034
Anthracite and slack.....	1,456,713	7,028,664
Coke	256,727	1,222,756
Total	5,575,735	\$16,448,454

All these imports were the output of American mines. The imports from all other countries, chiefly Great Britain were 147,455 tons-valued at \$636,368. The Canadian duty upon bituminous coal is 53 cents per ton of 2,000 pounds, and upon bituminous slack 20 per cent. but not to exceed 13 cents per net ton. No duty is imposed upon either anthracite or coke.

Canada is, however, an exporter of bituminous coal, our exports in 1903 being 1,979,951 tons, valued at \$5,452,434. The imports were chiefly into Montreal, Ontario, Manitoba and the North-West ; and the exports were almost entirely the output of Nova Scotia mines, 83 per

cent. of which were to New England states, the balance, 17 per cent., answering the requirements for domestic uses, a portion of it going to Quebec ports.

It can therefore be readily seen that the duty on soft coal is an unnecessary tax upon Canadian manufacturers.

THE ELECTRIC MANUFACTURE OF STEEL.

IN our last issue we published the salient points of an interesting address recently delivered by Mr. Lewis Simpson on the electric manufacture of steel, which subject is receiving increasing attention in Europe, there being now eight places there where electric furnaces are being operated to produce high grade steel.

Accounts of these works show that in central Ontario there are advantages for this manufacture not possessed in the districts where it is being operated in Europe. We have large deposits of magnetic ores which are the best suitable for this purpose, some of which are so free from phosphorus that they are capable of producing tool steel. Great improvements have recently been made in cleaning and enriching magnetic ores by magnetic separation, which is an excellent preparation for the electric furnace. Not much fuel is required in this manufacture, but the purest form is charcoal, which can be obtained cheaply in proximity to our ores. One of the most important requisites is cheap electricity, which certainly should be obtained from our numerous water powers as cheaply as at any place in the world.

High grade ores should bear the cost of transportation to Niagara Falls, with its unlimited power and electricity already developed, but if these advantages can be obtained close to the ores there would of course be a saving in freight, although an industrial centre like the Falls is a favorite place for such enterprises.

Speaking of the thermo-electric production of steel, the *Electrical World and Engineer* says :

In looking for new processes, nothing has more attracted the interest of European electro-metallurgists than the electro-metallurgy of iron and steel. Actual success has been achieved in the production of special steels, tool steels and crucible steel. A very great variety of arc and resistance furnaces have been developed for this purpose, and in all of them care is taken to prevent contaminations of the bath from the carbon electrodes. Of special interest on this point is the use of a resistance furnace based on the induction principle, the fused steel forming the single secondary turn of a transformer, no electrodes whatever being used.

In the production of metals from ores much research has been devoted to the problem of getting copper and nickle from the Sudbury ores. The late Dr. Hoepfner did valuable pioneer work, but full commercial success was obtained by David H. Browne, who, in working out his process in which chlorine passes through an ingenious cycle, found that pure solutions are necessary for the completion of his work, and applies them accordingly.

THE METRIC SYSTEM.

The *Toronto Globe* has decided that the metric system of weights and measures is entirely appropriate to Canadian wants, and therefore Canada must prepare at once to accept it, for its adoption is in the near future. This is what *The Globe* says about it :

A bill to establish the metric system of weights and measures in Britain has passed a second reading in the House of Lords. Although there is no likelihood of the proposed change being carried into effect at once, it is one for which we should prepare. The subject is freely discussed in engineering publications, and the superiority of the metric system cannot be questioned. The metre, which is the unit of length, is 39.3709 inches, and its decimal multiples are the decametre, hectometre, and kilometre, being respectively 10, 100, and 1,000 metres. What may be called the fractional measures are the decimetre, centimetre, and millimetre, being respectively the tenth, hundredth, and thousandth part of a metre. The same prefixes are used with the are or superficial unit, which is 100 square metres, and also with the stere or cubic metre, the litre or cubic centimetre, and the gramme or unit of weight, which is standardized as the weight of a cubic centimetre of distilled water. The objection to the establishment of a metric system arises through the natural reluctance which all must feel toward the abandonment of standards to which they have grown accustomed. We are familiar with inches, feet and yards. Mechanics, engineers, and others using these standards of measurement have a ready conception of dimensions expressed in them. Practice has produced a certain facility in arithmetical calculations, although the ratios of the different terms seem to have been devised with the special object of imposing difficulties. Adding, subtracting, multiplying, or dividing in a decimal system is so much easier that the continued use of our irregular standards at the present time is difficult to understand.

There is naturally a preference for our terms, and they need not be discarded. Inch, foot, yard, pound, ounce, ton, acre, rood, and similar terms were adopted before the linguistic instinct passed from the race and nation. Now a new word must be a polysyllable. But if it is really impossible to create new terms of reasonable length, utility might be served by applying the old names to the decimal dimensions and weights. The Latinized French terms, however, even if inevitable, should not stand long in the way of so desirable a change. We have a large French population in Canada, and that should make the adoption of this standard all the more acceptable. Years ago we made a departure in the right direction by substituting the decimal for the British currency. No great obstacle would be encountered in the adoption of decimal standards of weight and measure, and Britain may lead the United States in making the change.

The pressing need of uniform international standards is apparent, and will improve the most potent influence in effecting the change. The French standards are incomparably the best and are certain to become general. The scientific world has already adopted them, and it remains for the world of commerce and mechanics to follow that example. People should familiarize themselves with the coming standards. Thermometers marked with the degrees of both the Fahrenheit and centigrade scales are in demand. Steel squares, tape measures, and mechanics' rules with auxiliary figures in the metric system should also find a ready market. The schools, too, should endeavor to make the change come easier to the rising generation. Such confusion as will arise through the adoption of the decimal standards cannot weigh against the certain resultant advantages.

A bill relating to the metric system was introduced in the last United States Congress but its consideration was not pressed. Its friends in the present Congress are determined, however, that it shall now be considered. It is before the House Committee on Coinage, Weights, and Measures. The original bill reads as follows :

That on and after the first day of January, 1904, all the Departments of the Government of the United States,

in the transaction of all business requiring the use of weights and measures, excepting in completing the survey of public lands, shall employ and use only the weights and measures of the metric system; and on and after the first of January, 1907, the weights and measures of the metric system shall be the legal weights and measures of the United States.

This is a very radical measure, one which, if it should become a law, would revolutionize all our business methods, and work immense harm.

The question "What is the Metric System?" is considered by Prof. T. J. Chapman in an article in the *Pittsburg Gazette* as follows:

The proposition now before Congress to change our present system of weights and measures for what is called the metric system is certainly not well understood by the people, or a protest would go up that would call a halt to such a proceeding. This proposition contemplates the abolition of our entire system of weights and measures and the substitution of another of which the very terms are so long and difficult as to be startling. The old familiar inch, foot, mile, etc., are to disappear, and in their places we are to have the metre, millimetre, centimetre, dekametre, kilometre; instead of the old-time bushel, peck, quart, etc., we shall buy and sell by the litre, centilitre, dekalitre, etc.; and instead of ton, pound, ounce, etc., we shall deal in grams, milligrams, kilograms, quintals, tonneaus, etc.

To most reflecting minds this invasion of our English language by a host of foreign words, and the displacement of the terms familiar from our childhood, by a string of difficult words of Latin, Greek, and French origin, is very distasteful. Apart from mere sentiment, however, there are very grave objections of a practical character. For one thing, to all succeeding generations all our present literature and science would be largely unmeaning, or at least difficult to be understood. Every line of poetry in which any term of distance, weight, or measure occurs would have to be reconstructed. To every present book a glossary of obsolete terms would have to be added. Just as the ancient terms homer, hin, and cubit, used occasionally in our translation of the Bible, are indefinite or unmeaning to the average reader, so, only on an infinitely greater scale, would be all the terms now used in millions of instances in our present literature.

Another objection is that all our appliances for determining weights and measurements would be rendered useless. All our scales, yardsticks, quart measures, and so on, would have to go to the junk heap. Millions of dollars would be required to replace them with standards of the new system. These are considerations, that one would think ought to give our legislators reason to pause. Yet men of whom one would have expected wiser counsel have been using their influence to have this enormity imposed upon the people.

The inconvenience of this system for practical purposes is appalling. An inch is 2.54 centimetres; an acre is .4047 of a hektare. A peck of beans is .0881 of a hektoliter. Shylock's 'pound of flesh' becomes a demand for .4536 of a kilo. The area of Pennsylvania expands into a territory of 119,140 square kilometres. From Carnegie to Pittsburg is 12.8744 kilometres. Does all this add any clearness to our ideas of size and distance? Milton's fallen angel drops plumb down not '10,000 fathoms deep,' but a distance of one myriametre 8 kilometres 2 hektometres 8 dekametres and 8 metres. Only think of it! These are only a few specimen beauties of the proposed scheme.

The metric system may have, and likely has, some advantages, but they can never counterbalance the enormous disadvantages which we have mentioned.

The attitude of various important organizations in the United States on the question is noticeable. Another bal-

lot on the system has recently been taken by the National Association of Manufacturers. A ballot taken two years ago resulted in a large majority against any legislation to make the use of the system compulsory in any of the Government Departments. Since that ballot was taken the adverse vote then expressed has been concurred in by the following associations: American Society of Mechanical Engineers, Railway Master Mechanics' Association, Master Car Builders' Association, Furniture Association, National Metal Trades Association. Similar action has already been taken by the Association of Machine Tool Builders, Engine Builders' Association, the Society of Naval Architects and Marine Engineers, the Society of Heating and Ventilating Engineers, and the Providence, (R.I.) Society of Mechanical Engineers.

The members of the Manufacturers' Club, of Cincinnati, at a recent meeting adopted a resolution opposing the adoption by Congress of the metric system of weights and measures. Mr. J. C. Hobart, of the Triumph Electric Co., who brought the matter to the attention of the members, stated that it was a subject of vital importance to manufacturers; that it would mean an expense of about 33 1/3 per cent. of the equipment of each shop to put in the metric system, and also a conflict in the maintenance of the two systems. It was the opinion of Mr. Wm. Lodge, of the Lodge & Shipley Machine Tool Co., that the other nations would have to abandon the metric system and come to the English method of measurements. He said that despite the fact that the nations of continental Europe had adopted the metric system, there at least were ten times as many machines built on the English measurements as there were by the metric system, and this after that system had been in vogue for about 30 years.

This indicates the views of American manufacturers of iron and steel tools, machinery, etc., the consensus being decidedly against the adoption of the system.

Mr. Samuel S. Dale, a well-known American expert in the manufacture of textile fabrics, appeared a few days ago before the committee on coinage, weights, and measures of the United States House of Representatives and showed the entire inapplicability of the metric system to textile industries. He showed that the strands of textile materials vary from a few yards to a thousand miles per pound, and the varying ratios between the weight and length are expressed by counts or numbers, which indicate the number of lengths, called hanks, per pound of spun yarn, or the weight of a fixed length of reeled silk. Four lengths are used in the United States for gauging the size of spun yarn and one for silk, and these five are the standards for the United States and the British Empire, including a population of 475,000,000 people. We have for spun yarn the cotton length of 840, the worsted of 560, the linen of 300, and the woolen of 1,600 yards, and for reeled silk the length of 1,000 yards. Each of these systems of yarn numbering, with one unimportant exception, is confined to one kind of textile material. The woolen standard (100 yards per ounce), and the silk standard (1,000 yards) are decimal. All these Anglo-American systems of yarn numbering are based on the English yard-pound.

The English yarn system is the world's standard for linen. The 840-yard English system is the standard for

cotton throughout the world with the exception of France; the only other exception is found in Spain where an attempt to match the English standard has resulted in a system based on Spanish units and differing but 3 per cent. from the English.

There are, says Mr. Dale, 105,000,000 cotton spindles in the whole world, and of this number 68,000,000, or nearly two-thirds, are in England and the United States. Taking into consideration the use of the Anglo-American standards in other countries, it is a conservative estimate that three-fourths of the textile work of the world to-day is done by the English standards of weight and measure.

In 1901 the exports of cotton goods from Great Britain, India and the United States amounted in value to \$425,000,000, all manufactured by the English standards. The exports of cotton goods from France and Germany in the same year were valued at \$95,000,000, and in the manufacture of these French and German goods the metric system was used but very little.

The English system is an international textile standard, and in fact the only one. The German government is forced to use it in assessing duties on imports. In February, 1902, a hearing was given on the bill to introduce the metric system into the government work of the United States, preliminary to its general introduction throughout the country. Twenty weeks later a committee of the German Reichstag gave a hearing on the proposition to dispense with the English and use the metric system for assessing duties on cotton yarn imported into Germany. At that hearing Herr Munch-Ferber, of Hof, Bavaria, a member of the Reichstag and a textile manufacturer, denounced the proposition and declared it would throw the German textile industry into "ungodly disorder" (heillose Verwirrung). The German proposition was defeated and the English system remains the official German textile standard.

The names of the metric units are objectionable. Instead of short, distinctive expressions like yard, inch, ounce, pound, dram and grain, we have the following names for the eight metric units to be used in the textile industry: meter, millimeter, decimeter, centimeter, gram, kilogram, centigram, decigram. These foreign names are too long and too much alike for mill use.

It is now in order for The Globe to move a reconsideration of its judgment.

PORTLAND CEMENT.

ACCORDING to a statement just issued by the Ontario Bureau of Mines, the production of Portland cement in this province in 1903 was 695,200 barrels valued at \$1,182,709; and according to a statement just issued by the Geological Survey of Canada, the productions in the whole country were valued at \$1,690,842.

The imports of Portland cement into Canada for home consumption in 1903 amounted to 2,316,853 hundred weight, valued at \$868,131, upon which \$271,000 duty was collected, being at the rate of 12½ cents per hundred pounds.

But a few years ago the use of cement was restricted to but comparatively few purposes; but with the growth and expansion of the country these purposes have been

largely increased; and for many of them the article takes the place of brick, stone and wood.

It has been urged by some that the manufacture of cement in Canada, as in the United States, Germany and other countries was being very much overdone. The United States Department of Commerce and Labor in a investigation thereanent caused enquiries to be made in Germany, in reply to which Consul-General F. H. Mason at Berlin made an interesting report from which we make some extracts. He says:

The cement manufacture may be designated as that one of the great, long established industries in this country in which the capacity of production is most excessive and disproportionate to the normal consumptive power of the people. There were in operation in this country at the close of 1899 261 cement factories, and their number has increased rather than diminished since that time.

During the year 1901 there was consumed in Germany 14,000,000 barrels of cement, while the reports of the several syndicates show that the collective productive capacity of all their factories for the same period was 29,000,000 barrels per annum. The power of production had thus, in respect to Portland cement, outgrown the actual home demand by 100 per cent. Just how much cement was really produced in that year is difficult to ascertain. The cement factories of Germany are divided into several syndicates, which fight each other with persistent valor, and reveal as little of the inside workings of their several organizations as possible; but from all indications and estimates, there must have been in 1901 a surplus of from 10,000,000 to 12,000,000 barrels, of which there were exported 506,653 tons, leaving a large excess, which broke down the market, reduced profits to a pittance, and brought on a crisis in the industry from which it has not yet recovered.

In tracing the causes which led up to this result, it is noticeable that during the ten years from 1890 to 1900 all kinds of construction which use cement were phenomenally active in Germany, and the consumption was enormous and steadily increasing. Millions of barrels were used in the construction of the Kaiser Wilhelm and the Ems canal, and in improvements in the Rhine, Weser and other rivers. It was expected that the Midland Canal would also be authorized, and the cement factories made preparations to meet that additional demand, so that the failure and postponement of the project were among the contributing causes to the overproduction of that period. The situation led to a new effort to unite the several local syndicates and groups into which the cement makers were divided into one national and all-embracing combination, which could restrict the output, shut down superfluous factories, and, by getting the industry thoroughly in hand, restore prices to a profitable basis. All such efforts proved futile, and the war between the competing factories was bitter and unrelenting.

The year 1902 brought no substantial relief. The supply of cement everywhere exceeded the demand. Building operations slackened under the general industrial and financial depression, while labor and fuel—two of the principal factors in cement production—maintained practically undiminished values since the prosperous years preceding 1900. The only outlet for the surplus was through exports, and these slowly increased from 497,780 metric tons (of 2,205 pounds) in 1898 to 528,675 tons in 1899, 543,991 tons in 1900, and 641,520 tons in 1902. Of this large export the United States takes a larger share than any other nation, the shipments to that country aggregating 197,174 tons in 1900, 108,596 tons in 1901, and 246,726 tons in 1902. Next in order of importance in this respect comes the Netherlands, which last year took 66,837 tons of German cement; British South Africa, 36,720 tons; Great Britain, 33,534 tons; and Brazil, 18,209 tons.

Under the present tariff, cement is free of duty when imported into Germany, and there was a small influx of 51,947 tons in 1902, which came across the border at points in Belgium, Denmark, France, Austria and Switzerland, where factories near the frontier were geographically tributary to German territory. To shut out this slight competition the new German tariff imposes a duty of 50 pfennigs (about 12 cents) per 100 kilograms (\$1.20 per metric ton) on cement, as against \$4.04 per ton duty assessed by Russia, \$2.38 in Austria and Switzerland, \$1.42 in Sweden, and \$1.76 in the United States.

The sum of all recent information is that only the oldest and largest factories in Germany, which enjoy every advantage of location for obtaining raw material and handling their product, are able under present conditions to earn any substantial profit; many of the newer and smaller establishments are working at a loss. Early in the year 1903 there was a meeting in Berlin of cement manufacturers from all parts of the Empire, which, after a long, secret session, appointed a commission to consider and report in April upon a plan for the organization of the entire industry under a cartel, or syndicate, which should control output and manage the market. Thus far it would appear that the commission has not reported, and its continued silence is construed as an indication that the differences between local syndicates and individual factories have again been found irreconcilable, and that no general basis of combination can be reached.

The question is frequently asked, "what is cement?" There are several kinds of commercial cement; that which is known as silica, or sand cement is, we are told, manufactured by grinding together silica or clean sand with Portland cement, by which process the original cementing material is made extremely fine, and its capacity to cover surfaces of concrete aggregates is much increased. The sand is an adulteration, but on account of the extreme fineness of the product it serves to make mortar or concrete containing a given proportion of pure cement much more dense, the fine material being increased in volume. The increase in cementing capacity due to the fine grinding of the cement constituent offsets, in great degree, the effects of the sand adulteration, so that sand cement made from equal weights of cement and sand approximates in tensile strength to the neat cement, and the material is sold as cement. The extreme fine grinding also improves cement that contains expansives. Sand cement should be made on the work from approved materials, if used for other purposes than for grouting, for which it is peculiarly adapted.

The following are the best definitions of Portland cement that we have been able to obtain.

France. Product of grinding of clinkered rock obtained by the burning to a point of softening of an intimate mixture of carbonate of lime and argillaceous matter, rigorously combined and chemically and physically homogeneous in all its parts.

Germany. (Minister of Public Works). Portland Cement is a material resulting from the calcination, carried to the point of incipient fusion, of an intimate mixture of lime and argillaceous substances as its essential components, such calcination being followed by the grinding of the product to the fineness of flour.

Germany. (Portland Cement Manufacturers). Portland Cement is a product formed by cintering together materials containing only clay and lime, and finely pulverizing. It is allowable to add not more than 2 per cent. of plaster of Paris, or of some similar substance, for the purpose of rendering the setting of the cement slower. Beyond this, all additions or substitutions are to be regarded as adulterations.

Switzerland. Product obtained by the burning to the point of vitrification of hydraulic limestones, or of mixtures of argillaceous and calcareous materials, which are subsequently ground and reduced to fine powder. Port-

land cement, in addition, must contain a minimum of 1.7 parts lime to the unity of hydraulic materials.

Austria. Compounds of natural marls or artificial mixtures of clay and lime-bearing materials which are burned to vitrification and are subsequently ground to great fineness, and in which the calcareous material shall at least be 1.7 to the unity of the argillaceous.

Russia. Product made out of natural marls or artificial mixtures of materials in which clay and carbonate of lime are contained, and which materials are subsequently burned to clinker and are thereafter ground to the fineness of flour.

England. (London Chamber of Commerce). A mixture of two or more suitable materials intimately and artificially mixed in the requisite proportions, and afterwards properly calcined and ground, to which nothing has been added during or after calcination, excepting that an addition not exceeding 2 per cent. of gypsum is permissible for the purpose of regulating the setting. If any material whatever, excepting 2 per cent. of gypsum for the purpose of regulating the setting, be added to the Portland cement clinker during or after calcination, the article so produced shall not be sold as Portland cement, but under some other distinctive name.

United States. (Corps of Engineers, U. S. Army). Product obtained from the heating or calcining up to incipient fusion of intimate mixtures, either natural or artificial, of argillaceous with calcareous substances, the calcined product to contain at least 1.7 times as much of lime, by weight, as of the materials which give the lime its hydraulic properties, and to be finely pulverized after said calcination, and, therefore, additions or substitutions for the purpose only of regulating certain properties of technical importance to be allowable not exceeding 2 per cent. of the calcined product.

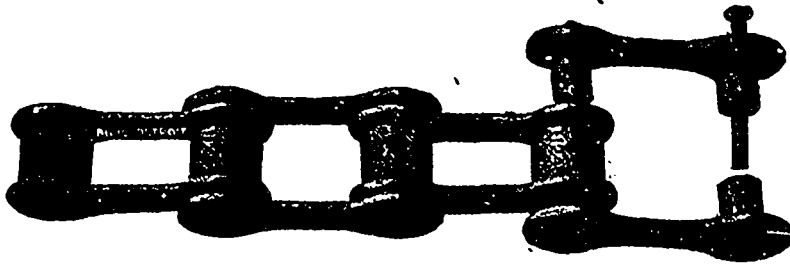
EDITORIAL NOTES.

Mr. H. T. McCoubrey, of the Standard Mfg. Co., St. John, Newfoundland, informs us that he is interested in promoting a Newfoundland Manufacturers' Association similar in aims and objects to the Canadian Manufacturers' Association. We wish his proposed enterprise every success. No doubt Newfoundland will soon be a province in this great Dominion of Canada, and when that time arrives we presume the new association will be assimilated with the old one.

Mr. S. Dillon-Mills, M. Ex., Toronto, informs us that he has recently ascertained the existence of radio-active force in a mineral which he discovered last fall in Cardiff Township, Ont., the exact nature of which has not yet been accurately determined, but it is probably Blomstrandite, a hydrous litano-niobrate of uranium. The radio-active force of the sample is equal to one thirty-fourth of that of uranium oxide. It occurs in thin seams from a quarter-inch to one inch in thickness, and in small patches in zneiss. It is jet black with glassy, resinous fracture, hard and brittle. The examination, Mr. Dillon-Mills informs us, was not made in time to be reported. At the reading of Mr. Obalski's paper on "The Radio-Active Minerals of Quebec" at the recent meeting of the Canadian Mining Institute in Toronto. In an address before the Mining Institute, Mr. J. Obalski, inspector of mines for Quebec, made the interesting announcement that radium is likely to be found in considerable quantities in Canada, especially in the Laurentian range. The white mica and coal found in Charlevoix County, Quebec, he demonstrated, possessed radio activity. He showed the specimens gathered in that province and had no doubt that on investigation the white mica deposits in Eastern Ontario would be found to have the same valuable properties.

THOUSAND STYLE RIVETED CHAIN,

The accompanying illustration is of the Buhl Thousand Style Riveted Chain, manufactured by the Buhl Malleable Co., Detroit, Mich. It is described as being over 200 per cent. stronger than the ordinary detachable chain. It is an accurately



(Buhl's Thousand Style Riveted Chain).

pitched malleable iron chain, so constructed that the strain is not upon the rivets, but upon the end bar. It is made in six sizes, and with all the standard attachments, that shown in the illustration having a breaking strain of 30,500 pounds. The net prices of these goods may be had upon application as above.

BETTER LUBRICATION.

A perfectly smooth surface exists, as a well known technical writer has said, only in theory or the imagination. No matter how smooth a metal surface may appear to be to the naked eye, it will always prove full of pores and of a rough, fibrous or granular character when examined under the microscope.

When two metal surfaces are brought into contact as in the bearings of machinery of all sorts, these roughnesses tend to interlock and resist motion, and if force be applied there will be a breaking off of the interlocking points and an increase of heat in the parts as well as wear.

The theory of lubrication is to keep metal surfaces apart, so that their points will not engage or even touch, if the best results are to be obtained, by interposing a layer or film of some soft or smooth substance, usually an oil or grease.

There is always a certain amount of resistance offered by the different particles of the oil, moving one upon the other, and the amount of this depends directly upon the "body" or viscosity of the lubricant under working conditions. The thinner the oil the less "internal friction" it will have and vice versa.

There are three important reasons for lubrication, in the following order of importance:—First, to prevent overheating and abrasion of the parts; second, to reduce wear as far as possible, and third, to lessen the amount of the power wasted.

Good lubrication depends as much upon the condition of the surface, as upon the quality of the lubricant itself, and the smoother a bearing surface can be made, the easier it is to lubricate. This point is emphasized by the use of pure flake graphite as a lubricant. It is extremely soft, and, when pure, entirely free from grit, and when introduced between friction surfaces, it soon rubs into the metal, filling every pore and crack, and the irregularities of surfaces, coating them with a veneer of great hardness, endurance, and of exceeding smoothness. There will be less necessity for using a heavy oil as formerly to keep the surfaces apart.

Graphite is found in many parts of the

world and occurs in both crystalline and amorphous forms, more or less closely associated with earthy impurities. The thin flake form is found much purer and freer from clay and grit than the others, and is therefore easier to separate. When pure flake graphite is introduced between rubbing surfaces, the very thin flakes tend to spread out as the cards of a scattered pack would spread out, covering a large area, with an extremely thin layer. When the thin flake graphite is taken between the fingers, a sensation of thickness is felt owing to the extreme thinness of the flakes, and it is this peculiar property that makes it adhere very closely to metal surfaces, from which it is not easily removed.

The flake graphite, particularly that found in Ticonderoga, N.Y., is much more valuable as a lubricant than amorphous forms.

For many years graphite has been used extensively as an emergency preparation to be applied to pins and bearings when they showed signs of excessive heating, but to-day the up-to-date engineer has a can of graphite in his engine room and uses it occasionally on almost all his bearings, and especially in his cylinders, to get the benefit of its wonderful properties for smoothing metal surfaces.

Cylinders in which graphite has been used, show a wonderful mirror polish, and valves work quietly and without straining or cutting. Bearings on which graphite is used, never over-heat, and it is a fact beyond all question that abrasion or cutting of friction surfaces absolutely cannot take place in the presence of graphite. Therefore, when it is used in the engine room there will never be any of the costly and perhaps disastrous results of over-heated bearings. Thinner, cheaper oils will suffice for the work that formerly required the use of expensive heavy body oils, and friction may be lowered at every point with corresponding benefit to the coal pile.

Graphite lubrication has long since passed the experimental stage, and thousands of engineers are using it in their cylinders and on their bearings, and find that its use is an absolute guarantee against friction troubles.

The Joseph Dixon Crucible Co., of

Jersey City, N.J., were the parents, as it were, of the graphite industry, having been engaged in the manufacture of its various products for the past seventy-six years, and their products are known throughout the civilized world. Any question about the use of graphite alone, or in combination with oils or grease for purposes of lubrication will be freely answered by the Joseph Dixon Crucible Co. to the best of their long experience.

METRIC WEIGHTS AND MEASURES.

METRIC WEIGHTS.

Milligram (1/1000 gram)	equals 0.0154 grain.
Centigram (1/100 gram)	equals 0.1543 grain.
Decigram (1/10 gram)	equals 1.5432 grains.
Gram	equals 15.432 grains.
Decagram (10 grams)	equals 0.3527 ounce.
Hectogram (100 grams)	equals 3.5274 ounces.
Kilogram (1,000 grams)	equals 2.2046 pounds.
Myriagram (10,000 grams)	equals 22.046 pounds.
Quintal (100,000 grams)	equals 220.46 pounds.
Millier or tonneau—ton (1,000,000 grams)	equals 2,204.6 pounds.

METRIC DRY MEASURE.

Milliliter (1/1000 liter)	equals 0.061 cubic inch.
Centiliter (1/100 liter)	equals 0.6102 cubic inch.
Deciliter (1/10 liter)	equals 6.1022 cubic inches.
Liter	equals 0.908 quart.
Decaliter (10 liters)	equals 9.08 quarts.
Hectoliter (100 liters)	equals 2.338 bushels.
Kiloliter (1,000 liters)	equals 1.308 cubic yards.

METRIC LIQUID MEASURE.

Milliliter (1/1000 liter)	equals 0.27 fluid dram.
Centiliter (1/100 liter)	equals 0.338 fluid ounce.
Deciliter (1/10 liter)	equals 0.845 gill.
Liter	equals 1.0567 quarts.
Decaliter (10 liters)	equals 2.6417 gallons.
Hectoliter (100 liters)	equals 26.417 gallons.
Kiloliter (1,000 liters)	equals 264.17 gallons.

METRIC MEASURES OF LENGTH.

Millimeter (1/1000 meter)	equals 0.0394 inch.
Centimeter (1/100 meter)	equals 0.3937 inch.
Decimeter (1/10 meter)	equals 3.937 inches.
Meter	equals 39.37 inches.
Decameter (10 meters)	equals 393.7 inches.
Hectometer (100 meters)	equals 328 feet 1 inch.
Kilometer (1,000 meters)	equals 0.62137 mile (3,280 feet 10 inches).
Myriameter (10,000 meters)	equals 6.2137 miles.

METRIC SURFACE MEASURE.

Centre (1 square meter) equals 1,550 square inches.
 Are (100 square meters) equals 119.6 square yards.
 Hectare (10,000 square meters) equals 2,471 acres.

THE FORT FRANCES WATER POWER.

The agreement between the Ontario Government and the Backus Syndicate for the Fort Frances power is creating a great deal of interest. It was brought down in the form of a return in the Legislature a few days ago. It is a somewhat lengthy document, and refers throughout to Mr. Edward Wellington Backus, of Minneapolis, and his associates, whose names are not given, as the purchasers. The preamble states that the agreement is to be held in escrow by the Government for two months from the date of signing, February 17, 1904, and to be delivered if Mr. Backus and his associates enter into an agreement with the Government that they will establish in Fort Frances a flour, or oatmeal and flour mill, having a capacity of 1,000 barrels per day, or other industry employing as much power and equally satisfactory to the Government. Upon failure of the Backus syndicate to enter into such an agreement, the main agreement as to the power becomes null and void.

The main agreement which follows this sets out that the people of Fort Frances and district desired to have the power developed from the rapids in the Rainy River, which at that point forms the boundary line between Ontario and Minnesota; and whereas the power can be more advantageously developed and more power produced by works embracing the entire river, and dealing with it as a whole, than by an independent development on the Canadian side, it is therefore in the public interest to adopt such a plan. The agreement states that the purchasers, the Backus syndicate, are the owners in fee simple of the lands and water power on the Minnesota side, and are desirous of obtaining from the Government of Ontario a grant in fee of the lands and power on the Canadian side for the purpose of developing the full capacity of the stream, thereby rendering available a large amount of power on the Canadian side of the river for municipal purposes, and for the operation of pulp or paper mills, flour and grist mills, and other manufacturing establishments.

Then follow several clauses to the effect that in order to secure the best results the syndicate is allowed to construct storage dams at various points to make more regular flow of water. The purchasers propose to form a joint stock company under the Ontario Act, to take over and acquire this agreement.

For these reasons the Government agrees to sell and the syndicate to buy the lands and powers on the Canadian side for \$5,000 cash, payable on the delivery of the agreement, and in consideration of covenants and requirements to supply power or electrical energy to

the town of Fort Frances and township of McIrvine. The syndicate agree to build a dam of solid masonry and concrete to the satisfaction of the Government Engineer, with waste weirs to prevent danger in time of floods or freshets. The height of water to be maintained in Rainy Lake to be at all times subject to such control and direction as may be necessary to secure safety. All power houses and appliances necessary for developing one-half the total power of the said river shall be erected and maintained on the Canadian side. The purchasers are to complete the works by May 1, 1906, and develop and render permanently for use one-half the total amount of power capable of development at that point. The purchasers agree to spend \$50,000 upon the work within one year from the delivery of the agreement. If the purchasers fail to do this, the agreement is void.

The purchasers agree to deliver to the municipalities of Fort Frances and McIrvine township such power as they require for municipal purposes or public utilities, but not for commercial purposes; (a) by cable or belt direct from the power house; (b) by electrical energy delivered on the wires of the municipal corporations at the purchasers' power-house; or, (c) by electrical energy delivered to the premises of the corporations within three miles of the power house, the corporations to supply the motors within their own premises. The power shall be supplied at specially favorable rates, which shall not exceed \$12 per h.p. per annum for method A, or \$14 per h.p. for method B. If the corporations desire it under method C, the purchasers may charge such extra sum as may be mutually agreed upon to cover the extra expense. In event of the corporations taking power at the power-house, they are given all necessary access thereto for poles, wires, etc. It is provided that power shall not be sold in less quantities than 50 h.p., and in event of disagreement the Lieutenant-Governor-in-Council shall fix the price. Prices fixed shall remain in force for five years.

The purchasers agree to supply power to individual users on the Canadian side at prices to be mutually agreed upon, or in event of disagreement, fixed by the Lieutenant-Governor-in-Council. But it is agreed that the maximum price to Fort Frances and McIrvine is part of the consideration of the agreement, and that the same shall not be used to the prejudice of the purchasers, the Backus Syndicate, in any appeal to the Lieutenant-Governor to establish the price for power. Canadian users are in no case to be charged higher rates or be subject to more onerous conditions than on the Minnesota side. The syndicate may erect dams at Kettle Falls, and if the Government deems it advisable it (the Government), may order the syndicate to construct power works there, and all of the power so developed shall be sold for commercial purposes on the Canadian side on the same general terms as at Fort Frances.

All the rights of the Dominion of Canada and Province as to navigation,

the construction of lock and canals are retained, with the right to enter upon the lands and construct the necessary works. The right of timber owners and others to float logs down the said rivers and lakes, for which purposes slides or other necessary works are to be constructed by the purchasers. The purchasers shall construct fishways, if required, and shall not empty or run into the said rivers and lakes any sawdust or chemical which would pollute the waters or injure the fish. The Government gives no right to overflow any lands except those owned by the Government, and if damage to private lands is done, no recourse is to be had against the Government. The purchasers are to give the preference to Canadian railways and steamboats in the carriage of their goods, where the rates are not higher than on other lines. Nothing in the agreement is to affect the rights of the inhabitants of Fort Frances or of the public to free access to the shores and waters of Rainy River, and the use of such waters for municipal purposes. The failure of the purchasers to carry out any of the conditions shall cause a forfeiture of lands, rights and privileges, but the Government may, at its option, require a penalty not exceeding \$100 per day while default continues.

The agreement is signed by Hon. E. J. Davis, Commissioner of Crown Lands, and Edward Wellington Backus.

IRRIGATING CANADIAN LANDS.

The plan of the Canadian Pacific Railway Co. for extensive irrigation in the west has become an assured fact, and tenders will be called in Vancouver, Chicago, Montreal, Winnipeg and Calgary for the main canal excavations.

The project will be started near Calgary, and if it proves as successful as the company's engineers have every faith that it will, over 3,000,000 acres of land will be reclaimed and rendered cultivatable. The land is now lying waste owing to the lack of moisture, that region being subject to cycles of extreme drouth. It is believed that the irrigation plan will render fully 1,500,000 acres fit for growing cereals of all kinds, while the remainder will be devoted to grass cultivation and grazing purposes.

At present the company will irrigate 300,000 acres and after colonizing that will extend the works until the entire area is covered.

Mr. Tighe, assistant engineer of the company states that tenders for the canal work would be invited at once, though the actual operations will not be commenced before spring. Mr. J. S. Dennis is the engineer in charge of the work at Calgary.

There will be two canals used to irrigate the tract, a main canal 35 miles long with a width at bottom of 60 feet, and carrying ten feet depth of water. This will be built first and will be used to carry water to the secondary canal, which, when completed will be 115 miles long. To make the main canal 250,000,000 cubic feet of earth will be removed. The work will be done by steam shovels, etc. The project is the largest of the kind ever attempted on the continent.

CAPTAINS OF INDUSTRY.

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

If a new manufacturing enterprise of any kind is being started, or an electric lighting plant instituted, or an electric railroad, or a telephone, or a telegraph line is being constructed; or a saw mill, a woolen, cotton, or knitting mill; or if any industrial establishment has been destroyed by fire with a probability of its being rebuilt, our friends should understand that possibly there may be something in the event for them. Do you catch on to the idea?

The starting of any such concern means a demand for some sort of machines, machinery, or supplies, such as steam engines and boilers, shafting, pulleys, bolting, lubricants, machinery supplies, wood or iron working machinery, ventilating and drying apparatus; pumps, valves, packing, dynamos, motors, wire, arc and incandescent lamps, and an infinite variety of electrical supplies, chemicals, acids, alkalies, etc. It is well worth the while of every reader of the Canadian Manufacturer to closely inspect all items under the head of Captains of Industry.

J. M. Campbell, Kingston, Ont., is considering the installation of an electric plant at Kingston Mills.

The Peterborough Lock Co., Peterborough, Ont., are considering the erection of new factory buildings at a cost of \$30,000.

The J. F. Pease Foundry Co., Toronto, have changed their name to Pease Foundry Co., Limited.

The Morris-Field-Rogers Co., Listowel, Ont., have changed their name to the Morris Piano Co., Limited.

D. Knechtel, Hanover, Ont., will erect a new Y.M.C.A. building at a cost of about \$7,000.

The Toronto & Mimico Electric Railway will be extended to Lorne Park.

John Belcher, architect, Peterborough, Ont., has prepared plans for a new Collegiate Institute building, at that place, to cost about \$38,000.

The congregation of the Holy Angels Church, St. Thomas, Ont., will erect a new stone edifice, at a cost of \$50,000.

The plans for the new national museum at Ottawa, Ont., have been approved by the Dominion Government. The building, which is to be of Canadian stone, will be 380 feet long.

The city clerk, Windsor, Ont., is inviting tenders for the supply of asphalt paving blocks and Portland cement.

Mr. F. J. Carrie, Stratford, Ont., will erect a large hotel in that city.

The town council of Smith's Falls, Ont., will purchase two new waterworks pumps at a cost of about \$8,000.

Mr. Clark, manager of the waterworks, Stratford, Ont., has recommended the building of a large reservoir and two filtration beds, with a twenty-four inch pipe to the works at a cost of about \$25,000.

The Toronto city council will submit a by-law to the ratepayers to provide \$1,000,000 for waterworks improvements.

The Hamilton, Grimsby & Beamsville Electric Railway Co., will enlarge their plant in Hamilton, Ont.

The Gillespie Fur Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture furs, etc. The provisional directors include F. R. Gillespie,

New York City, J. Gillespie and H. H. Gillespie, Toronto.

The Huntsville, Lake of Bays & Lake Simcoe Navigation Co., will build a new steamer.

Messrs. Cawthorpe & Co., will erect a grist mill at Norwich, Ont., with a capacity of 75 barrels per day.

Messrs. Stewart, Stewart & Taylor, architects, Brantford, Ont., are preparing plans for a new school building at a cost of about \$7,000.

The Belleville, Ont., Board of Trade have passed a resolution to be presented to the transportation commission, urging that the Trent Valley Canal be finished and that Trenton, Ont., be the terminus.

H. Hoffman's furniture factory at Simcoe, Ont., has been destroyed by fire.

The Rideau Canoe Club, of Ottawa, Ont., purpose erecting a club house on the Rideau, near Ottawa, the coming season, at a cost of about \$8,000.

The Educational Publishing Co. will erect a large warehouse in Toronto.

The Canadian Cannery Consolidated Companies, Limited, Hamilton, Ont., have changed their name to the Canadian Cannery, Limited.

The Stayner Light & Power Co., Stayner, Ont., have been incorporated with a capital of \$40,000, to produce electricity for lighting and heating purposes. The provisional directors include J. S. Knox, M. Gartlan and S. L. Devlin, Stayner.

The Clark Lithograph Co., Toronto, have been incorporated with a capital of \$150,000, to manufacture machinery for lithographing, electro-typing, etc. The provisional directors include T. J. Clark, H. E. Miller and T. A. Rowan, Toronto.

The Ludlam-Ainslie Lumber Co., Leamington, Ont., have been incorporated with a capital of \$50,000, to carry on a planing mill business and to manufacture carpenters' and builders' supplies. The provisional directors include A. Ludlam and Jas. Ainslie, Leamington, and J. H. Ainslie, Sarnia, Ont.

Messrs. O. G. Anderson & W. S. Y. Anderson purpose establishing a large furniture factory in Fredericton, N.B.

The Building Committee of the Public School Board at Ottawa, Ont., have

recommended the following additions to the schools: Archibald street, four rooms, cost \$12,000; Elgin street, six rooms, cost \$20,000; Creighton street, four rooms, cost \$11,000, also the installation of new heating apparatus in Kent street school, at cost of \$3,000.

J. H. Langton, and Colonel Montgomery, Ottawa, Ont., are interested in a syndicate which has been formed to build a hotel in Ottawa at a cost of about \$1,000,000.

Mr. B. Williams, Stratford, Ont., has organized a company with a capital of \$40,000, to erect a knitted goods factory in that city.

Mr. F. H. Lancaster, manager of The Richter Mfg. Co., Tenafly, N.J., the well-known makers of burlaps and canvases, was in Toronto a few days ago in connection with the establishment of a branch factory here.

A six-inch water main, 200 feet long, frozen solid, also the hydrants and twenty services connected with it, in Toronto, were thawed out by electricity in two and a-half hours.

The Parks and Exhibition Committee of Toronto, at a special meeting a few days ago, decided to recommend the City Council to grant the Industrial Exhibition Association \$35,000 for the following new buildings: Fireproof addition to the Art Gallery, \$13,000; Administrative Building, \$20,000; lavatory and public conveniences, \$2,000. Mr. W. K. McNaught, president, and Dr. Orr, manager of the Exhibition, were present.

The Canadian Locomotive Co., Kingston, Ont., are building a Heisler geared locomotive for the Thetford Mines, Que.

The Ogilvie Flour Mills Co., Montreal, will establish a fleet of steamers of their own on the Upper Lakes. The Bertram Engine Works, Toronto, will build some of the steamers.

The board of management of St. Paul's Presbyterian Church, Toronto, will erect a new church building.

The Receipts of the Toronto Railway Co. for February, and comparison with previous years, have been handed out as follows:—

	Gross Receipts.
February, 1904	\$172,110 17
February, 1903	147,222 50
February, 1902	128,668 82
February, 1901	110,475 88
February, 1900	104,753 50
February, 1899	92,531 57

The passenger steamer Lincoln, which plied between Windsor, Ont., and Pelee Island, sank at her dock a few days ago.

The factory of D. W. Thompson & Co., upholstery and undertakers' supplies, Toronto, was destroyed by fire March 8. Loss about \$130,000.

Messrs. T. Long & Bro. Co.'s warehouse and stores at Collingwood, Ont., were destroyed by fire March 8. Loss about \$100,000.

Canoeing trips in Northern Canada promise to be a popular pastime for tourists next season, and Mr. L. O. Armstrong, of the Canadian Pacific Railway, who has returned from the Sportsmen's

Show at New York, has booked some 250 parties to visit Northern Ontario on canoeing bent. Lake Temiskaming, the rivers north of Desbaretts, and Lake Nipigon, will be the favorite routes of some, while others will explore the water ways from Rat Portage to Winnipeg, Man. To meet the requirements of these pleasure-seekers the Canadian Pacific Railway will require 500 canoes as well as many additional guides.

The Geo. B. Meadows Wire, Iron & Brass Co., Toronto, have been awarded the contract for counter railings, tellers' cages and interior fittings for the new offices of Molson's Bank at Winnipeg. They have recently installed the very handsome new fittings in the Toronto Branch of The Bank of British North America, and also those in The Toronto Clearing House.

The Hamilton Cataract Power, Light & Traction Co., Hamilton, Ont., are inviting tenders for the enlargement of their hydraulic system, the work including dams, canals, bridges, piling, etc., estimated 424,000 cubic yards of excavating, 99,000 cubic yards of embankment work, and 100,000 feet of piling will have to be done.

The Sudbury Power Co., of which J. R. Gordon, Sudbury, Ont., is manager, expects to have their plant completed about June 1. The power is situated on the Vermilion River, and 3,000 h.p. will be obtained. The dam across the river is about half completed and the excavation for the power house has begun. The work will cost about \$150,000.

The Hamilton Bridge Works, Hamilton, Ont., have secured the contract for the structural iron and steel work for the new Westinghouse plant to be erected in that city. It is estimated that 750 tons of structural iron will be required.

Southam, Limited, Hamilton, Ont., have been incorporated with a capital of \$1,000,000, to acquire the business of Southam & Carey, of Montreal; The Ottawa Citizen Co.; The Mail Job Printing Co.; and The Hamilton Spectator; and to carry on a printing and lithographing business. The provisional directors include Wm. Southam, Hamilton, F. N. Southam, Montreal, and R. Southam, Toronto.

The Standard Drug Co., Ottawa, Ont., have been incorporated with a capital of \$20,000, to manufacture drugs, etc. The provisional directors include G. A. Parr, H. J. Fraser, Ottawa, and W. B. Graham, Ridgetown, Ont.

The Union Mfg. & Trading Co., Rockland, Ont., have been incorporated with a capital of \$100,000, to manufacture cement, bricks, drain pipes, etc. The provisional directors include R. C. Wilson, J. G. Wilson, Cumberland, Ont., and G. C. Edwards, Ottawa, Ont.

The Dresden Sugar Co., Dresden, Ont., will rebuild their beet sugar plant recently destroyed by fire, at a cost of about \$1,000,000.

The St. Mary's Footwear Co., St. Mary's, Ont., recently incorporated with a capital of \$50,000, will erect a factory building at a cost of about \$22,000.

The Aberdeen Development Co., Aberdeen, Ont., have been incorporated with a capital of \$300,000, to carry on a mining, milling and development business. The provisional directors include H. Weil, New York City, M. Wile, Buffalo, N.Y., and S. Shlesinger, Cleveland, Ohio.

The Blonde Lumber & Mfg. Co., Chatham, Ont., will increase their capital from \$80,000 to \$150,000.

The St. Thomas Brass Co., St. Thomas, Ont., will increase their capital from \$25,000 to \$100,000.

The Star Printing & Publishing Co., Toronto, will increase their capital from \$100,000 to \$200,000.

The John Island Tug Co., John Island, Ont., have been incorporated with a capital of \$8,000, to operate steam vessels, etc. The provisional directors include G. H. Moulthrop, W. C. Moulthrop, Bay City, Mich., and John McEwen, Sault Ste. Marie, Mich.

The Canada Wood Grain Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture furniture and veneers. The provisional directors include N. W. Tovell, J. T. Eastwood and S. Gillespie, Toronto.

The American Motor Car Co., Berlin, Ont., have been incorporated with a capital of \$50,000, to manufacture motor cars, vehicles, etc. The provisional directors include M. Good, N. Good, Berlin, and I. Neuber, Waterloo, Ont.

The Hamilton Motor Works, Hamilton, Ont., have been incorporated with a capital of \$40,000, to manufacture gasoline and electrical engines, automobiles, etc. The provisional directors include W. C. G. Smart, J. A. Turner and W. A. Logie, Hamilton.

The Academy of Music, Peterborough, Ont., have been incorporated with a capital of \$40,000, to erect an opera house. The provisional directors include J. R. Stratton, A. Hall and W. G. Ferguson, Peterborough.

The Sarnia Bay Lumber, Timber & Salt Co., Sarnia, Ont., have been incorporated with a capital of \$300,000, to acquire the business of Edmund Hall, deceased, and to carry on a general sawmilling business. The provisional directors include W. D. Lummis, Toronto, J. J. McFadden, Sault Ste. Marie, Ont., and John Ferguson, Renfrew, Ont.

Messrs. Krug Bros. Co's. furniture factory at Chesley, Ont., was damaged by fire March 4. Loss about \$3,000.

The Raven Lake Cement Co., Raven Lake, Ont., will have their new works in operation by May 1.

The Canada Linen Works will establish a factory at Ragged Rapids, near Orillia, Ont.

The Department of Public Works, Ottawa, are inviting tenders for the construction of a wharf at Les Escoumaius, Saguenay County, Que.

Hon. E. J. Davis, Ontario commissioner of crown lands, has received an application from some Parry Sound gentlemen, with whom are associated American capitalists, for the lease of a

valuable water-power at Canal Rapids on the Magnetawan River near Georgian Bay. The proposition is to build a large pulp mill and, perhaps, other industries.

The Department of Railways & Canals at Ottawa are inviting tenders for supplying and erecting arc lamps, regulators, switchboards and other apparatus, appliances and materials required for the Welland Canal. Plans and specifications may be seen at the office of R. J. Parke, Toronto.

The malting plant of Eaton Bros. Brewing Co., at Owen Sound, Ont., was destroyed by fire March 11. Loss about \$40,000.

J. R. Booth, Ottawa, Ont., will build a large paper mill in connection with his pulp mill at Chaudiere Falls.

Messrs. F. B. Stevens & Co.'s grain elevator at Fletcher, Ont., was destroyed by fire a few days ago.

The building occupied by Messrs. Reynolds & Hasons, J. H. F. Hilsdorf and Stedbodino Bros., at Perth, Ont., was destroyed by fire March 5. Loss about \$100,000.

The John Bertram & Sons Co., Dundas, Ont., have about completed the installation of machine tools in the Montreal shops of the Canadian Pacific Railway. The same company furnished the machine tools for the Winnipeg shops of the Canadian Pacific Railway and for the Locomotive and Machine Co., Montreal.

The John L. Cassidy Co., Montreal, have increased their capital from \$150,000 to \$500,000.

The Montreal Harbor Commissioners are inviting tenders for fourteen wharf sheds to be erected in that city.

The Quebec Electric Co., Quebec City, is being organized to install a hydraulic electric plant at Seven Falls, on the River Ste. Anne, and to construct an electric railway from these Falls to the City of Quebec by way of St. Ferol, St. Joachim, Ste. Anne de Beaupre, Chateau River, L'Ange Gardien, Montmorency Falls, Beauport and Limoilpu, and to sell in these places electricity, heat and motor power.

Messrs. Jodoin, Maloney & Lawrence, Montreal, have been incorporated with a capital of \$100,000, to manufacture wines, liquors, etc. The provisional directors include J. E. Jodoin, M. E. Maloney and J. B. Lawrence, Montreal.

The Canadian Engineering Co., Montreal, have been incorporated with a capital of \$10,000, to manufacture engines, boilers, etc. The provisional directors include Wm. J. Henderson, Geo. E. Clark and W. G. Mitchell, Montreal.

Messrs. Lawrence & Co., Montreal, have been incorporated with a capital of \$20,000, to acquire the business of A. T. Lawrence, and to manufacture small-wares, etc. The provisional directors include A. T. Lawrence, W. H. Edgar and G. A. Reavely, Montreal.

The Dominion Introduction Co., Montreal, have been incorporated with a capital of \$49,000, to manufacture merchandise, etc. The provisional directors include H. G. Brown, Alex. Murray and A. J. Lee, Montreal.

Messrs. J. A. Hurteau & Cie, Montreal, have been incorporated with a capital of \$50,000, to manufacture musical instruments, pianos, etc. The provisional directors include J. A. Hurteau, J. L. Chalifoux, Montreal, and L. Hamelin, Ste. Cunegonde, Que.

The Columbia Shoe Dressing Co., Montreal, have been incorporated with a capital of \$10,000, to manufacture leather and rubber, shoe dressings, etc. The provisional directors include C. E. Slater, C. H. Martin and Wm. Starke, Montreal.

The purchase of the entire plant of the Montreal Locomotive & Machine Co. at Longue Pointe, near Montreal, by the American Locomotive Co., has been consummated. President S. R. Calloway, of the American Locomotive Co., states that that company found that with the duty against them they were unable to do any large amount of business in Canada, and therefore were glad of the opportunity of merging the Montreal company into their own, the idea being to manufacture here for the Canadian trade. The works at Longue Pointe are extremely complete and have cost a great deal of money. The plant will immediately be put in shape to build from 150 to 200 locomotives a year, and will, when running, employ 2,000 hands. The works also include a large plant for the manufacture of structural steel bridges, and this portion of the works will be operated to its fullest capacity. The Montreal Locomotive & Machine Co. had their origin with Messrs. Henry Davis and other capitalists, chiefly from Ontario. Mr. Miller, one of the Canadian shareholders, is to be manager.

The town of Fraserville, Que., will apply to the legislature for power to borrow \$150,000 for completion of the water-works system.

The Rock City Tobacco Co., Quebec City, have increased their capital to \$100,000.

A new Catholic Church building will be erected at Cookshire, Que., at a cost of about \$15,000.

The building occupied by the Canadian Jewelry & Importing Co., The Comfort Soap Co., The Metropolitan House Furnishing Co., and G. Trudeau & Co., Montreal, was partially destroyed by fire March 9. Loss about \$75,000.

The Eastern Townships Mining & Smelting Co., have applied to the city of Sherbrooke, Que., for a bonus of \$10,000, and exemption from taxation for ten years, to erect a custom copper smelter with a capacity of 60 tons per day.

The Belgo-Canadian Pulp Co. have installed a paper machine with a capacity of 25 tons per day in their mill at Shawinigan Falls, Que.

A company is being formed to install an electric light system in Blackville, N.B.

W. J. O'Leary is negotiating for the installation of an electric light system in Rexton, N.B.

Two large machines have recently been added to the shops of the Halifax and South Western Railway at Bridgewater, N.S. One is for turning locomotive

wheels and the other for forcing car and locomotive wheels off the journals.

The Canadian Pacific Railway Co. will remodel and enlarge their depot at McAdam, N.B.

The town clerk, Springfield, N.S., is inviting tenders for the construction of a steel storage tank.

No. 1 blast furnace at the Dominion Iron & Steel Co.'s works at Sydney, N.S., which was closed for repairs, has been re-lighted. There are now three blast furnaces in operation.

A new Government detention-house will be erected at St. Johns, N.B., during the coming summer, at a cost of \$30,000. The building will be three stories high, and fitted up in the most modern manner for the proper treatment of immigrants who are detained on account of physical disability. This building is one of three, the others to be erected in Halifax and Quebec.

Negotiations for the sale of the Maritime Sulphite Property, recently bought by the Bank of Montreal, are being carried on with American capitalists. It is expected that the sale will soon be completed, and the mill will resume operations. There are 262 square miles of timber limits included in the lumber rights of this valuable property.

The Cape Breton Silicate Co., North Sydney, N.S., will enlarge their plant to meet the increased demand for silicate brick.

The Davidson Lumber Co., composed chiefly of Pittsburg capitalists, have bought the property of E. D. Davidson & Sons in the vicinity of Bridgewater, N.S., containing about 250,000 acres. Several mills are run by the company, and a new one is being erected at Bridgewater. The manager is Mr. Teufel.

D. Pottinger, General Manager, Intercolonial Railway, Moncton, N.B., is inviting tenders for the construction of car repair shops at Sydney, N.S.

A fire occurred on March 5 at Halifax, N.S., which destroyed several large buildings, including the British-American Hotel, Commercial Hotel, and E. B. Eddy Co.'s paper warehouse. Loss about \$50,000.

The Maritime Nail Works, St. John, N.B., were destroyed by fire March 11. Loss about \$75,000. The works will be rebuilt.

The Acacia Coal Co., Stellarton, N.S., have contracted with Messrs. John Starr, Son & Co., of Halifax, for a complete electric light plant for lighting their different collieries, offices, etc. The generating plant will have a capacity of 1,200 lights, arcs and incandescent, and will be of Westinghouse make, for which Messrs. John Starr, Son & Co. are agents.

The Maritime Dairy Co., Sussex, N.B., have been incorporated with a capital of \$48,000, to manufacture dairy produce and machinery for same, etc. The provisional directors include J. D. Frier, W. J. Mills, and H. H. Parlee, Sussex, N.B.

The New Brunswick Publishing Co., St. John, N.B., have been incorporated

with a capital of \$95,000, to carry on a printing and engraving business. The provisional directors include Thos. McAvity, H. A. McKeown, St. John, and C. S. Hickman, Dorchester, N.B.

The Herring Cove Railway Co., Herring Cove, N.B., are applying for incorporation to build a line of railway from Alma to Herring Cove, and to construct bridges, etc.

The J. Sutton Clark Co., St. George, N.B., have been incorporated with a capital of \$150,000, to acquire the business of J. Sutton Clark, and to carry on a general coal storage and canning business. The provisional directors include J. Sutton Clark, St. George, J. E. Moore, St. John, N.B., and J. D. Chipman, St. Stephen, N.B.

The St. John Foundry Co., St. John, N.B., have increased their capital from \$6,000 to \$24,000.

The White Candy Co., St. John, N.B., have increased their capital from \$30,000 to \$75,000.

Reports from Newfoundland show that the export of lumber this year will amount to fully 50,000,000 feet.

At a recent meeting of the Sydney, N.S., Board of Trade, Mr. Plummer, of the Dominion Iron & Steel Co., stated that the work in connection with the coal-washing plant of the company was proceeding satisfactorily, and that the plant will be in operation in July. Two of the blast furnaces are producing pig iron in satisfactory quality and quantity. It is not intended to increase their number until the washing plant is complete and coke available. Four open hearth furnaces are running, and others will be started as soon as the demand for steel increases. The finishing of the rod and billet mills has been delayed because of the non-arrival of certain machinery, but it is expected that the rod mill will be in operation in April, and the billet mill a few weeks later. The plans for the rail mill are about completed, and it is expected that the board will approve of them at the next meeting. When the new mills are completed the number of employees will be materially increased, and many of them will be skilled laborers. Mr. Plummer said he anticipated no difficulties from the manufacturing side of the enterprise, so soon as washed coal is again available.

One of the most interesting features of the new plant now being erected by the B. F. Sturtevant Co. at Hyde Park, Mass., is an elaborate testing plate for its engines. With an output of a thousand engines or more per year this is the essential climax of a careful system of manufacture and testing. The plate, or more properly the plates, will be supported upon a series of heavy parallel walls between which steam and exhaust pipes are carried so that at almost any point in the entire area of the floor measuring about 30 x 60 feet, steam and exhaust connections may be made to any engine. Testing facilities will be provided, and a transfer crane over-head will make it very simple to locate or remove the engines. The same crane will transport

to the packing department, and thence load them directly upon cars which traverse the end of the building.

Messrs. Riblet & Co., Nelson, B.C., have been awarded the contract for the erection of a tramway at the Alice Mine near Creston, B. C.

The new Imperial Mines have been incorporated at Victoria, B.C., with a capital of \$100,000, to carry on a mining, milling and refining business.

The Vanstone Heating & Plumbing Co., New Westminster, B.C., have been incorporated with a capital of \$25,000, to acquire the business of W. E. Vanstone and to manufacture hot water heaters, etc.

The Moore Preserve Co. have been incorporated at Victoria, B.C., with a capital of \$50,000, to manufacture jams, jellies, etc.

The Golden Copper Mining Co. have been incorporated at Victoria, B.C., with a capital of \$200,000 to carry on a mining and smelting business.

The A. J. Burton Saw Co. have been incorporated at Victoria, B.C., with a capital of \$75,000, to manufacture saws, files, machines, etc.

The Canadian Pacific Railway Co. will erect a new station at Revelstoke, B.C., a station and general offices at Calgary, N.W.T., at a cost of \$50,000, and a station at Medicine Hat, N.W.T., at a cost of \$10,000.

The British Columbia Railway Co. will enlarge their car shops at New Westminster, B.C.

J. C. Downing, Seattle, will erect a cigar factory two storeys high, 75x25 feet, in Vancouver, B.C.

The Kalispell Brewing Co. propose building a brewery at Morrissey, B.C.

W. F. VanBuskirk, city engineer, Rossland, B.C., is preparing estimates for a municipal electric light plant.

C. Fernau, consulting engineer of Newcastle-on-Tyne, England, and Oscar L. Lefebre, Brussels, Belgium, who have been in the Kootenays for the past month seeking sites for zinc reduction and lead reduction plants, have announced that they had practically determined on the sites. The zinc enriching plant will be located at Rosebery, on Lake Slocan. The zinc smelters will be at Fernie, B.C., or Frank, N.W.T. Location will be determined after they have made a trip to the East and had a conference with the people owning coal mines in the Crow's Nest Pass. They hold that it would be cheaper to haul the zinc concentrates and ores to the point where cheap fuel can be obtained than haul fuel to the mines.

The Pittsburg Shafting Co., Detroit, Mich., inform us that they are meeting with much success in introducing their Hyatt Roller Bearings in Canada. They have just equipped the works of the following prominent Canadian manufacturing concerns with these bearings: The Cockshutt Plov Co., Brantford, Ont.; William Gray & Sons, manufacturers of carriages, etc., Chatham, Ont.; McClary Mfg. Co., London, Ont.; and the Toronto Brass Mfg. Co., Toronto. The Pittsburg

Shafting Co. say that the reason that the Hyatt Roller Bearings are meeting with such success is because they effect the purpose desired and are not expensive.

The International Coal & Coke Co. will establish waterworks and electric light system in Blairmore, N. W. T.

The Canadian Pacific Railway Co. will erect a new depot at Blairmore, N.W.T.

A. M. Fraser, architect, Indian Head, N.W.T., has prepared plans for a hotel to be built at Neudof, N.W.T., at a cost of \$6,000; also for a \$12,000 hotel at Frances, N.W.T.

The ratepayers of Calgary, N.W.T., have passed a by-law to provide \$70,000 for erection of new public schools.

The contract has been let to W. Horner for the erection of a three-story addition to the Occidental Hotel, Winnipeg, Man., of which D. Ripstein is the proprietor.

The Manitoba Construction Co., Winnipeg, Man., have secured the contract from W. B. Stirling for the erection of a large warehouse in that city. The building will be occupied by the Royal Furniture Co., formerly the Steele Furniture Co.

The Winnipeg Casket Co., Winnipeg, Man., will enlarge their factory by a two story addition 60 x 40 feet, which will be used for the manufacture of boxes, packing cases, crates, etc.

The Gurney Stove and Range Co., Winnipeg, Man., have changed their name to Tilden, Gurney & Co.

Mr. E. H. Rodgers, building inspector, has presented a report to the Winnipeg City Council showing that during the months of January and February he has issued permits for buildings valued at \$145,300, as against \$42,150 for the corresponding two months of last year. There is every indication that building operations in Winnipeg this year will be far in excess of last, when permits for over \$5,000,000 worth of warehouses, blocks and dwellings were issued.

The Willson Stationery Co., Winnipeg, Man., have been incorporated with a capital of \$30,000, to acquire the business of the Ford Stationery Co., and to manufacture office supplies, etc. The provisional directors include H. L. Willson, F. E. Martin and G. M. Stunden, Winnipeg.

PROPOSED NEW WATERWORKS FOR TORONTO.

The Committee on Works of the Toronto City Council are having a by-law prepared to be submitted as soon as possible to the ratepayers of the city to raise \$1,000,000 for waterworks improvements. The details of the improvements which the Engineer proposes to make are as follows:

- New meters, \$50,000.
- Concreting sides and bottom of Rosehill Reservoir, \$85,000.
- 36 inch main, Bathurst street, College street to Rosehill Reservoir, 16,800 feet, \$190,011.
- 24-inch main, Front street, Church street to Sumach, thence up Sumach street to Queen, \$55,394.

20-inch main, from High Level Station to St. George street, via Dupont street, 1,080 feet, \$8,308.

16-inch main, St. George street, from Dupont to Bloor, 3,150 feet, \$13,484.

16-inch main, Queen street east, from Sumach to Don Bridge, 1,050 feet, \$4,809.

16-inch main Queen street east, from Don Bridge to Broadview avenue, 1,050 feet, \$6,520.

12-inch main, Strachan avenue, from Wellington avenue to Exhibition, 3,800 feet, \$10,604.

12-inch main, Queen street west, from Dundas to Gladstone, 2,200 feet, \$6,464.

12 inch and 6-inch mains at Dundas and Kuskin avenue, to connect and improve pressure, 1,200 feet, \$2,015.

High level district east of the Don, to improve pressure and supply, \$2,584.

New 5,000,000-gallon pumping engine and boiler, building and equipment for High Level Pumping Station, \$50,000.

6-foot steel pipe from shore crib to tunnel shaft, including masonry, valves, connections to basia and Hanlan's crib, \$200,000.

Tunnel, including all connections, valves, etc., \$325,000.

Total, \$960,193.

PRODUCTION OF MINERALS IN ONTARIO.

The Ontario Bureau of Mines has issued a statement showing the production of minerals in this province in 1903. The total value of metallic minerals was \$5,164,800, and non-metallic, \$7,632,644. The number engaged in the production was: Metallic, 2,936; earning in wages, \$1,583,361. Non-metallic, 7,652; earning \$2,617,012. Following is the summary of production:

METALLIC.		Value.
Article.		
Gold	ounces, 10,333	\$183,036
Silver	" 16,863	8,912
Copper	tons, 4,731	611,735
Nickel	" 6,938	2,429,068
Iron ore	" 208,154	450,000
Pig-iron	" 57,004	1,191,036
Steel	" 15,229	301,586
Zinc ore	" 1,150	17,000

Total value, \$5,601,154, less value Ontario ore smelted into pig-iron and pig-iron converted into steel, \$136,154. Total value of metallic production, \$5,464,900.

NON-METALLIC.		Value.
Article.		
Acetnolite	tons, 550	\$1,650
Arsenic	" 257	20,016
Tile, drain	number, 13,200,000	227,000
Brick, common	" 234,000,000	1,561,700
Brick, paving	" 3,783,800	45,233
Brick, pressed and terra-cotta	number, 23,702,610	215,530
Building and crushed stone	"	845,000
Carbide of calcium	tons, 2,507	144,000
Cement, natural rock	barrels, 83,519	69,319
Cement, Portland	" 695,200	1,182,799
Corundum, grain	tons, 849	84,900
Corundum, cobbed	" 270	2,700
Felspar	" 15,296	20,016
Graphite	" 4,100	20,636
Gypsum	" 4,520	7,910
Iron pyrites	" 7,400	21,603
Lime	bushels, 3,400,000	520,000
Mica	tons, 918	112,205
Natural gas	"	196,535
Peat	tons, 1,100	3,300
Petroleum, Imperial gallons, 15,610,333		1,586,674
Illuminating oil	" 7,632,644	160,000
Lubricating oil	" 2,614,313	383,097
Benzine and naphtha	" 82,153	190,971
Gas and fuel oils and tar	" 1,963,172	2,625
Paraffin wax and candles, lbs. 2,673,846		
Pottery	"	
Salt	tons, 58,974	
Sewer pipe	"	
Talc	tons, 920	

Total non-metallic production, value, \$7,632,644; add metallic production, \$5,164,800. Total value, \$12,797,444.

INDUSTRIAL PUBLICATIONS.

The Imperial Pneumatic Tool Co., Sherbrooke, Que., have issued a number of folders and catalogues describing and illustrating their line of air tools now being placed on the market.

H. W. Petrie, Toronto, has issued circulars describing the Petrie steam boiler and Buffalo belt fasteners.

The Laurie Eugue Co., Montreal, have issued a small brochure having reference to their "Efficient" feed water heater, in which, in describing their apparatus, they say:—"The great problem which confronts all users of steam power is that of securing the most economical means of using fuel. Hence, any device which can be used to lessen the consumption of coal and still secure the same or greater efficiency is always eagerly sought after."

Articles by M. Emile Guarini have recently been appearing in the Engineering Magazine, London, England, on the subject of electric power appliances in mines, and in closing his remarks on this very interesting subject, the writer instances two cases showing the economy resulting from the adoption of electricity, and these should be noted by all interested in this very important question. M. Guarini says: "Prior to the introduction of electricity, the Burma ruby mines were unable to make any dividends, the expense of the operation being too high. Since its adoption the expenses have been reduced by the sum of £6,000 per annum, permitting the payment of profits, and at the Sheba mines the economy in operating expenses since the introduction of electric power in 1896, has amounted to £10,000 per annum." The contracts for the power equipment for both the Burma ruby mines and the Sheba gold mines were executed by Messrs. Johnson & Phillips of Old Charlton, England, who have made a specialty of transmission of electric power.

The Imperial Plaster Co., Toronto, have issued a neat booklet descriptive of their wood fibre plaster now in extensive use through the Dominion.

The Cincinnati Punch & Shear Co., Cincinnati, Ohio, have favored us with a copy of their catalogue having reference to the punches, shears, rolls, rolling mill machinery, etc., which may be belt, engine or motor driven. These lines embrace sizes and types for nearly every requirement in iron working industries.

The rapidly increasing use of the electric automobile has created a demand for outfits for properly charging the storage batteries used in such vehicles and thus prolonging their life and usefulness. To meet this demand the Westinghouse Electric & Mfg. Co., Pittsburg, Pa., and Hamilton, Ont., have designed the apparatus listed and described in an illustrated circular just issued by them which will be found to cover all the requirements of public and private installations at a comparatively low cost, and to give satisfactory service.

The Harbison-Walker Co., Pittsburg, Pa., have sent us an exceedingly handsome and convenient pocket size cata-

logue containing useful information in connection with the use of silica, magnesia, chrome and fire clay brick and the various refractories manufactured by them. The yearly product of the twenty factories operated by this company amounts to 180,000,000 pieces. The book contains illustrations and descriptions of the different styles and qualities of fire brick, the purposes for which they are best adapted, sizes, shapes, etc. It also contains a number of tables, a knowledge of which is of importance in all industrial pursuits.

The George White & Sons Co., London, Ont., have sent us their new illustrated catalogue descriptive of the several lines of agricultural and farming machinery made by them. This is a most prosperous "Made in Canada" concern, their plant, as they inform us having been increased year by year for a number of years, their output for the past season being four times greater than it was four years ago.

The Canadian Coral Marble Co., Toronto, have sent us a copy of their new illustrated booklet descriptive of their products and methods of their application. Many of the best and most durable floors in Toronto and other towns and cities have been put down by this company with most satisfactory results. Such floors are in every way sanitary, dust, water and fire proof, perfectly smooth and free from seams or cavities; and can be put down in any color or design. For wainscoting, lining and other interior decorations, coral marble is made in slabs of any desired size or color, plain or ornamented. Specimens of this marble are to be seen in the interior of the King Edward and Grand Union Hotels, the columns in the Bank of British North America, the City Hall and many other fine buildings in Toronto. The company also manufacture a fine grade of paint for bridge work or any exposed metal that is liable to corrode or rust, being much more durable than other paint, and more economical.

The current issue of the Marine Review of Cleveland, Ohio., is the most elaborate number that publication has ever issued. It is a fitting-out number and is, in addition, devoted to a discussion of the shipping question in all its various phases. The list of contributors upon this subject is unusually brilliant, embracing the Hon. Geo. B. Cortelyou, secretary of the United States Department of Commerce and Labor; Senator Wm. P. Frye, of the United States Senate; John McNeil, president of the Brotherhood of Boiler Makers & Iron Ship Builders of America, and Mr. Winthrop L. Marvin, author of "The History of the American Merchant Marine." Hon. T. E. Burton, chairman of the committee of rivers and harbors of the House of Representatives, discusses the system of river and harbor improvements of the Federal Government, and points out some radical defects in it. Col. Thomas W. Symons, member of the Erie Canal Advisory Commission discusses the enlargement of the Erie Canal to accommodate barges of 1,000 tons capacity from

the historical and commercial standpoints. Mr. Harvey D. Goulder, council for the Lake Carriers' Association, outlines what has been done toward bringing uniformity in the rules for navigation on the Great Lakes. Mr. W. L. Brown, president of the American Shipbuilding Co., discusses the future of shipbuilding on the Great Lakes. The Panama canal is most exhaustively treated and illustrated. Detailed drawings are also published of a new dipper dredge for the Canadian Government. These are a few of the leading articles. The edition from a pictorial standpoint represents the high-water mark of marine journalism. It is splendidly illustrated throughout with more than ninety beautiful photographs.

The Joseph Dixon Crucible Co., Jersey City, N.J., are sending out a folder having reference to their graphite pipe joint compound, which is now put up in the very convenient and handy form of collapsible tubes of a size that may readily be carried in the pocket or tool bag. In this form it is particularly useful for all small work away from the shop or for those who have only occasional need for making threaded connections.

The McCullough-Dalzell Crucible Co., Pittsburg, Pa., advise users to "stop the leaks in their crucibles"—that if they are faulty there is a lot of money going to waste. Of course the object of the company in sending out the folder is to advise users to purchase crucibles made by them.

The National Electric Co., Milwaukee, Wis., have sent in their Catalogue No. 60, describing the alternating current machinery for lighting, power and railway service manufactured by them. These machines represent the latest development of engineering design, and both the mechanical and electrical features are given the most careful consideration.

Messrs. Taylor & Bethel, Montreal, have issued descriptive matter on Aurora tools and Garden City fans for which they are Canadian agents.

The J. C. McLaren Belting Co., of Montreal, have issued a complete catalogue of belting, card clothing, mill supplies, etc.

PERSONAL.

Wm. Sclater, formerly of the Canadian Asbestos Co., has opened offices in the Board of Trade Building, Montreal, having formed the Sclater Asbestos Co. The company are Canadian agents for the Keasley & Mattison Co., Ambler, Pa., one of the largest manufacturers of asbestos goods in the world.

Mr. J. W. Auld has succeeded Mr. W. A. Bradshaw as manager of the Imperial Plaster Co., Toronto.

Messrs. Taylor & Bethel, Victoria Square, Montreal, have been appointed agents for Quebec and the Maritime Provinces, for the John Steptoe Shaper Co., Cincinnati, Ohio. The company are also agents for a number of other large English and American manufacturers of machinery.

Mr. H. Etches who has recently joined

the firm of Von der Osta & Co., Toronto, was for many years mechanical engineer and chief draughtsman for the Carnegie Steel Co., Pittsburg, Pa. He is a member of the English Institute of Mechanical Engineers and while in the Old Country was engaged in the construction of railroad bridges and municipal work. Since coming to Canada he has been associated with such firms as the Waterous Engine Works Co., Brantford, Ont., and the Dodge Mfg. Co., Toronto Junction; and has been actively engaged in the designing of special machinery for brickmaking, the manufacture of peat, etc.

Mr. Clarence G Strong, representing the Pittsburg Shafting Co., Detroit, Mich., blew in on us last week like a refreshing breeze from the Sunny South, to report the good success he is meeting in equipping a number of Canadian factories with the Hyatt Roller Bearings made by his company.

Messrs. W. H. Coverdale & Co., 66 Broadway, New York City, have been incorporated to do a general engineering and contracting business. Their organization includes engineers of experience in all matters relating to the design and construction of steam and electric railroads, lighting and power plants, coal and ore-handling machinery, etc. Mr. Coverdale is a Canadian, having been born and educated at Kingston, Ont. He was for many years in the engineering department of the Pennsylvania Railroad, and was track elevation engineer of that company in Chicago during 1898-99. He was also prominently identified with the construction of the Westinghouse shops at East Pittsburg, and for the last three years has been civil engineer for a New York firm of engineers and contractors.

The Canadian Forestry Association which was in session in Toronto last week decided that they would hold their annual meeting next year in Quebec. Officers for the ensuing year were elected as follows:—Patron, his Excellency the Governor-General (re-elected); Hon. President, Wm. Little, Montreal (re-elected); President, Aubrey White, Toronto; First Vice-President, E. G. Joly, de Lotbiniere, Quebec; Secretary, R. H. Campbell, Ottawa; Treasurer, Norman M. Ross, Ottawa; Board of Directors, J. R. Booth, Ottawa, John Bertram, Toronto, Dr. Wm. Saunders, Ottawa, Prof. John Macoun, Ottawa, Thos. Southworth, Toronto, Hiram Robinson, Ottawa, E. Stewart, Ottawa, H. M. Price, Quebec; Vice-Presidents for the various provinces in the Dominion; Nova Scotia, Hon. J. W. Longley; Prince Edward Island, Rev. A. E. Burke; New Brunswick, His Honor Lieut.-Governor Snowball; Quebec, Hon. S. M. Parent; Ontario, Hon. E. J. Davis; Assiniboia, His Honor Lieut.-Governor Forget; Alberta, Wm. Pearce; Athabaska, F. D. Wilson; British Columbia, Hewitt Bostock; Manitoba and Saskatchewan will be settled later.

Mr. A. A. Bowman formerly in charge of the Toronto office of the Canadian Rand Drill Co., has been appointed man-

ager of sales for the Imperial Pneumatic Tool Co., with headquarters in Montreal.

Montreal expects to hold an exhibition in 1905 along the lines of the Toronto Industrial, and the project got well under way at a meeting held there last week, when the Montreal Industrial Exhibition Co., was organized. The following officers were elected:—Hon.-Presidents, Hon. Sidney Fisher and Hon. Mr. Tourgeon; President, Senator Drummond; Vice-Presidents, Senator Beique and the Mayor; Hon. Secretary-Treasurer, Henry Miles. It is expected that the city will contribute a considerable sum of money towards the enterprise, and it is believed that some arrangement can be made whereby permanent buildings may be erected.

Mr. A. G. Christie, a graduate of the Toronto School of Practical Science, who has been connected with the steam turbine department of the Westinghouse Electric & Mfg. Co., Pittsburg, Pa., for the last two years, read a paper on steam turbine testing at the last meeting of the S. P. S. Engineering Society at the school.

Mr. Alexander McLean, Ottawa, has been appointed Canadian Commercial Agent in Japan. Mr. McLean will leave at an early date to take advantage of the special opportunities which the war might afford for the sale of Canadian foodstuffs.

The Montreal offices of the Canadian Rand Drill Co. will be moved to the Imperial Bank Building shortly.

A CANADIAN LAKE STEAMER.

Plans have been received by the Cleveland & Georgian Bay Line at Detroit from the Walker shipyard of Sir W. G. Armstrong, Whitworth & Co., Newcastle-on-Tyne, for the steamer which the company proposes to introduce into its Canadian service. The plans call for a steamer 250 feet over all, 235 feet keel, 41 feet beam and 14 feet deep. It is not yet determined whether the steamer will have single or twin screws. She will be built of steel and the steel will extend up the sides to the top of the first cabin deck which will ensure greater strength than is ordinarily contained in this type of lake steamer. Mr. W. J. Brown, the general manager, reports that the company intends to bring three of these steamers to the lakes and that they are to be placed on the route between Toronto, Hamilton and Fort William, sailing twice each week. Each steamer will have sleeping accommodation for 250 passengers and all the staterooms will be outside rooms with running water. The dining room will extend the entire width of the steamer and will have a capacity for seating 150 persons at one time. Concerning the service Mr. Brown says:

During the season, June 15 to September 15, the steamers will call at Cleveland, and will stop regularly from May 1 to December 1 at Windsor, Sarnia, Goderich, Kincardine, then through the north channel of Georgian Bay, stopping at Manitowaning, Little Current, Gore Bay, Thessalon, Bruce Mines, Sault Ste. Marie, Fort William and Port Arthur on the north shore

of Lake Superior, returning via the same route and making the same calls. They will be able to make the round trip in from eight to nine days, as they are to be built under a guarantee to make 16 knots per hour on a draught of 12 feet. They are also expected to carry 1,000 tons of package freight on this draught. As the bulk of the package freight for western Canada originates at Toronto and Hamilton, and up to the present time has been all shipped by rail to Georgian Bay points and re-shipped there by boat, which necessitated two extra handlings, assures these steamers being a success from the start, as they will be able to deliver freight at Sault Ste. Marie and Fort William twenty-four hours in advance of what it has formerly been done via the rail and lake route and with but one handling, which will guarantee the freight being delivered at its destination in much better condition than it has heretofore.

FIRE-PROOF CONCRETE.

The result of an inspection of the ruins of the Baltimore fire by Mr. Beaumont Jarvis, architect, Toronto, is to convince him that concrete and brick walls are the best proof against fires. "The building material of the future," he says, "will be monolithic concrete, poured and made of crushed bricks and Portland cement, or bricks laid in cement. Brick walls laid in lime mortar will not stand the fire. The best evidence of that is the result—150 acres of brick piles. The natural stone had simply disintegrated and lost all resemblance to its original form." Mr. Jarvis classifies the building materials in the following order according as they stood the fire:—(1) Concrete and bricks, (2) cast iron, (3) steel, (4) granite, (5) sandstone, (6) lime mortar. He says some of the leading engineers of America agree with him that the brick debris which has been through the fire could be utilized and turned into cement concrete, which would be absolutely fire-proof. He also says that a company of New York engineers are now negotiating with him with regard to a concrete construction company to operate in Baltimore, and that they will be able to cast walls for from 25 to 50 per cent. less than walls laid in brick.

The heat at the Baltimore fire is estimated at 3,000 degrees. In some districts absolutely nothing was left but the bricks which had fallen down, which were as good as new, except many were broken. The terra-cotta surrounding the skeleton steel and forming the floors of the big sky-scrapers was a failure, so far as its re-use is concerned, and it failed to sustain the safes, which dropped through to the basement. The buildings that were fire-proofed by armored concrete were merely gutted, and one concrete building stands apparently as good as ever. Stone and terra-cotta seem to have been eaten up, and even granite was splintered and destroyed.

Messrs. Adams & Co., wholesale leather merchants of Toronto, will erect a five-story building in Winnipeg, Man.

CALIFORNIA-OREGON EXCURSION.

Every day in the year single and round trip excursions via the Chicago, Union Pacific and North Western Line. Through first-class Pullman and tourist sleeping cars daily, to points in California and Oregon. Personally conducted excursions from Chicago to San Francisco, Los Angeles and other Pacific Coast points, leaving Chicago on Tuesdays, Wednesdays, Thursdays and Fridays. Lowest rates, shortest time on the road. Finest scenery. For maps, illustrated folders and rates, wire B. H. Bennett, 2 King Street East, Toronto.

BUSY TIMES.

H. W. Petrie, machinery dealer, Front St. West, Toronto, has recently filled some large and important orders for machinery, including the following:

A full equipment for a first-class machine shop for the Imperial Paper Mills Co., at Sturgeon Falls, Ont.

A Wheelock engine and a horizontal boiler for the Woodstock Cereal Co., at Woodstock, Ont.

Two carloads of machinery for the large sash and door factory of Hembling & Tramb, at Didsbury, N.W.T.

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Offices: 4 New York Life Building, Montreal. and 907 O Street, Washington, D. C.

Two double drums, double cylinder, hoisting machines for the Westinghouse-Church-Kerr Co., to be used in the construction of their new works at Hamilton, Ont.

A large and complete machine shop outfit for W. Kelehon, at Kingston, Ont.

A 100 h.p. Wheelock engine, and a new Erie horizontal boiler to match, for the Georgetown Electric Light and Power Co., at Georgetown, Ont.

A Wheelock automatic engine for the Ontario Spring Bed and Mattress Co., at London, Ont.

An extensive veneer plant, including engine and boiler, for Messrs. Buck & McLean, Norwood, Ont.

Mr. C. B. Dickerson, North Bay, Ont., has just opened a first-class machine shop, equipped throughout by H. W. Petrie.

Mr. Petrie has just received a large shipment of new Bremer and London power punches and shears.

M. A. Y. BELTING.

The Rosendale Belting Co., Toronto, are in receipt of a letter from Mr. J. W. Dulaney, superintendent of the National Cash Register Co., Toronto, in which they say:—"We take pleasure in saying that the belting we purchased from you is giving us good satisfaction. This we are glad to be able to state without the least hesitation."

The company inform us that they are in receipt of an order for a Rosendale, 48 inches wide, twin belt, same as illustrated in their catalogue; also for a 22 inches wide solid woven belt, and a 20 inches wide coal carrying belt over 400 feet long. These latter belts are surface-hardened and armour-plated.

M.A.Y. belting is in demand.

THE MINING INSTITUTE.

The Canadian Mining Institute, as heretofore announced, held its usual annual session in Toronto last week. Mr. Eugene Coste, the president, occupying the chair. Mr. Coste, before reading his Presidential address, referred to the irre-

parable loss which the institute sustained in the death of Mr. B. T. A. Bell, the Secretary. Mr. Stevenson Brown, the Treasurer, moved a resolution, seconded by Prof. Miller, testifying to the institute's indebtedness to Mr. Bell's untiring energy, and conveying to Mrs. Bell and family the sympathy and condolence of the members. The resolution was supported by Mr. Obalski, of Quebec, and carried. The question of a successor will be left to the new council.

The annual report of the council showed a membership of 435. The committees on awards gave the geological prize of \$25 to Mr. S. H. Boright, and the mining prize to Mr. Norman W. Parlee.

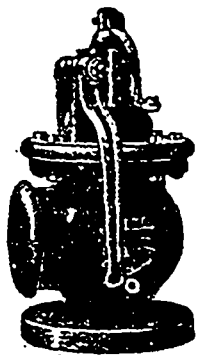
The election of officers resulted as follows:—President, Eugene Coste, Toronto; Vice-President, E. B. Kirby, Rossland; Treasurer, J. Stevenson Brown, Montreal; Members of Council, J. M. McEvoy, of Fernie, W. F. Robertson, of Victoria, A. W. B. Hodge, of Granby, W. G. Miller, of Toronto, Major R. G. Leckie, of Sudbury, John Blue, of Eustis, Frank D. Adams, Graham Fraser, of North Sydney.

ELECTRIC POWER FOR TORONTO.

The Electric Development Co., of Ontario, have made public some of their plans for transmitting power to Toronto. As a start, 50,000 h.p. will be transmitted. The company have a private right of way, and in place of wooden poles to support the wires, galvanized steel towers will be used. They will be 400 feet apart and the cross arms will be 45 feet high. There will be four circuits, so that in case of any accident to one, three others will be available. The voltage on the line will be 60,000 volts. There will be a transformer house at Niagara Falls, at which the voltage will be stepped up, and another at Toronto, where it will be stepped down to the voltage commercially in use. The works at Niagara are proceeding very rapidly and about 450 feet of the main tunnel has been excavated. This tunnel before it is lined with cement and brick, is over 30 feet in diameter.

CORUNDUM WHEELS, EMERY WHEELS and GRINDING MACHINERY

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Pressure and Vacuum Gages.
Lubricators, etc.



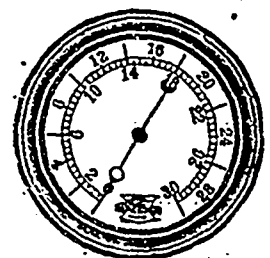
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Single Bell Chimney Whistles.

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OPPORTUNITIES.

The following enquiries have been received at the offices of the High Commissioner for Canada in London, and at the Canadian Section of the Imperial Institute, London, England.

NOTE.—Those who may wish to correspond with any of these enquirers can obtain the names and addresses by applying to the CANADIAN MANUFACTURER, Toronto. No charge for giving information. When writing refer to the numerals opposite the enquiries, and enclose 2c. postage stamp for reply.

1220. A produce broker in London, England, is desirous of taking up the sale of Canadian wheat on commission, as well as other grain, canned fruit and fish.

1221. A London, England, firm of general merchants and commission agents are desirous of obtaining consignments of fruit from Canadian sources.

1222. Enquiry is made respecting shipments of concentrated apple juice which

has been going to the English market from Canada.

1223. A timber merchant in London, England, has asked to be placed in touch with Canadian manufacturers of blind laths.

1224. A firm of sauce, catchup, essence and vinegar manufacturers are anxious to appoint representatives in one or two of the largest trade centres in Canada.

1225. A commission agent in the North of Ireland is seeking the agencies for Canadian shippers of canned fruits, meats, condensed milk, cheese and canned fish.

1226. A firm reaching the grocery, confectionery and druggist trades invites correspondence from Canadian manufacturers of any goods in these lines for which an export outlet is desired.

1227. The manufacturers of glass bottles of various kinds ask to be placed in communication with Canadian importers.

1228. A firm manufacturing needles and fish hooks are open to appoint a resident agent for Canada, with the exception

of the Maritime Provinces and British Columbia.

1229. A firm in Aberdeen, Scotland, would be pleased to hear from Canadian shippers of cheese, butter and other produce.

1230. A London, England, firm with South African connections have asked to be placed in touch with reliable shippers of flour from Canada.

1231. A North of England firm have requested to be put in communication with a few of the largest exporters of eggs from Canada, who are not already represented in their district.

The Canadian Pacific Railway Co. have almost completed their new building in Winnipeg, Man. They intend installing an acetylene gas plant, and will be in a position to manufacture all the gas they may require.

The Winnipeg, Man., Exhibition Board have awarded contracts for three new buildings for the Dominion Fair, 80 x 40, at a cost of \$33,000.

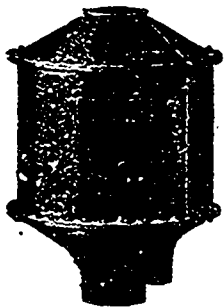
Results are the only Crucible test. If you have not gotten them, look to us, and get best results, not once, but all the time. We can demonstrate this, if you'll try us.

MCCULLOUGH-DALZELL CRUCIBLE CO., - PITTSBURG, PA.

A SMALL SUM

invested in a

Burt Exhaust Head



now, will save you a large bill for repairs later—water and oil from the exhaust pipe will rot and rust the roof and walls of your plant.

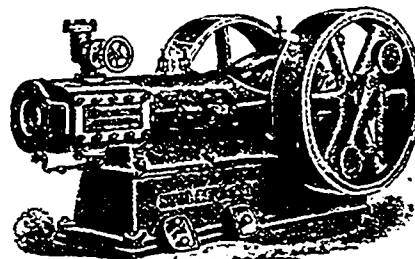
“We are well pleased with the Burt Exhaust Head. It does all that is required of it.”—PITTSBURG (PA.) ICE CO.

Order NOW, with size of pipe; if dissatisfied, return.

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LARGEST MFRS. OF OIL FILTERS IN THE WORLD.
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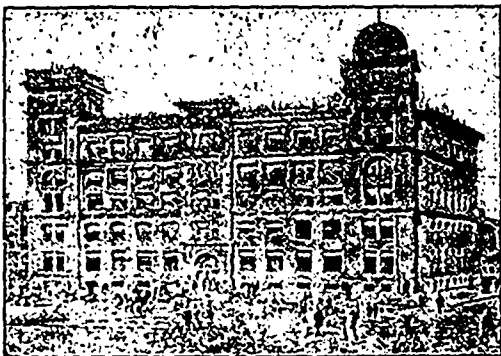
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We Build all Types and
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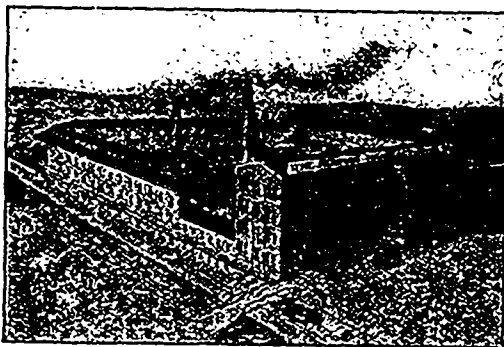
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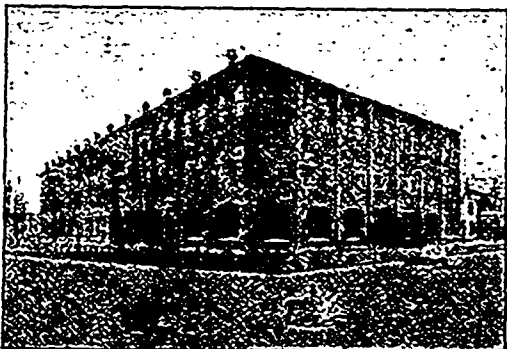
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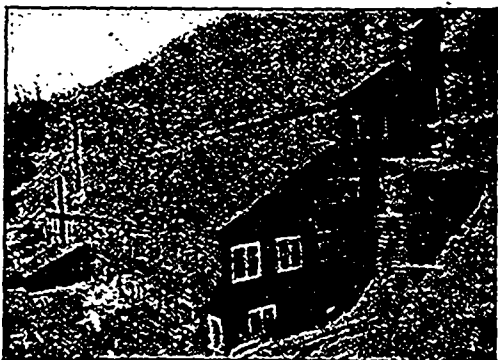
PENMAN MFG. CO., Limited, Paris, Ont.

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GENDRON MFG. CO., Limited,
Toronto, Ont.

Heated by Webster System.



YMIR GOLD MINES, Ymir, B.C.

Heated by Webster System.

"The Webster System of Steam Circulation"

is in operation in Hundreds of the
Largest Offices and Factory Buildings
throughout the Dominion of Canada.

THE FOLLOWING LETTERS WILL BE SELF-EXPLANATORY :

STRATFORD, ONT., February 6, 1904.

MESSRS. DARLING BROS., Montreal, Que.

Gentlemen,—Answering your favor of the 5th inst. in which you ask if the Webster Heating System which we installed last year has proven satisfactory, would say that it has given us no trouble. At all times the circulation has been perfect, and we would recommend this system without hesitation to any one who is looking for economy as well as efficiency in heating. Wishing you success, we remain, yours truly,

THE KEMP MANURE SPREADER CO., LIMITED,
(Signed) W. I. KEMP, Manager.

TORONTO, February 10, 1904.

MESSRS. DARLING BROS., Montreal.

Gentlemen,—In answer to yours of February 5th with reference to the Webster Heating Apparatus supplied by you in our new warehouse, Pears Ave., Toronto, we have found this system very satisfactory, and believe it is a great economy. We contemplate extending the use of same to other of our buildings.

We will be pleased to show any prospective customer of yours through our Works in which this system is installed. Yours truly,

(Signed) GEO. H. HEES, SON & CO., LIMITED.

STRATFORD, ONT., February 6, 1904.

MESSRS. DARLING BROS., Montreal, Que.

Dear Sirs,—Answering your inquiry of the 5th inst., in reference to the Webster Heating System supplied by you, may say, that the system is working to our entire satisfaction, and any trouble we have had with it has been through our own neglect.

If properly used the results obtained are everything that could be desired, but like all other good things requires a little care. We have no difficulty in getting heat into the remotest part of our factory, and this winter has been an exceptionally severe test on all heating apparatus, the thermometer having registered on an average 10 degrees below zero for the past two weeks.

We have recommended the system to a couple of other factories that have been put up in this city, and both have adopted it, and we understand are well pleased with the investment. Yours very truly,

THE GLOBE-WERNICKE CO., LIMITED,
per JAS. J. MASON, President.

MONTREAL, February 8, 1904.

MESSRS. DARLING BROS., City.

Gentlemen,—In answer to yours of the 5th, re Catalogue, I have installed the "Webster System" in the following buildings:—Liverpool, London & Globe, Office Building, Montreal, Que.; The Robert Mitchell Co., Limited, Brass Factory, St. Henri, Que.; J. & T. Bell, Boot and Shoe Manufacturers, Montreal, Que.; Montreal Steel Works, Limited, Steel Manufacturers, Montreal, Que.; Kilgour & Bro., Furniture Factory, Beauharnois, Que.; Truro Condensed Milk Co., Milk and Canning Co., Huntingdon, P.Q.

I take pleasure in stating that the above mentioned buildings have been entirely satisfactory, and I consider the "Webster System," without a doubt, the most economical system to maintain and give absolutely perfect circulation under atmospheric pressure, and would be pleased to recommend it to anyone desiring to put in a low pressure heating system.

Yours very truly,
(Signed) JAS. BALLANTYNE.

If you are interested, we will be pleased to have
one of our Heating Engineers call and give you
full particulars. Our Illustrated Catalogue "H"
will be sent on application.

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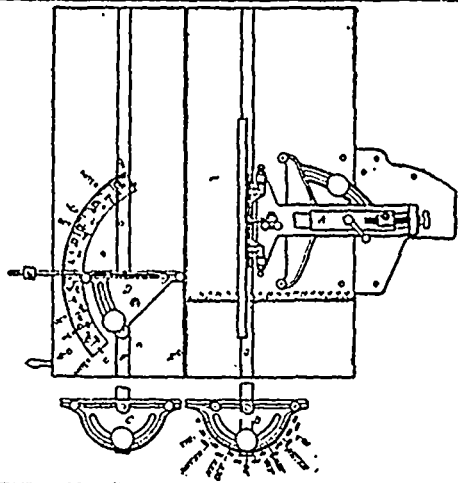
Central Ontario Power Co.

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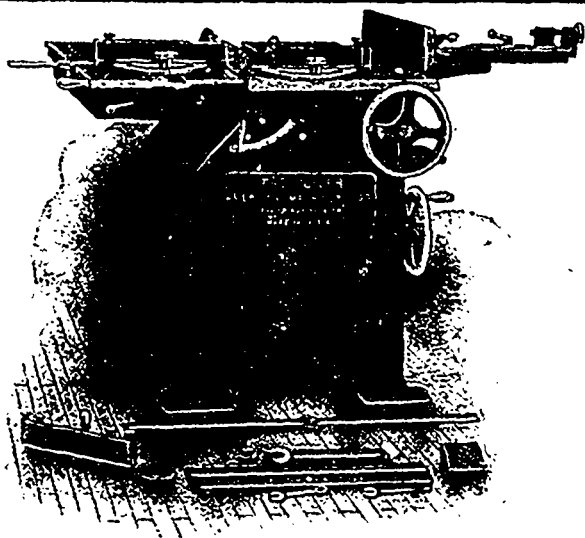
J. ALEXR. CULVERWELL, Managing Director,

Address Branch Office—9 Toronto St., TORONTO.

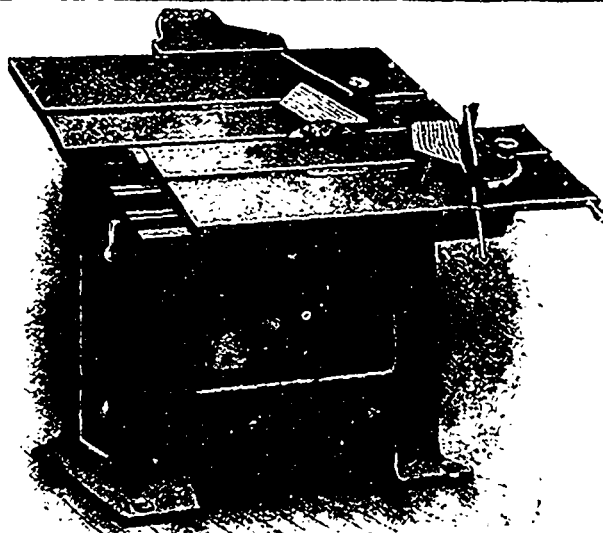
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It is built with all the care and accuracy of the best machine tools and not on the line of ordinary wood-working machinery.

Ask us for catalogue giving further details regarding this machine.

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The Manufacturers' List

Buyers' Guide of Canada

1904

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Contains the addresses of more than 12,000 bona fide Canadian manufacturers, and character of their business.

The names of none but bona fide Canadian Manufacturers are included in the book.

Size of book 8x10 inches, 570 pages. Substantially bound in blue cloth, handsomely illuminated.

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MACHINE KNIVES

For WOOD-WORKING,
 PAPER CUTTING and LEATHER SPLITTING
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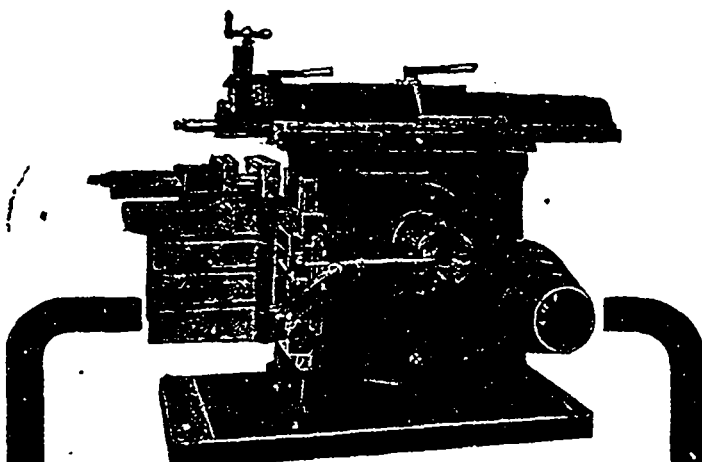
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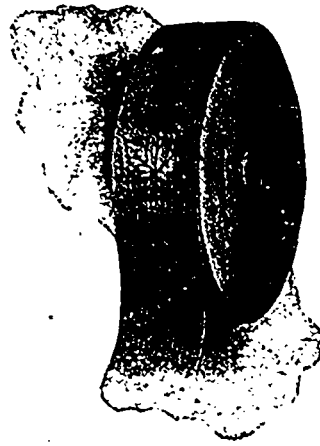
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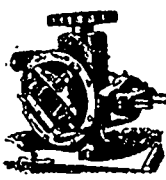


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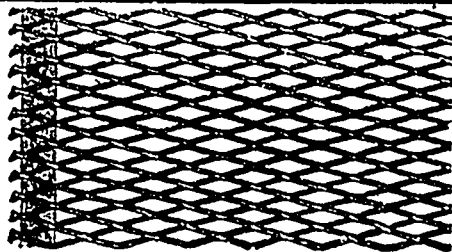
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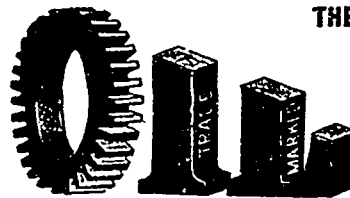
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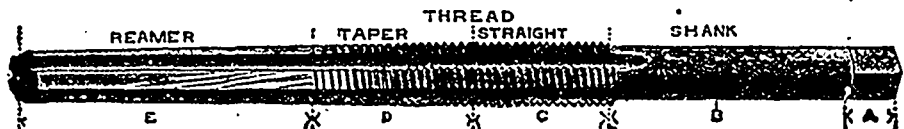
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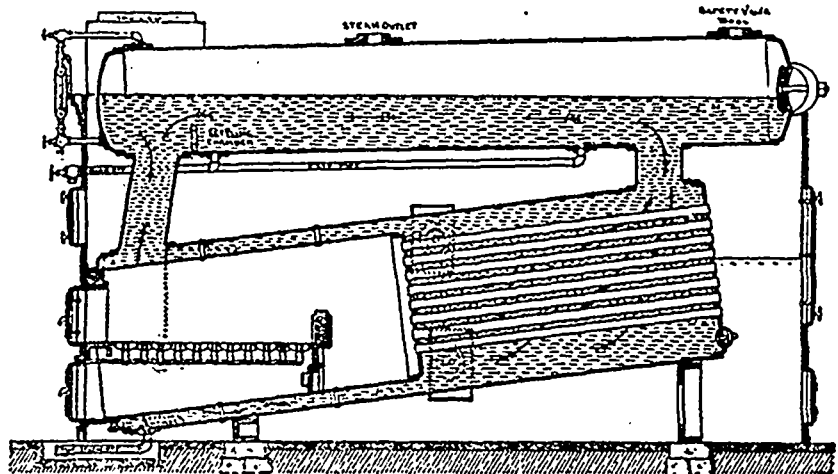
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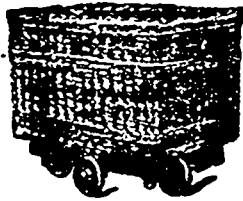
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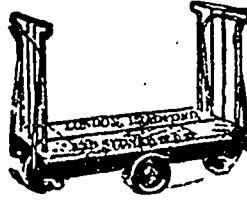
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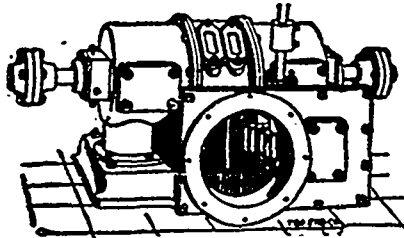
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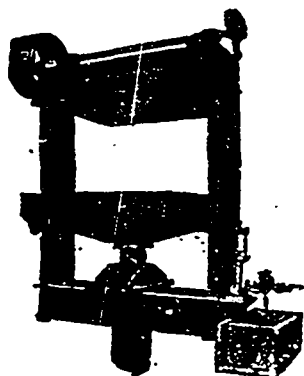
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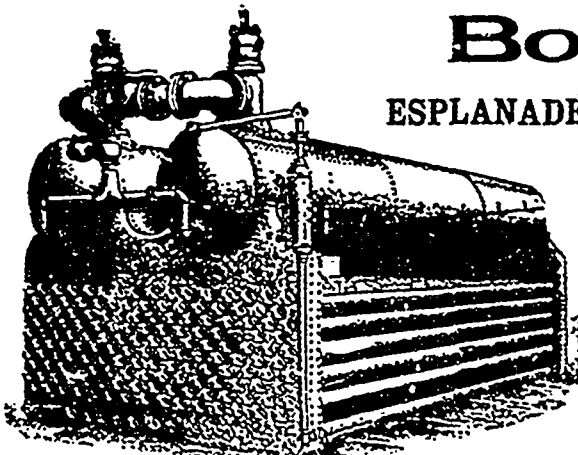
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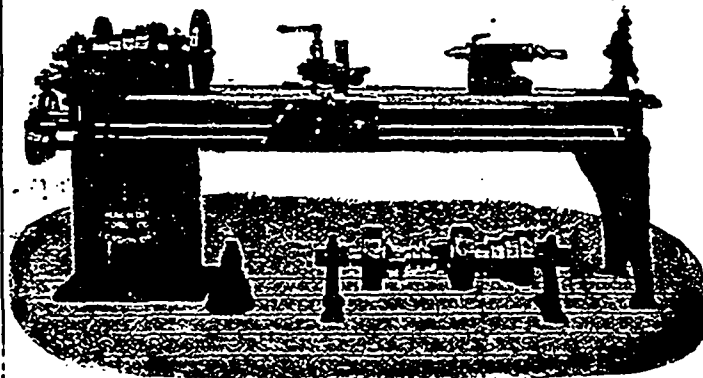
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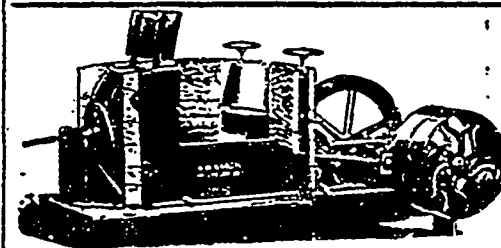
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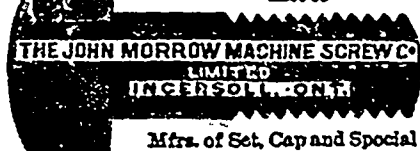
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Expanded Metal & Fireproofing Co., Toronto.

Builders' Materials

Albert Mfg. Co., Hillsboro, Ont.
Canada Foundry Co., Toronto.
Canadian Otis Elevator Co., Toronto.
Canadian Portland Cement Co., Deseronto, Ont.
Cooper, Estate late James, Montreal.
Dodge Mfg. Co., Toronto.
Expanded Metal & Fireproofing Co., Toronto.
Gartshore, John J., Toronto.
Metallic Roofing Co., Toronto.
Owen Sound Portland Cement Co., Owen Sound,
Ont.
Pittsburgh Shafting Co., Detroit, Mich.
Rico Lewis & Son, Toronto.
Sheldon & Sheldon, Galt, Ont.

Cables

Dominion Wire Rope Co., Montreal.
Wire & Cable Co., Montreal.

Canada Plates

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

Canoes

Peterborough Canoe Co., Peterborough, Ont.

Caps

McCullough-Dalzell Crucible Co., Pittsburg, Pa.

Card Clothing

McLaren, D. K., Montreal and Toronto.
McLaren, J. C. Belting Co., Montreal and Toronto.

Cast Iron Pipe

Canada Foundry Co., Toronto.
Gartshore-Thomson Pipe & Foundry Co., Hamil-
ton, Ont.
Rico Lewis & Son, Toronto.
Montreal Pipe Foundry Co., Montreal.

Castings (Iron and Brass)

Kerr Engine Co., Walkerville, Ont.
Toronto Iron & Brass Bodstead Co., Toronto.

Cement Machinery

Wentz, R. F. Engineering Co., Toronto.

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.

Chemists

Archbold, Dr. Geo., Prescott, Ont.
Heys, Thos. & Son, Toronto.
Wentz, R. F. Engineering Co., Toronto.

Clay Working Machinery

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

Coal and Coke

Bourne-Fuller Co., Cleveland, Ohio.
Brownlee, J., Galt, Ont.
Hoffman, Jules G., Detroit, Mich.
Milnes, James H. & Co., Toronto.
Pittsburgh Coal Co., Pittsburgh, Pa.
Shipman, O. W. Co., Detroit, Mich.

Coal Cutting Machines

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.

Collection Agency

Petrie, H. D., Hamilton, Ont.

Concrete Mixers

Cooper, Estate late James, Montreal.

Continuous Rolling Mills

Morgan Construction Co., Worcester, Mass.

Contractors' Machinery

Carlin's, Thomas Sons Co., Allegheny, Pa.
Cooper, Estate late James, Montreal.
Gartshore, John J., Toronto.
Shaw, Willis, Chicago, Ill.

Contractor's Plants

Shaw, Willis, Chicago, Ill.
Von der Osten, E. & Co., Toronto.

Conveying Machinery

Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Buhl Malleable Co., Detroit, Mich.
Dodge Mfg. Co., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
Perrin, William R. & Company, Limited, Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Rossendale Belting Co., Toronto.
Stevens, Alfred J., Toronto.

Copper Materials

Greening, B. Wire Company, Hamilton, Ont.
Syracuse Smelting Works, Montreal.
Wire & Cable Co., Montreal.

Corundum

Canada Corundum Co., Toronto.

Corundum Wheels

Canadian Corundum Wheel Co., Hamilton, Ont.
Hart Corundum Wheel Co., Hamilton, Ont.
Rico Lewis & Son, Toronto.

Covers

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

Crayons

Lowell Crayon Co., Lowell, Mass.

Crucibles

Dixon, Joseph, Crucible Co., Jersey City, N.J.
McCullough-Dalzell Crucible Co., Pittsburg, Pa.
Pittsburg Crucible Works, Pittsburg, Pa.
Syracuse Smelting Works, Montreal.

Crucible Caps and Nozzles

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

Crucible Covers and Stoppers

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

Diem (Socket, Sewer Pipe and Tile)

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

Directories

Kelly's Directories, Limited, Toronto.

Draw Benches (Wire)

Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls,
Ohio.

Drills

Bertram, John, & Sons Co., Dundas, Ont.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Shaw, Willis, Chicago, Ill.

Drills (Pneumatic and Rock)

Canadian Rand Drill Co., Sherbrooke, Que.
Chicago Pneumatic Tool Co., Chicago, Ill.
Jeffrey Mfg. Co., Columbus, Ohio.

Drills (Twist)

Cleveland Twist Drill Co., Cleveland, Ohio.
Pittsburg Shafting Co., Detroit, Mich.

Drop Forgings

Globe Machine & Stamping Co., Cleveland, Ohio.

When writing to Advertisers kindly mention THE CANADIAN MANUFACTURER.

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

Dry Kiln Apparatus
Sheldon & Sheldon, Galt, Ont.
Stovens, Alfred J., Toronto.
Sturtevant, B. F. Co., Boston, Mass.

Dust and Shavings Separators
Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Dye Stuffs and Chemicals
Bellhouse, Dillon & Co., Montreal.
Benson, W. T. & Co., Montreal.
Brunner, Mond & Co., Northwich, England.
Cassella Color Co., New York City.
Geigy Anilino & Extract Co., New York City.
Klipstein, A. & Co., New York City.
McArthur, Cornellio & Co., Montreal.
Winn & Holland, Montreal.

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.
Shaw, Willis, Chicago, Ill.

Electrical Supplies
Bristol Co., Waterbury, Conn.
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Electrical Construction Co., London, Ont.
Forman, John, Montreal.
Jones & Moore Electric Co., Toronto.
Packard Electric Co., St. Catharines, Ont.
Phillips, Eugene F., Electrical Works, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Worth & Martin, Toronto.

Elevators
Canadian Otis Elevator Co., Toronto.
Darling Bros., Montreal.
Jeffrey Mfg. Co., Columbus, Ohio.

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

Emery and Emery Wheels.
Canadian Corundum Wheel Co., Hamilton, Ont.
Forman, John, Montreal.
Hart Corundum Wheel Co., Hamilton, Ont.
Petrie, H. W., Toronto.

Engineers (Cement).
Wentz, R. F. Engineering Co., Toronto.

Engineers (Chemical.)
Heys, Thos. & Son, Toronto.
Hunt, Robert W. & Co., Chicago, Ill.

Engineers (Civil)
DeLano-Osborn Engineering Co., Toronto.
Kelsch, R. S., Montreal.
Parke, R. J., Toronto.
Vogel, C. H., Ottawa.

Engineers (Consulting)
DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Hunt, Robert W. & Co., Chicago, Ill.
Kelsch, R. S., Montreal.
Marion & Marion, Montreal.
Morgan Construction Co., Worcester, Mass.
Parke, R. J., Toronto.
Perrin, William R. & Company, Limited, Toronto.
Simpson, T. T., Deschenes, Que.
Vogel, C. H., Ottawa.
Von der Osten, E. & Co., Toronto.
Wentz, R. F. Engineering Co., Toronto.

Engineers (Contracting)
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Electrical Construction Co., London, Ont.

Engineers (Electrical)
Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.
Electric Engineering & Supply Co., Montreal.
Kelsch, R. S., Montreal.
Jones & Moore Electric Co., Toronto.
Marion & Marion, Montreal.
Toronto & Hamilton Electric Co., Hamilton, Ont.
United Electric Co., Toronto.
Worth & Martin, Toronto.

Engineers (Mechanical)
Babcock & Wilcox, Limited, Montreal.
Buhl Malleable Co., Detroit, Mich.
Carrier, Laine & Co., Lavis, Quebec.
Darling Bros., Montreal.
DeLano-Osborn Engineering Co., Toronto.
Electrical Construction Co., London, Ont.

Hunt, Robert W. & Co., Chicago, Ill.
Kelsch, R. S., Montreal.
Kerr Engine Co., Walkerville, Ont.
Marion & Marion, Montreal.
Morgan Construction Co., Worcester, Mass.
Robb Engineering Co., Amherst, N.S.
Sheldon & Sheldon, Galt, Ont.
Wentz, R. F. Engineering Co., Toronto.

Engineers (Mill and Hydraulic)
Buhl Malleable Co., Detroit, Mich.
DeLano-Osborn Engineering Co., Toronto.
Vogel, C. H., Ottawa.

Engineers (Mining.)
Buhl Malleable Co., Detroit, Mich.
Heys, Thos. & Son, Toronto.
Mills, S. D., Toronto.

Engineers (Municipal)
Von der Osten, E. & Co., Toronto.

Engineers and Contractors.
Buhl Malleable Co., Detroit, Mich.
Jeffrey Mfg. Co., Columbus, Ohio.

Engines and Boilers
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
Canadian Heine Safety Boiler Co., Toronto.
Cooper, Estate late James, Montreal.
Goldie & McCulloch Co., Galt, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Hyde Bros. & Co., Pittsburg, Pa.
Leonard, F. & Sons, London, Ont.
Petrie, H. W., Toronto.
Petroleum Iron Works Co., Washington, Pa.
Pittsburgh Shuffling Co., Detroit, Mich.
Robb Engineering Co., Amherst, N.S.
Shaw, Willis, Chicago, Ill.
Sheldon & Sheldon, Galt, 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
Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Exhaust Heads
Burt Mfg. Co., Akron, Ohio.
Darling Bros., Montreal.

Exporters
Canadian Export Co., Toronto.

Factory Sites
Central Ontario Power Co., Peterboro, Ont.

Food Water Heaters
Babcock & Wilcox, Limited, Montreal.
Darling Bros., Montreal.
Petroleum Iron Works Co., Washington, Pa.

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

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

Filters (Oil)
Babcock & Wilcox, Limited, Montreal.
Burt Mfg. Co., Akron, Ohio.
Darling Bros., Montreal.
Perrin, William R. & Company, Limited, Toronto.

Filters and Filtering Systems (Water)
Babcock & Wilcox, Limited, Montreal.

Fire Brick and Clay
Dunbar Fire Brick Co., Pittsburg, Pa.
Hamilton Facing Mill Co., Hamilton, Ont.
Pennsylvania Fire Brick Co., Lock Haven.
Scioto Fire Brick Co., Sciotoville, Ohio.
Wynn, W. H. & Co., West Decatur, Pa.

Forges and Blowers
Canada Foundry Co., Toronto.
Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Founders
Canada Foundry Co., Toronto.
Cowan & Co., Galt, Ont.
Gartshore-Thomson Pipe & Foundry Co., Hamilton, Ont.
Goldie & McCulloch Co., Galt, Ont.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Karch, H. W., Hospeler, Ont.

Foundry Facings and Supplies
Hamilton Facing Mill Co., Hamilton, Ont.

Fuel Economizers
Babcock & Wilcox, Limited, Montreal.

Furniture (Lodge, Opera and School)
Canadian Office & School Furniture Co., Preston, Ont.

Galvanizing
Ontario Wind Engine & Pump Co., Toronto.

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Advise with particulars.

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Cornwall, Ont.

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and Cream Laid and Wove Foolscaps, Account,
Envelope and Lithographic Papers, etc.

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Manufacturers of...

ORNAMENTAL IRON AND BRASS

Bedsteads

OF ALL KINDS.

WRITE FOR PRICES

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Galvanizing and Tinning Machinery and Furnaces (Wire)

Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., Cuyahoga Falls
Ohio.

Gas and Gasoline Engines

Goldie & McCulloch Co., Galt, Ont.
Morrison, T. A. & Co., Montreal.

Gas Producers.

Morgan Construction Co., Worcester, Mass.

Gauges (Recording Pressure)

Bristol Co., Waterbury, Conn.

Gauges (Steam)

American Steam Pump Co., Battle Creek, Mich.
Crosby Steam Gauge & Valve Co., Boston, Mass.
Penberthy Injector Co., Windsor, Ont.
Petrie, H. W., Toronto.
Williams, A. R., Machinery Co., Toronto.

Gauges (Water)

Babcock & Wilcox, Limited, Montreal.
Penberthy Injector Co., Windsor, Ont.

Generators

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

Storoy, W. H. & Son, Acton, Ont.

Government Notices

Factory Inspectors.
Minister of Agriculture.

Grease Cups

Penberthy Injector Co., Windsor, Ont.

Grinding Machinery

Canadian Corundum Wheel Co., Hamilton, Ont.
Hart Corundum Wheel Co., Hamilton, Ont.

Grinding Pans

Carlin's, Thomas Sons Co., Allegheny, Pa.

Hand Travelling Cranes

Morgan Construction Co., Worcester, Mass.

Hardware

Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cooper, James, Montreal.
Empire Machine & Metal Stamping Co., Toronto.
Garthshore, John J., Toronto.
Globe Machine & Stamping Co., Cleveland, Ohio.
Morrow, John, Machine Screw Co., Ingersoll, Ont.
Rice Lewis & Son, Toronto.
Ryall Machine Screw Co., Montreal.

Heating and Ventilating Apparatus

Darling Bros., Montreal.
Leonard, R. & Sons, London, Ont.
Sheldon & Sheldon, Galt, Ont.
Stevens, Alfred J., Toronto.
Sturtevant, B. F. Co., Boston, Mass.

Hoists (Chain and Pneumatic)

Canadian Rand Drill Co., Sherbrooke, Que.
Chicago Pneumatic Tool Co., Chicago, Ill.
Cooper, Estate late James, Montreal.

Hose (Fire and Pneumatic)

Chicago Pneumatic Tool Co., Chicago, Ill.
Gutta Percha & Rubber Mfg. Co., Toronto.
McLaren, J. C. Belling Co., Montreal and Toronto.

Hydrants

Kerr Engine Co., Walkerville, Ont.

Hydraulic Accumulators

Morgan Construction Co., Worcester, Mass.

Hydraulic Cranes

Morgan Construction Co., Worcester, Mass.

Hydraulic Machinery

Canada Foundry Co., Toronto.
Darling Bros., Montreal.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
Morgan Construction Co., Worcester, Mass.
Perrin, William H. & Company, Limited, Toronto.
Petrie, H. W., Toronto.
Wilson, J. C. & Co., Glenside, Ont.

Industrial Plants

Von der Osten, E. & Co., Toronto.

Insulated Wires and Cables

Wire & Cable Co., Montreal.

Iron and Steel Specialties

Abbott, William, Montreal.
Armstrong Mfg. Co., Bridgeport, Conn.
Bourne-Fuller Co., Cleveland, Ohio.
Brown & Co., Paris, Ont.
Buhl Malleable Co., Detroit, Mich.
Canada Foundry Co., Toronto.
Cleveland Twist Drill Co., Cleveland, Ohio.
Dodge Mfg. Co., Toronto.
Karch, H. W., Hespeler, Ont.
Leslie, A. C. & Co., Montreal.
Meadows, Geo. B. Wire, Iron & Brass Works Co.,
Toronto.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.
Petrie, H. W., Toronto.
Petroleum Iron Works Co., Washington, Pa.
Pittsburgh Shafting Co., Detroit, Mich.
Rice Lewis & Son, Toronto.
Ryall Machine Screw Co., Montreal.

Injectors

Canada Foundry Co., Toronto.
Hamilton Brass Mfg. Co., Hamilton, Ont.
Penberthy Injector Co., Windsor, Ont.
Williams, A. R. Machinery Co., Toronto.

Iron and Steel Inspection

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

Lamps—Electric

Canadian General Electric Co., Toronto.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Forman, John, Montreal.
Packard Electric Co., St. Catharines, Ont.

Lathes

Bertram, John, & Sons Co., Dundas, Ont.
London Machine Tool Co., London, Ont.
Petrie, H. W., Toronto.
Williams, A. R. & Co., Toronto.

Lathes (Wood-Working)

American Machinery Co., Grand Rapids, Mich.
Cowan & Co., Galt, Ont.
Goldie & McCulloch Co., Galt, Ont.
Petrie, H. W., Toronto.
Williams, A. R. Machinery Co., Toronto.

Lubricators

Penberthy Injector Co., Windsor, Ont.

Machinists.

Buhl Malleable Co., Detroit, Mich.
Goldie & McCulloch Co., Galt, Ont.
Worth & Martin, Toronto.

Machinists' Supplies

Armstrong Mfg. Co., Bridgeport, Conn.
Buhl Malleable Co., Detroit, Mich.
Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland, Ohio.
Cooper, James, Montreal.
Dodge Mfg. Co., Toronto.
Goldie & McCulloch Co., Galt, Ont.
Gutta Percha & Rubber Mfg. Co., Toronto.
Jeffrey Mfg. Co., Columbus, Ohio.
Morrow, John, Machine Screw Co., Ingersoll, Ont.
Petrie, H. W., Toronto.
Pittsburgh Shafting Co., Detroit, Mich.
Ryall Machine Screw Co., Montreal.
Worth & Martin, Toronto.

Machine Tools

Abbott, William, Montreal.
Bertram, John, & Sons Co., Dundas, Ont.
Cleveland Twist Drill Co., Cleveland, Ohio.
Darling Bros., Montreal.
Petrie, H. W., Toronto.

Malleable Iron Castings

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

Mechanical Draft

Babcock & Wilcox, Limited, Montreal.
Sheldon & Sheldon, Galt, Ont.
Sturtevant, B. F. Co., Boston, Mass.

Metal Gates

Pago Wire Fence Co., Walkerville, Ont.

Metal Shears

Morgan Construction Co., Worcester, Mass.

Metal Stamping

Empire Machine & Metal Stamping Co., Toronto.
Globe Machine & Stamping Co., Cleveland, Ohio.

Metallurgists.

Mills, S. D., Toronto.
Wontz, R. F. Engineering Co., Toronto.

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Mill Machinery and Supplies

American Machinery Co., Grand Rapids, Mich.
 Armstrong Mfg. Co., Bridgeport, Conn.
 Buhl Malleable Co., Detroit, Mich.
 Cleveland Twist Drill Co., Cleveland, Ohio.
 Cooper, Estate late James, Montreal.
 Cowan & Co., Galt, Ont.
 Darling Bros., Montreal.
 Dodge Mfg. Co., Toronto.
 Fleming, W. A. & Co., Montreal.
 Gartshore, John J., Toronto.
 Goldie & McCulloch Co., Galt, Ont.
 Gutta Percha & Rubber Mfg. Co., Toronto.
 Hamilton Brass Mfg. Co., Hamilton, Ont.
 Hamilton, Wm. Mfg. Co., Peterborough, Ont.
 Hay, Peter Knife Co., Galt, Ont.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Karch, H. W., Hespeler, Ont.
 Leonard, E. & Sons, London, Ont.
 London Machine Tool Co., London, Ont.
 Morrow, John, Machine Screw Co., Ingersoll, Ont.
 McLaron, D. K., Montreal and Toronto.
 Penberthy Injector Co., Windsor, Ont.
 Petrie, H. W., Toronto.
 Pittsburgh Shafting Co., Detroit, Mich.
 Rice Lewis & Son, Toronto.
 Robb Engineering Co., Amherst, N.S.
 Ryall Machine Screw Co., Montreal.
 Spence, R. & Co., Hamilton, Ont.
 Wilson, J. C. & Co., Glenora, Ont.

Mining Machinery

Buhl Malleable Co., Detroit, Mich.
 Canadian Hand Drill Co., Sherbrooke, Que.
 Chicago Pneumatic Tool Co., Chicago, Ill.
 Cleveland Twist Drill Co., Cleveland, Ohio.
 Cooper, Estate late James, Montreal.
 Gartshore, John J., Toronto.
 Hamilton, Wm. Mfg. Co., Peterborough, Ont.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Perrin, William R. & Company, Limited, Toronto.
 Petrie, H. W., Toronto.
 Shaw, Willis, Chicago, Ill.
 Williams, A. R. Machinery Co., Toronto.

Motors and Dynamos

Canadian General Electric Co., Toronto.
 Canadian Westinghouse Co., Ltd., Hamilton, Ont.
 Electrical Construction Co., London, Ont.
 Forinan, John, Montreal.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Jones & Moore Electric Co., Toronto.
 Petrie, H. W., Toronto.
 Toronto & Hamilton Electric Co., Hamilton, Ont.
 United Electric Co., Toronto.

Moulding Sand

Hamilton Facing Mills Co., Hamilton, Ont.

Novelty Manufacturers.

Worth & Martin, Toronto.

Nozzles.

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

Office and Bank Fittings

Canadian Office & School Furniture Co.,
 Preston, Ont.
 Meadows, Geo. B., Wire, Iron & Brass Works Co.,
 Toronto.

Oils and Lubricants

Chicago Pneumatic Tool Co., Chicago, Ill.
 Dixon, Jos., Crucible Co., Jersey City, N.J.
 Fleming, W. A. & Co., Montreal.
 Hart & Co., Chicago, Ill.
 Imperial Oil Co., Petrolia, Ont.
 Queen City Oil Co., Toronto.

Oil Cloth

Dominion Oil Cloth Co., Montreal.

Oil Cups

Penberthy Injector Co., Windsor, Ont.

Paints and Colors

Bellhouse, Dillon & Co., Montreal.
 Fleming, W. A. & Co., Montreal.
 Geigy Aniline & Extract Co., New York City.
 Lipstein, A. & Co., New York City.
 McArthur, Cornelle & Co., Montreal.

Paper Manufacturers

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

Patents

Budden, Hanbury A., Montreal.
 Case, Egerton R., Toronto.
 Fotherstonhaugh & Co., Toronto.
 Marion & Marion, Montreal.
 Patent Exchange & Investment Co., Toronto, Ont.

Pattern Makers' Machinery and Supplies
 American Machinery Co., Grand Rapids, Mich.

Pattern Shop Equipments

American Machinery Co., Grand Rapids, Mich.

Perforated Metals

Greening, B. Wire Co., Hamilton, Ont.

Personal Accident

Canadian Casualty & Boiler Insurance Co.,
 Toronto.

Phosphorizers.

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

Pig Iron

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

Pipe (Riveted, Iron and Steel)

Babcock & Wilcox, Limited, Montreal.
 Petroleum Iron Works Co., Washington, Pa.

Pipe Threading Machines

Armstrong Mfg. Co., Bridgeport, Conn.
 Butterfield & Co., Rock Island, Que.
 Petrie, H. W., Toronto.
 Rice Lewis & Son, Toronto.

Pipes and Tubes

Abbott, William, Montreal.
 Bourne-Fuller Co., Cleveland, Ohio.
 Canada Foundry Co., Toronto.
 Gartshore-Thomson Pipe & Foundry Co., Hamilton,
 Ont.
 Montreal Pipe Foundry Co., Montreal.
 Rice Lewis & Son, Toronto.

Plaster

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

Plates

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

Plumbago

Hamilton Facing Mills Co., Hamilton, Ont.
 McCullough-Dalzell Crucible Co., Pittsburg, Pa.
 Pittsburg Crucible Works, Pittsburg, Pa.

Pneumatic Tools

Canadian Hand Drill Co., Sherbrooke, Que.
 Chicago Pneumatic Tool Co., Chicago, Ill.

Pointer Rolls (For Rods and Wire.)

Morgan Construction Co., Worcester, Mass.
 Turner, Vaughn & Taylor Co., Cuyahoga Falls,
 Ohio.

Portland Cement

Canadian Portland Cement Co., Deseronto, Ont.
 Owen Sound Portland Cement Co., Owen Sound,
 Ont.
 Rathbun Co., Toronto.
 St. Lawrence Portland Cement Co., Montreal.

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Bourne-Fuller Co., Cleveland, Ohio.
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Gutta Percha & Rubber Mfg. Co., Toronto.
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Smith Mfg. Co., Toronto.
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Bristol Co., Waterbury, Conn.

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Syracuse Smelting Works, Montreal.

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Cooper, Estate late James, Montreal.
Leslie, A. C. & Co., Montreal.

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Slingsby, H. C., Montreal.

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Trucks (Wire Mill Supplies)

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

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Globe Machine & Stamping Co., Cleveland, Ohio.

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Canada Foundry Co., Toronto.
Hamilton, Wm. Mfg. Co., Peterborough, Ont.
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Typewriters and Supplies

United Typewriter Co., Toronto

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American Steam Pump Co., Battle Creek, Mich.
Babcock & Wilcox, Limited, Montreal.
Canada Foundry Co., Toronto.
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Kerr Engine Co., Walkerville, Ont.
Petrie, H. W., Toronto.
Williams, A. R., Machinery Co., Toronto.

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Morgan Construction Co., Worcester, Mass.
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Leslie, A. C. & Co., Montreal.
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Wire & Cable Co., Montreal.

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Wire Fencing and Netting

Page Wire Fence Co., Walkerville, Ont.

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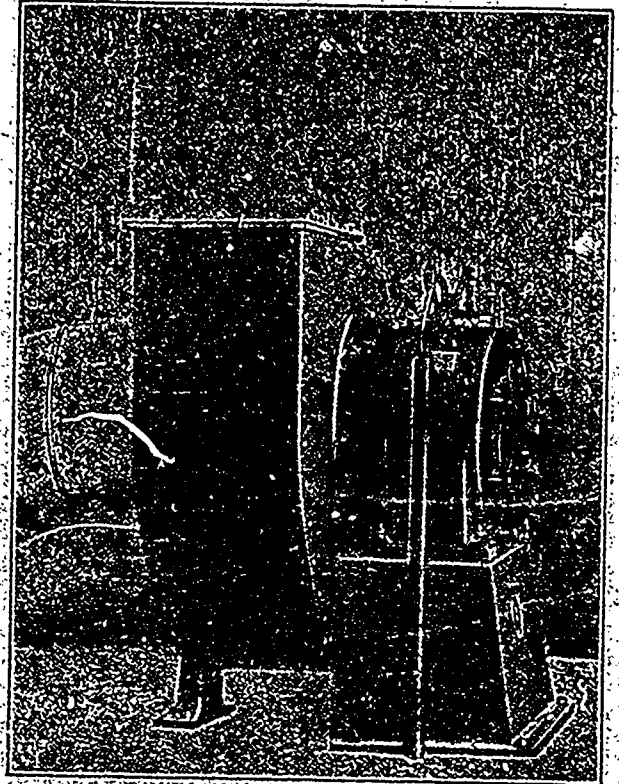
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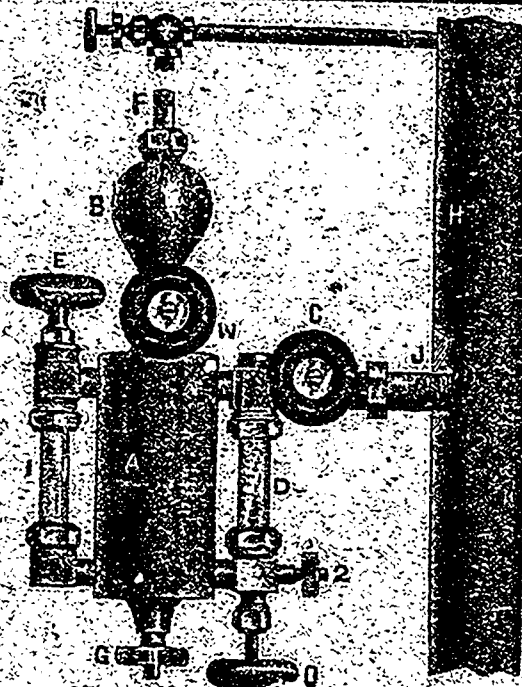
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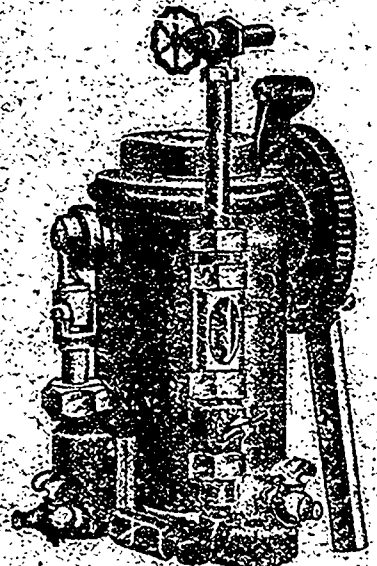
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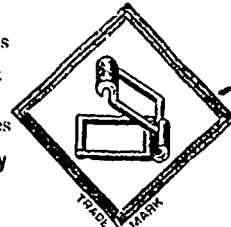
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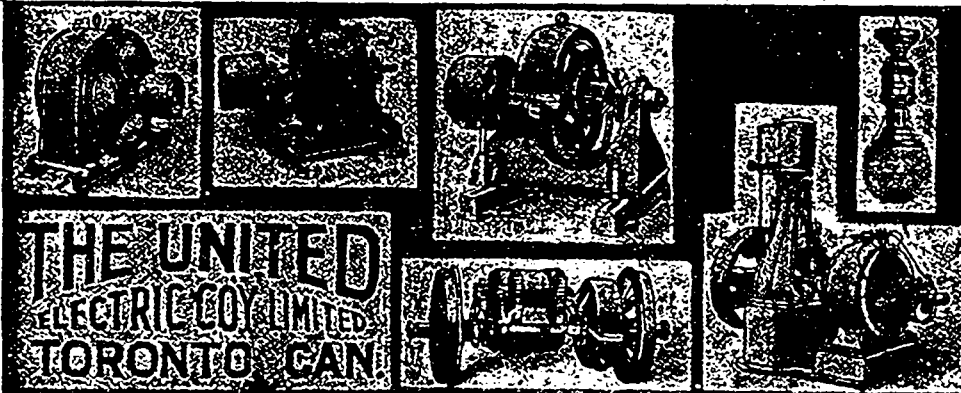
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