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The Canadian Engineer

VOL. I.—No. 12.

TORONTO AND MONTREAL, APRIL, 1894.

PRICE, 10 CENTS
\$1.00 PER YEAR.

The Canadian Engineer.

ISSUED MONTHLY IN THE INTERESTS OF THE
MECHANICAL, ELECTRICAL, MARINE, LOCOMOTIVE, STATIONARY
AND SANITARY ENGINEER, THE MANUFACTURER, THE
CONTRACTOR AND THE MERCHANT IN THE
METAL TRADES.

SUBSCRIPTION:

Canada and the United States, \$1.00 per year, Great Britain, 5s. Advertising rates on application.

Offices: { 62 CHURCH ST., TORONTO.
FRASER BUILDING, MONTREAL.

E. B. BIGGAR, PUBLISHER R. R. SAMUEL, BUSINESS MANAGER
Fraser Building, Montreal.

Toronto Telephone, 1392. Montreal Telephone, 2589.

All editorial correspondence should be addressed to the Montreal Office.

PRESSURE on our advertising space this month has compelled us to hold over a quantity of news and editorial matter. This we hope to remedy for the future by an enlargement of the paper.

INTENDING advertisers will do well to read the article headed "Ourselves as others see us." Next month begins our second volume, and the initial number of the new year will be an interesting issue. Among other illustrations there will be portraits of the officers and members of the Canadian Society of Civil Engineers, with views of their headquarters, etc. The CANADIAN ENGINEER will next month be permanently enlarged by four pages.

AMERICA VS. BRITAIN.

The notable feature nowadays in buying metals is the great change that has taken place in the market. Formerly Scotch warrants practically made the price of pig iron for the world, and English manufacturers of bar and other iron did the same in their special lines of business. So far as this country and the United States are concerned, these markets are no longer the only factor. At present the United States makes the price for most leading lines that until within a very late period came either from England, Scotland or Germany. The following very important articles now are nearly all obtained from the United States: Lead, copper, zinc, hoop-iron, steel boiler plates, wire, pig-iron and gas-pipe, with probably other minor articles. It is true that some of these have not yet reached Montreal, but the Ontario market is in the hands of the Americans. The question with many is—Will this last? In the opinion of some very shrewd buyers who have largely taken advantage of the very low American prices, it will. There is ample room, however, for a difference of opinion on this point. Everybody knows that the prices prevailing in the United States are unprecedented for that country, and for that matter nearly all other countries. The question to be settled is whether, when trade revives in the U. S., prices may not rise and the Americans become indifferent to the Canadian market. Another item that might have been mentioned is chain. In this the English imagine themselves to be impregnable. The Americans think not, and are now canvassing this market for business. One advantage that cannot be ignored in favor of buying the metals named from the Americans is the prompt attention given to

orders, whereas many English manufacturers consider this of no consequence whatever. Orders are entered in their books and shipment is made when it suits their convenience, not that of the buyer. It would be well for many English manufacturers to make a large note of this, and to act accordingly. Price alone has not caused them to lose trade, but the indifferent manner in which buyers are treated. We are confident that other things being equal, it is the desire of Canadian buyers or consumers to maintain relations with English houses, but the present condition of affairs is such that if they wish to hold their trade they must wake up. It is not the first over-sea market some English manufacturers and merchants have lost forever by their deep-rooted conservatism and prejudice, or both.

In conversation with a representative of this journal, a leading metal merchant of Montreal observed that this was a subject which he and others had more than once brought to the notice of British shippers, urging them to greater promptitude and closer attention to the needs of customers. As a rule the Americans are quick to adapt themselves to the special requirements of new customers, and certainly just now they are making a most successful invasion of the Canadian market. One might think that Tennyson's appeal, "Britons, hold your own!" had been written with a prevision of the present condition of the Canadian metal market.

DARTMOUTH, N. S., WATER WORKS.

A comprehensive paper by F. A. Creighton was read last month before the Canadian Society of Civil Engineers, upon the "Dartmouth, N.S., Water and Sewerage Works." The water is brought from Lamont and Topsail Lakes, which are about three miles north-east of the town, and are at an elevation of 225 feet above the mean tide level of Halifax harbor, and have a combined watershed (exclusive of the lakes themselves) of 538 acres. Lake Lamont has an area of 22 acres, and Lake Topsail 141 acres. They are capable of supplying to the town 750,000 gallons per diem, while for the present 250,000 is all that will be used. The storage capacity is 234,000,000 gallons. The efficiency of these lakes may be more than doubled as soon as necessity arises, by the addition of Loon Lake, which is distant from Topsail about 1,500 feet. This lake belongs to a different watershed from Topsail Lake. It was the reservoir of the old Shubenacadie canal, and is some three feet lower than Topsail. Before connecting Topsail and Loon Lakes the water level of Loon would of course have to be raised, which could be done by means of a dam about 150 feet long at the outlet, at a cost of \$500. It is proposed to connect the lakes by a 24-inch crock pipe, laid so as to take the overflow of Loon Lake. This pipe, when laid as proposed, can deliver, running full, some 2,600,000 gallons per diem, thus largely increasing the available water supply. The total cost of the connection is estimated at \$5,000.

The main pipe from the lakes to the town is 12,600 ft. long. It starts from the gate house with 20 in. pipe, which continues for about half a mile, when it is reduced to a 12 in., which runs a distance of 9,300 ft. to

the town. In the line there are 3 blow offs and 3 air cocks. For a distance of 800 ft. just before the end of the 20 in. pipe, there is a hill rising above the lake level; this had to be cut through to a depth of 23 ft. in order to get the pipe down to grade. At a place 1,300 ft. from the lake the trench bottom was found to be too soft to lay the 20 in. pipe on; so a platform of 2 in. plank was built for a distance of some 75 ft.

There are 25 hydrants, made by the Burrell-Johnson Iron Co., Yarmouth, N.S. The house connections are all made with $\frac{1}{2}$ in. lead pipe weighing 7 lbs. to the yard, and costing when laid in the trench about 12 cts. per foot. The service-pipes were laid to a depth of 5 ft., which, in Dartmouth, appears to be below the frost level. The sewerage system is divided into three sections, each having its own outfall. The principal outfall is a 20x30 in. concrete block, egg-shaped sewer, extended out into the harbor 30 ft., with a circular wooden box 30 ins. in diameter. Wherever two or more sewers meet there is a manhole, and every change of grade a lamphole and ventilator. The catch basins, of which there are 42, were designed by E. H. Keating, and are connected with the sewer by a 9 in. pipe, there being always a good fall. All catch basins and manholes are made of concrete.

A SURVEYOR'S OBSERVATIONS AND OPINIONS.

BY L. V. RORKE, D.L.S.

This paper, though containing my own ideas from a personal standpoint, I feel is but a repetition of what has been read time and again before you. If the title, a surveyor's "observations," were presented to a surveyors' association, they would look for a discourse on the magnitude, distance, and relative position of the polar star, sun, moon, or some other planet. But when presented to a mining association, it is expected that their minds will be directed to things that are earthly, if not "rocky."

The history of mining regions is very different, and seldom has the history of one been identical with that of another. Some mining districts have been developed soon after discovery and on a large scale, producing handsome rewards to the promoters and investors in a very short time. Others have been discovered and worked by slow stages, although drawing attention the wide world over, and still drag out a weary and lifeless existence over an extended period before thorough and practical operations take place, if ever. Amongst the latter kind are those that have not sufficient paying mineral to make them mining districts, and those that have good mineral in abundance, and are also comparatively easy of access, with many natural facilities, but which for some reason or reasons do not come to the front as mining districts in the true sense of the word, with scenes of bustling activity in practical work, and the smoke rising from hundreds of mines throughout their extent. Under this head the mining districts of Algoma and Nipissing must at present be classed.

The reason why this state of affairs exists in these districts will be fully discussed in other papers. I will confine myself, therefore, to a few of the observations made during the past few years. Almost all discoveries have been made in the "brulé," for the simple reason that the part of the country burnt over is much easier prospected than in the green bush. It is for the same reason, no doubt, that the great territory lying

between here and Hudson's Bay is yet unexplored, though we are led to believe from reports, both official and private, that it is not less rich in the more valuable minerals than our own immediate vicinity. It is quite evident that the majority of prospectors prefer to go upon and explore lands readily accessible to the outside world, and from which they can escape periodically and rest from their arduous life and refresh their wearied limbs. Nor is it to be wondered at either that they seek the best finds nearest to railway or steamboat communication, when such are the ones that most readily attract the attention of investors. However, I think that a sally into these more remote regions to the north will repay any prospector. There he will to a certain extent be on territory of his own. At least, he need have no fears of previous claims on any discoveries he may make. He would also be entitled to the benefit of sub-section 3, section 4, of the Mines Act, 1892, that gives exemption from royalty for fifteen years. If even by the sacrifice of one rich claim he induces capital to come to his aid, and a railroad is built into his now explored territory, he can hold or dispose of his other finds to advantage.

Many pass through this district hurriedly, and carry away the impression that to build twenty or thirty miles of railway means more than most mines are worth. True, air lines through this rugged country would be gigantic undertakings, but these are only necessary on short lines making seaboard connections over which through traffic passes, with a view of rapid transit, and even then would not repay the extra expenditure did not competition render it absolutely necessary. But very different are the requirements of a line to freight ore, timber and other natural products of this northern district. I do not think I have observed any territory where it would be more difficult to build a road than that traversed by the Canadian Pacific Railway. Then again, this twenty or thirty miles of road into unexplored territory would be the tapping of lands still more remote, and eventually pay as handsome a dividend as the mines to which it would act as an outlet.

WATER POWERS.

Whatever ideas one may form regarding the building of railways by a hurried look over the country, he cannot but notice the numerous water powers throughout its extent. Even without leaving the railway coach he can observe, while crossing the Spanish, Vermillion and Onaping rivers, a few of the great falls that occur along the different streams. It may be a glowing picture of the future, but I believe that ere long, in this fast advancing age of electricity, we shall see these several powers used for the generating and transmission of electric currents throughout the district, to the various mines and works, thus lessening the cost of mining, separating and shipping the ores of the country. We are frequently asked by outside parties who have heard of this part of Ontario as a mining district, what kinds of mineral are found here? Generally we reply by naming the most common, such as nickel, gold, copper and iron, without referring to the different other metals, some of recent discovery. Well, and are all these in paying quantities? is the next enquiry, which brings an answer somewhat as follows: They are not yet fully developed; the district is new, but judging from such development as has been done, from the tests made for finding the different ores, and comparing the results with other mining fields, there is a very encouraging

outlook for mining in the future, and especially of nickel and gold. Why, then, is this development so slow, and why are capitalists so unobservant of the attractions here for mining investments? As an example, let us look at some of the gold claims worked in other places as compared with those in this district.

OTHER GOLD FIELDS.

The Homestake mine in the Black Hills yields only \$3.79 in gold, and after reducing leaves a profit of \$1.19 per ton. The second annual report for the year ending May 31st, 1892, of the Treadwell mine, Alaska, shows a profit of \$361,000 earned during the year on an average yield of \$2.95 per ton. The Haile gold mine, South Carolina, yields only about \$4.50 per ton, while here we have several quartz veins yielding from \$10 to \$100 per ton that remain unworked. True, in many cases the gold may be associated with refractory ores which increase the cost of production to double or even treble the amount had it been free milling quartz, but even this should leave a handsome profit. These mines above referred to of course have large bodies of ore, as would indeed be necessary where the yield was so small per ton.

Why then this slow progress to mining activity here? It cannot be that there is no demand for gold. That we all know is next to an absurdity. Is it because those gold mines are on American lands and these on Canadian, and that capitalists are more ready to invest under their own flag than in foreign countries? Is it that the enterprise and energy of the people make mining a greater success there than here? Is it that capital, which is in demand at present throughout the civilized world, has so many chances for investment which have not the risks pertaining to mining enterprise, that it is hard to attract it for this purpose?

OUR NICKEL MINES.

A careful inspection of the various nickel deposits will show that nickel mining is bound to be the principal industry on this range. The enormous size of the deposits, which never can be fully estimated, makes it certain that if the demand for this metal is sufficient the mining of it will at once become a necessity, and do away with the ordinary risks involved in mining generally. It is quite evident that most of the development work done is not what it should be, as an inspection of many claims opened up will show. Two or three men will set to work and sink a hole five or ten feet deep, then considering the property developed, go in search of a purchaser. Nine times out of ten the purchaser will give no more for a property in that shape than when it was found, and he is very liable to turn away disgusted at first sight, having reached there over a long and tiresome trail through the woods, expecting to find a fully developed mine. Of undeveloped claims, too, glowing accounts are often given by the discoverer, and one of the greatest drawbacks in making a sale of a good property is leading the intending purchaser to believe there is more ore to be found, and of a better quality than there really is. Rather under-rate a property, and if it is found to bear out your reports, you have gained the confidence of the party with whom you are negotiating, and turned the tide in favor of not only your own, but also of properties in the vicinity. There is an excuse, however, for those who, not pretending to know, or not knowing the valuable minerals at sight, accidentally, or otherwise, find what they suppose to be valuable, and wish to create a wonderful impression of their discovery.

Of these people, the Indian is the most wily, and they have yet to learn that well known proverb "that all is not gold that glitters." More than one of us have been led by them over long trips of more than one day's journey, our hopes buoyed up with brilliant accounts of the glistening gold and silver we were about to see. But after reaching the place, and viewing some shining mica specks in a granite boulder, or probably a small deposit of galena, we retrace our steps with a resolution never to be again led astray, yet only to be broken on the first opportunity.

A PECULIAR RANGE.

The prospector or expert coming into these mining fields expecting to follow the rules and instructions as laid down in the different works on geology, will be at a loss trying to reconcile his observations with his former ideas. He will find quartz veins, bearing gold and silver, running from the centre to all points of the compass, and not in those running in any particular direction need he confine his search for the precious metal. He will find rock matter which will puzzle him to place in any of the different classes he has heard of. He will find a mixture of minerals in the same rock which he would have thought impossible to be so closely associated; and he will find, if his observations are anything like those of the writer, that he must adopt rules of his own, or follow at least the thread of his own observations independently of what may have been his former opinions. I do not mean to convey the idea that there is no rule or idea worth following in the search for minerals here, or in the examination of properties. But I do say that these ideas can only be formed and carried out by those who have studied closely the physical features of the district and have observed closely the manner in which the minerals occur.

A WIDER FIELD.

In conclusion, I would draw your attention to a wider field than our own immediate vicinity. It is more than probable that the globe could be travelled over and the several countries examined superficially without finding as varied a surface in as small a territory as we have right here in our own Province of Ontario. The valley of the Lower Ottawa, with the agricultural plateaux extending for miles back; the eastern portion of the province, with its flat rocky limestone ridges showing their faces to the sun, or clad with a light covering of soil; the fine agricultural fields of the western portion of the province, whose soil and soft material in many places have yet to be fathomed; and that portion of the northern peninsula especially favored with boulders during the glacial period, Muskoka, with her hardwood ridges, Laurentian rocks, and beautiful inland lakes.

Nipissing and Algoma, with Laurentian and Huronian rocks, mineral belts, clays and sands, hills and valleys, lakes and muskegs, spruce and tamarac swamps, and pine-clad mountains; western Algoma and Rainy River, with their richly pocketed rocks, fine rivers, water powers and thickly-wooded lands, all go to make up the varied and finished surface which nature has favored us with.

What agriculturist could not be satisfied with Western Ontario, the Ottawa valley, or the fertile belts throughout this northern country? What mineralogist or mining investor cannot find fields of labor or investments in the gold and nickel ranges of Algoma and Nipissing? In Eastern Ontario's phosphate, iron and

quarry beds, or in the oils and gases of Western Ontario? Where will the artist find landscape views to satisfy him better than in Muskoka and Northern Ontario, or where can the physical features of any country afford a better field of labor in advancing, promoting and benefiting the commercial and industrial pursuits which can be undertaken.

CANADIAN IRON INDUSTRY.

BY GEORGE E. DRUMMOND, OF THE CANADA IRON FURNACE COMPANY.

(Concluded.)

The utilization of the hard and soft woods of our forests, at present waste material, would be of incalculable benefit to the Provinces of Ontario and Québec, and, above all, to the agriculturists of these provinces.

Next to the farming class the railways of Canada would perhaps be the greatest gainers by the establishment of an iron industry.

In the case of the Government railway, the Intercolonial, it is safe to say that the combined operations of the Londonderry Iron Company, the New Glasgow Iron, Coal and Railway Company, and the Nova Scotia Steel and Forge Company, furnish one-fifth of all the freight business of the railway in question.

The Piles branch of the C.P.R., on which the works of the Canada Iron Furnace Company are located, is perhaps the best paying piece of line possessed by that great trans continental road, and this is very largely due to the fact that every pound of raw material inwards to the furnace, and finished product outwards to the market, contribute to the revenue of the railway company.

It is plain that any policy that would serve to cripple these iron industries will be severely felt by the railways. Perhaps the greatest difficulty that has stood in the way of the advancement of the Canadian iron industry up to the present time has been the uncertainty of the tariff, and political cries of "Commercial Union," "Unrestricted Reciprocity," "Free Trade," and "Revenue Tariff" have served to frighten capitalists, so that the Canadian iron masters have found it very difficult to obtain investors for the carrying forward of the work on a proper basis. When the difficulties are all considered, it is remarkable that the industry has reached even its present stage.

The United States at the present time presents an example of what uncertainty regarding tariff changes will do. During the past six months business has been completely demoralized in the iron trade of the Republic by the fear of a possible change in the duties. This in the face of the fact that both parties in Congress are known to be more or less protectionist in theory and practice, the difference being only one of degree, whereas in Canada politicians are most extreme in their views, and the battle against protection to native industries has been waged in and out of Parliament during all the term that the so-called National Policy has been in existence.

With such a nucleus as the existing establishments afford, with unlimited supplies of raw material, and possessing the best of all markets—a home market—the Canadian iron industry cannot fail to expand rapidly and safely—probably, as in the case of the United States, much more rapidly than the population, if only the Government of Canada will establish confidence in the minds of capitalists by, in some manner, giving a

degree of permanency to the present protective tariff. Minor details will from time to time require adjustment, but the broad principle of protection to an industry for which Nature has so eminently fitted the Dominion, must be endorsed by both Government and Opposition, giving a fair period of time in which to secure a full development of the industry, so that it may meet, on something like equal terms, the opposition of its powerful competitors in the United States and Great Britain. Without this the industry will be restricted, and in times of depression such as the present, the iron masters of the United States will simply unload their bankrupt stocks into Canada, with the end that a healthy Canadian industry will be an utter impossibility.

It is a notable fact that during the past four years the increased output of the Canadian furnaces has led to a decreased cost of production per ton of iron, and Canadian makers have now forced foreign agents to lower their prices fully \$3 per ton from prices asked four years ago. A well-maintained tariff for some years to come will have exactly the same tendency as it had in Great Britain and the United States, viz., to strengthen and expand the native industry to the point where Canadians can control the entire trade of the country, and yet sell to the consumer at as low a price as any foreign competitor can do in his own country.

Location.—The question of the proper location of coke and charcoal furnaces will be settled by the natural fitness of each province. Nova Scotia, possessing as she does a great wealth of mineral fuel, must continue for some years to come to produce the coke iron required by the country. It may be urged that she is far removed from her best market, viz., Ontario. However, Nova Scotia is in quite as good a position in this respect, and ought to be, in regard to freight rates, as her present greatest competitors, viz., the furnaces of the Southern United States. Within the past two years Nova Scotia has made great progress in the erection of modern plants and improved appliances. She must continue on this course, for the time is past when iron can be successfully produced without improved appliances both in construction and modern methods of operation. The blast furnace must meet the consumers' wants in quality of iron and mechanical knowledge, and administrative ability must be joined together in Canada just as in the United States, to secure the increased output, and the high quality of iron which the times demand. Quebec and Ontario afford a splendid field for the development of the charcoal and iron industry, and this department will become more and more important as the forests of the neighboring Republic and Sweden are depleted.

It is hardly feasible under existing circumstances to successfully establish coke furnaces in either Ontario or Quebec, inasmuch as these provinces would have to depend upon importing their supply of fuel from the United States. Such an industry would be of little value to the provinces or the Dominion, inasmuch as by far the largest proportion of labor required in the manufacture of iron is that connected with the mines, both coal and iron. Certainly the Government would not be warranted in granting a bounty for the establishment of an industry contributing as largely as this would to the labor of our most important competitor, the United States.

There is a reasonable hope that in due time Nova Scotian coal will be profitably coked at Montreal, and other centres of population, through the utilization of

by-products. When that time comes Ontario and Quebec will be in a position to operate blast furnaces economically with mineral fuel, the product of Nova Scotian mines, thereby adding another link to strengthen the Confederation of the Canadian provinces.

For the immediate future the charcoal iron industry offers the best and surest field of operation and investment to the provinces of Ontario and Quebec.

A full and unbiased investigation into all the facts concerning the successful establishment of the iron industry in other countries, and of the circumstances attending the work already done in Canada, leads to the following conclusions: First.—That the Canadian iron industry has greater and more just claims to the good will and support of the Government and people of Canada than, perhaps, any other of the great industries of the country. In tobacco, sugar and cotton, splendid progress has been made, yet these industries, whilst of unquestionable benefit to the country, all contribute more or less to the labor of foreign countries, by using raw materials of foreign growth, for which nature has not fitted Canada. The iron industry is altogether different, being purely Canadian from raw material to finished product. Nature has richly endowed Canada with everything that goes to make success in this special line of enterprise. It rests with the Government and people of the Dominion to foster the industry to a perfect development.

Second.—The Dominion Parliament must immediately adopt a course that will give confidence to investors, by demonstrating that the protective tariff and bounty will be well maintained for some time to come. The Government must rectify judiciously any errors that may have arisen, and must seek, at least approximately, *to grant a uniform protection to labor, in whatever branch of the industry it may be employed*, be it at the mines, furnace, rolling mill, iron foundry, or machine shop.

Third.—The Provincial Governments must take steps immediately to encourage, by every reasonable concession, the development of the iron industries now within their respective borders.

In Quebec and Ontario, every facility should be granted by the Provincial Governments in the way of privileges for the clearing of hard and soft woods from Crown lands. This course will not only strengthen and build up the charcoal iron industry, but will bring about a rapid settlement of Government lands.

Hitherto settlers have avoided the forest lands of the East in favor of the more easily cultivated prairies of the West. Establish the charcoal iron industry in Quebec and Ontario, and the settler will find a sure and profitable return for labor expended in clearing the wood, and the inducement will make the bush lands of these provinces more attractive than the prairies of the West.

The section of the different provincial mining laws, providing for a proper expenditure in the development of mining locations within a given time, should be strictly enforced, and if possible the obligations made even more stringent than at present, so as to ensure a fair amount of work being done promptly, and prevent as much as possible the "locking up" of valuable mines by speculators.

Where the owners of locations are too poor to carry on the work of development in a proper manner, then the Provincial Government should do so by some

equitable arrangement with the owner. For this purpose the Provincial Legislature should vote in each year's supplies a reasonable sum of money. This would serve to bring about a business-like development of some very valuable mines that now lie dormant, and must in time bring a very profitable return to the Government by the settlement of Crown lands.

Further it would tend to prove to capitalists that the ore supplies are all that they are claimed to be, and ample for all requirements.

The Provincial Governments require to deal with the whole question in a business-like manner, strictly enforcing laws that will tend to an early development, but at the same time they must be heartily in accord with the Dominion Government in granting every legitimate encouragement and facility that will tend to build up so valuable an industry.

Fourth.—Canadian bankers, capitalists, and men of affairs generally will do well to give the native industry more attention in the future than they have in the past. An industry that is peculiarly Canadian in every branch, drawing all its wealth from Canadian soil, is surely worthy of their legitimate support. The fact that the earlier iron industries of this country failed to succeed under the most adverse circumstances, is no reason why, under existing conditions, undeniably more favorable, the industry cannot be made a thorough success, not alone affording a great field for safe investment of capital, but indirectly benefiting other existing Canadian industries and interests, aiding towards increased population and national wealth.

Let the Canadian Government and people go steadily onward, and by every energy and sympathy build up great national industries and interests, neither doubting themselves nor their resources, but rather cultivating in every department of trade and commerce and in the hearts of the people that national pride in national products so characteristic of Englishmen and Americans. Following such a course, Canada must soon develop, not only in her iron industries, but in every department of national life.

SOME arrangements have lately been made for the convention of the National Association of Fire Engineers, to be held in Montreal from August 14th to 17th. The Victoria Rink will probably be used as an exhibition building, and the meeting will be held in the Windsor Hotel. Between three and four hundred delegates are expected to attend, and arrangements have been made with the hotels and railroad companies. This is stated to be the first convention held out of the United States. Henry A. Hills, Cincinnati, is secretary to the association.

OUR CIRCULATION.

OFFICE OF MONETARY TIMES PRINTING CO.

This is to certify that we have printed and mailed TWO THOUSAND copies of THE CANADIAN ENGINEER for the month of March.

MONETARY TIMES PRINTING CO.
OF CANADA (LIMITED).

Per A. W. LAW, Sec.-Treas.

Toronto, April 1, 1894.

For THE CANADIAN ENGINEER.

THE CHARGE OF THE BOILER BRIGADE.

AFTER TENNYSON (A LONG WAY).

Eighty pounds, ninety pounds,
The steam gauge points onward,
Fireman has orders
To raise to a hundred.
"Steam up," the boss has said.
"Fire strong! don't be afraid,
Those boilers are good," he said,
"Good for a hundred."

Forward points the trusted gauge
(Of which no test since new was made),
Not tho' the fireman knew
'Twas heavy half hundred,
His not to make reply,
Hi' weights on valves to lie,
His to get steam up high,
Up to the hundred.

Leaks start to right of him,
Leaks start to left of him,
Tubes start in front of him—
Noise like to thunder!
Strained by the pressure borne,
Slight stays from rivets torn,
Under the weak boiler shell
Fires glare like mouth of Hell—
Death hovers all around,
Gauge points to hundred.

Flashed all the bright steel bare,
Flashed in the sunlit air,
While strong willing workers there
Dazed by the frightful sounds,
Trembled and wondered!
Plunged then in hissing steam,
Crushed by the falling beam,
Fathers and brothers;
Death stills the piercing screams
Of loved ones sundered,
Caused by that rotten shell
Thought good for a hundred!

Shrieks to the right of them,
Shrieks to the left of them,
Shrieks all around them,
And moanings unnumbered—
Crushed by the walls that fell,
Who can their torture tell?
They who had toiled so well,
Now in the jaws of Death,
Caused by that rotten shell
Thought good for a hundred!

Whose be the honored name?
Who to the world proclaim?
As fearless to right this wrong,
For justice has slumbered!
Weed out those rotten shells—
Boilers that boom death knells,—
Replace them with boilers strong,
And good for a hundred!

St. John, N.B., Feb, 1894.

W. J. COLESTON.

NOVA SCOTIA COAL OUTPUT

We are favored by R. Drummond, editor of the *Stellarion Journal*, who has special facilities for ascertaining correct data, with a report of the output of the Nova Scotia collieries for the past year. Referring to some previously published figures, the accuracy of which was challenged, Mr. Drummond says:

The figures as published by the *Journal-News* I admit are not accurate so far as they relate to the collieries operated by the Dominion Coal Company. The figures at first received from the officials of that company either did not include the land sales for 1893, or omitted wholly the sales for the first quarter of the year, during which period the collieries were operated by other owners. The *Journal* gave the shipments for 1893 from the collieries operated by the Dominion Coal Company as some fifteen hundred tons

less than the shipments from the same collieries in 1891. This was due to the reason above given. Instead, however of being less, the statement below will show that the shipments, the quantity on which the company will pay royalty, were 7,051 tons in excess of 1891. First let me give the figures from the several collieries for 1893:

Name of Colliery.	Shipments 1892.	Shipments 1893.
Springhill ..	361,984	391,000
Joggins ..	58,535	82,200
Sundries ..	2,128	2,000
Acadia } ..	218,103	80,775
Albion } ..		98,144
Vale } ..	185,929	65,858
Intercolonial ..		210,000
Bridgeport* ..	31,328	41,700
Caledonia* ..	107,200	154,908
Gardiner* ..	39,485	27,316
Glace Bay* ..	93,690	116,579
Gowrie* ..	138,413	113,430
International* ..	105,479	113,653
Reserve* } ..	135,836	174,613
Emery* } ..		
Victoria ..	108,332	95,345
Sydney ..	164,078	195,092
Sundries ..	2,414	1,000
Total ..	1,752,934	1,968,613

The totals show that the shipments of '93 exceeded those of '92 by no less a quantity than 215,678 tons. The total sales for '91—the year showing the largest previous shipments—were 1,849,945, leaving no fewer than 118,669 tons in favor of '93. There has been a great deal of controversy in both branches of the legislature as to whether the collieries now operated by the Dominion Coal Company shipped as much coal in 1893 as they did in 1891, when operated by individual owners. To set the matter at rest it may be well to give the shipments from these collieries—marked above with an asterisk—for '91, '92 and '93.

Name of Colliery.	1891.	1892.	1893.
Bridgeport ..	32,547	31,328	46,720
Caledonia ..	144,995	107,200	154,908
Gardiner ..	17,105	39,485	27,316
Glace Bay ..	110,212	93,690	116,579
Gowrie ..	152,367	138,413	113,430
International ..	124,677	105,479	113,653
Ontario ..	2,709	28
Reserve, } ..	154,656	135,886	174,613
Emery, } ..			
Totals ..	739,268	651,458	747,219

These figures show that the output of the Dominion Coal Co. for 1893 is in excess of 1892 by 95,760 tons

JOSEPH JOHN LANNING.

Joseph John Lanning, who during the past month succeeded Charles Percy as Assistant General Manager of the Grand Trunk Railway, was born at Templemore, in Ireland, on the 3rd June, 1852. He obtained his early education at Great Yarmouth and Carlisle, in England, and at Dundalk, Ireland. At the age of 16 he crossed the Atlantic in the old "Hibernian," and arrived in Canada without knowing a soul in the country. Having, to use a railway phrase, surveyed his line to Montreal, he obtained a situation in some humble capacity in the wholesale fancy goods house of Thomas Hiam & Bros, in Lemoine street. After about three months here he entered the service of the Grand Trunk as a junior clerk in the stores department. Here he obtained a good general knowledge, for everything was kept in these stores from a needle to an anchor—a statement which was literally as well as figuratively true, since they had canvas and other needles, and kept a stock of ferry-boat anchors. He not only acquired a knowledge of the general trade and requirements of the country, but began the study of shorthand, in which, having a quick and receptive mind and an accurate hand in penmanship, he soon became an expert. This led to his services being called into a more important sphere of work in the general offices, and in Nov., 1870, he was put into the office of the then general manager, the late C. J. Brydges. Business capacity, together with patience, industry and perseverance, led to his being chosen as private secretary to Joseph Hickson (now Sir Joseph Hickson) when that gentleman succeeded Mr. Brydges, and he retained that post under the present general manager, Mr. Seargeant. In that capacity he accompanied the general manager over the road on nearly all of his official and

private trips, and thus obtained a wide knowledge, not only of the geography of the country, but of the railway connections of this great system of railways—for the Grand Trunk is not one road, but an aggregation of roads developed by enterprise or acquired by the administrative ability of its executive heads, and is now to this country what the muscular system is to the human frame. Mr. Lanning has gained his present position after 26 years of service, not so much by what is called genius, but by the qualities mentioned above—patience, intelligence, industry, perseverance and faithfulness. Mr. Lanning is one of the most modest and unassuming of men, and it must have been a source of gratification to him to read



JOSEPH JOHN LANNING.

the many kind things that have been said of him by railway people and the press—such compliments often coming from people whom perhaps he had never met but once, but on whom his courtesy and absence of humbleness had left a kindly impression. The *Montreal Star* said of Mr. Lanning: "It is quite safe to say that next to the general manager and traffic manager, no officer of the company has, during that period, had a more intimate knowledge of the policy of the board and management than Mr. Lanning." The *Empire's* Montreal correspondent had this to say: "Mr. Lanning, who, as private secretary to the general manager, has become as much of a Grand Trunk institution as Bonaventure depot itself, is now called upon to preside over the department vacated by Mr. Percy, and there is not a man on the line from Portland to Chicago who will not rejoice at Mr. Lanning's well-merited advancement. In all the time of his service he has been as faithful to his employers as he was obliging to the public." The *Shareholder*, speaking of Mr. Percy and Mr. Lanning, said: "We think the Grand Trunk has made the best possible selections, and in following the plan of promotion it affords scope to other employees to fit themselves for higher positions than they now occupy. The action of the Grand Trunk will meet the hearty approval of the people." The *Trade Review* remarked that Mr. Lanning "had a friend in every officer of the company, and in every one with whom his duties bring him in contact." Among the compliments paid him by the American railway and financial press, we make this extract from the *New York Journal of Finance*: "During this time he has filled many positions of responsibility and trust to the entire satisfaction of the management, and his close application to duty, coupled with a rare amount of good judgment, has marked him as a coming railway man." A railway man who has intimately known him for years observed to the writer: "That Mr. Lanning is qualified for the office goes without saying, that he is eminently qualified, those with whom he is intimate are well able to vouch for. His knowledge of the many conflicting interests of the great trunk line associations, together with an intimate acquaintance with the various projects of his own railway, past and present, fit him well for his important office. The work of administering a vast concern like the Grand Trunk is enormous, not only

in the various departmental matters, but also the many relations which the road bears to its allies and competitors, as well as to the mercantile and travelling community in general. There is a great deal, however, in system and systematic methods of doing business, and Mr. Seargeant, the general manager, who has always himself been especially noted for these qualifications, will be ably seconded in that respect by Mr. Lanning."

CANADIAN MANUFACTURERS' ASSOCIATION.

In our directory of engineering and manufacturing associations we give the recently elected officers of the Canadian Manufacturers' Association, a report of which was accidentally omitted from last issue. The first and principal resolution passed was that confirming previous declarations upholding the National Policy, and the second called for such an amendment of the Customs Act as would enable the officers to levy duty "on the regular and not on the slaughter price of goods," so as to stop undervaluation. The third resolution condemned the policy of bringing prison labor into competition with free labor.

The principal event of the meeting was the address of the president, John Bertram head of the firm of John Bertram & Sons, Dundas, who upon retiring made an able speech in the plain but convincing style characteristic of him. Mr. Bertram reviewed the history of tariff legislation in Canada and the United States, and pointed out that our tariff of duties was still much lower than the American tariff under the Wilson bill, which was the concrete expression of tariff reform over the border. Mr. Bertram referred with pride to the fact that at the World's Fair Canada took rank alongside the United States, Great Britain, and Germany, and he congratulated the country on its financial position compared with the depression which had spread over almost every other civilized country.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

A meeting of the Society was held in their rooms, in Montreal, on Thursday, March the 15th, Mr. Duggan in the chair.

Further discussion on the Dartmouth, N.S., Water Works, consisted in some correspondence from Major Grey, which was read by the secretary.

A paper was read by J. G. G. Kerry, on the "Construction of a Small Tunnel." The tunnel in question was situated on the West Virginia and Pittsburg Railroad, which was built to open up the otherwise inaccessible parts of Central West Virginia. The district in which this tunnel had to be built consists of heavy, narrow parallel ridges, with deep dividing valleys, the earth being a soft blue clay shale, nearly dry, and showing little stratification. This shale rapidly disintegrated on exposure to the air, and tunneling through it without timbering would have been dangerous, if not impossible, and a system of timbering was used strong enough for several years service, and large enough to contain the masonry when it should be built. Owing to this double lining, an unusually large excavation was rendered necessary. Mr. Kerry gave a full and detailed account of this tunnel, together with particulars of the processes used in its construction.

A vote of thanks to the writer was then passed.

There was no discussion on the paper.

Another meeting took place on the 29th inst., Mr. Peterson in the chair.

The names of several new members were announced.

The secretary read some correspondence from Alan Macdougall on two papers recently read before the Society, viz., "Dartmouth, N.S., Waterworks and Concussion in Sewer Pipes."

A paper by Alan Macdougall on "A Permanent Roadway" was then read, in which he gave the opinions of several authorities as to what constituted a permanent roadway.

ONTARIO MINING ASSOCIATION.

A successful meeting of the Ontario Mining Association was held at Sudbury, on the 14th ult., at which there was a large attendance. Several resolutions were passed, amongst them being one that all royalties on minerals should be abolished. Several interesting papers were read, one of which, by Mr. Rorke, will be found on another page. Officers were elected as follows.—J. B. Hammond, president, R. McConnell, 1st vice-president; John McKay, 2nd vice-president; Geo. Mickle (Sudbury), secretary; and R. W. Demorest, treasurer.

ABOUT COPPER.

It is astonishing how little engineers as a rule know about copper, considering the important position the metal takes, in constructive work. To the ordinary engineer, copper is copper and nothing more. He may have a vague idea that traces of impurities may be found in the mass he purchases, in the shape of plates or otherwise, but as a rule it is generally supposed that commercial copper is fairly pure, and the purer the better. Engineers have had their eyes opened to their error in this respect, by a report recently issued by the Alloys Research Committee of the Institution of Mechanical Engineers. The chief author is Prof. W. C. Roberts-Austen, who probably stands at the head of English metallurgists.

The report gives the result of a very large number of tests made in order to ascertain the effects of various impurities in copper. The experiments have extended over several months, and the committee have had at their disposal exceptional means of carrying on the work, in the shape of very complete apparatus.

Arsenic is naturally the first alloy considered in regard to copper. The tenacity of pure copper at 570 degrees, Fahr., is 9.38 tons per square inch, with an elongation of 34.6 per cent. This is, according to le Chatelier, while the experiments made by the research committee show that arsenical copper at that temperature, has a tenacity of 12.6 tons (28,320 pounds per square inch). The temperature is an important point, especially in the present day of high pressure steam. In England, copper fire boxes for locomotives are the favorite practice, and in that respect, therefore, temperature is a still more important fact. It appears safe to conclude that the superior strength ductility of arsenical copper is maintained at the temperatures reached by the plates of the fire boxes of locomotives; and copper alloyed with arsenic is harder than the pure copper. In the tables attached to the report, copper rods containing 1.2 per cent. of arsenic, were tested without preliminary work. At 68 degrees F., the tensile strength per square inch on original area, was 24,840 pounds, the co-efficient of contraction being 0.79. The elongation in the former of these tests was 20 per cent.; in the latter, 10 per cent. The arsenic here, of course, is very high. Other samples tested with 0.5 per cent. of arsenic (a more normal quantity) at a temperature of 64 degrees F., gave a tensile strength, on original area, of 33,420 pounds to the square inch; the elongation being 37 per cent. At 212 degrees F., the tensile strength was 30,920 pounds, with 30 per cent. elongation. At 496 degrees, the tensile strength was 30,030 pounds with 23 per cent. elongation, while at 835 degrees F., the tensile strength was 20,000 pounds per square inch, with 13 per cent. elongation. It has generally been supposed that arsenic and antimony, as impurities in copper, have very much the same action, and it may be said generally that the particulars given by Prof. Roberts-Austen bear out this assumption. The older text-books, however, are strong in their condemnation of antimony in copper and arsenic also, but the above quoted tests indicate that it is only at excessive temperatures that the tensile strength of the material falls off to any great extent. That, of course, applies to arsenical copper in order to form an estimate for this purpose. Sets of rods were made from copper of a high degree of purity; they were hammered, rolled and slowly annealed; when tested at 52 degrees F., the tensile strength was 30,170 pounds to the square inch on original area; the elongation being 37 per cent. At 480 degrees the tensile strength was 28,240 pounds to the square inch, with 72 per cent. elongation. At 878 degrees the tensile strength was 21,730 pounds; the elongation is not given in the tables, but was certainly considerably below 15 per cent., if one may judge by the results of analogous experiments.

We therefore see, on comparing pure copper with that containing 5 per cent. of arsenic, that in the former, at a temperature due to that of the atmosphere, we get a tenacity of 30,170 pounds, as compared to 33,420 pounds for the arsenical copper, showing a superiority for the latter, the elongation being the same in both cases. If we go to the temperature of boiling water at atmospheric pressure, the tenacity of the pure copper is 30,920 pounds, an increase in strength; in the arsenical copper tenacity has fallen off, until the strength of both samples are equal, the elongation being also equal in both cases. The effect of arsenic, however, at extremely high temperatures, is to reduce the strength until the absolutely pure copper has an advantage. The experiments, however, were made for laboratory purposes, and are not to be taken as conclusive in regard to engineering practice. Good fire boxes are made containing a percentage of arsenic of from .2 to .6 per cent. and even higher.

Dr. Watson referred to this matter. The influence of impurities on copper in the oxidized condition in which it is ordinarily

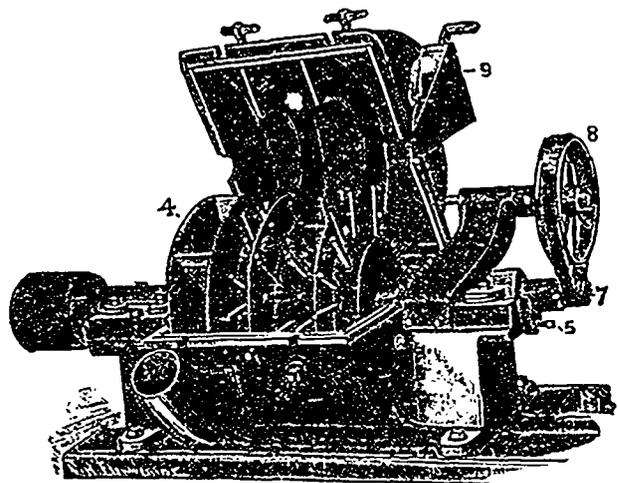
used, by engineers, in some cases differed from their influence when the copper is de-oxidized. He had made experiments, in which he found that arsenic does not increase the strength of the oxidized copper. Professor Roberts-Austen took elaborate precautions in casting his test rods to prevent oxidation, but it is impossible, the mechanical methods he employed, and which were devised with great ingenuity, were not so efficient as those of the ordinary copper smelter, as used in general commercial work, when phosphorus is introduced for the purpose of removing oxide, which it does, in the shape of a slag.

With regard to antimony, it appears from the report that its influence is even more marked than that of arsenic, the strength of copper with 0.26 and 0.529 per cent being respectively 73,800 pounds and 77,900 pounds to the square inch. No attempt was made to ascertain the strength of an antimony alloy of copper above atmospheric temperatures, and it may be said that in commercial copper antimony is rarely present in sufficient quantity to materially influence the properties of the metal as wrought, but its tendency is to cause cold shortness.

One of the most important results of the investigations of this committee will be to call the attention of engineers to the influence of bismuth in copper. Hitherto this alloy has been, we think we may say, generally ignored by those who work in copper, although, of course, chemists have known that its influence is by no means inconsiderable. It has been generally supposed that bismuth acts on copper chiefly by lessening its ductility, but the experiments of the committee tend to prove that it renders copper singularly weak. A sample containing 0.1 per cent. was too brittle to work, and at ordinary temperatures had a tenacity of 18,000 pounds to the square inch; but when tested at gradually rising temperatures, the fall in tenacity was very rapid, and there was practically no elongation. The effect of bismuth, however, did not appear to be quite proportional to the amount present, copper containing 0.2 per cent. had a tenacity of 7,000 pounds. The prejudicial effects of bismuth did not seem to vanish, even though but a trace be present, for instance, in one case, with a singularly pure copper, there was but 0.002 per cent. of bismuth, and although strong, the elongation was very small.

THE WOODBURN PULVERIZER.

We add to our list of advertisements that of E. S. Stephenson & Co., St. John, N.B., who are the manufacturers of the "Woodburn Patent Pulverizer." This is a machine that has been on the market for a number of years, and gives entire satisfaction to all who have them. It was designed especially for pulverizing granulated sugar for bakers and confectioners' use, and it would be hard to find its equal. It does its work most thoroughly and satisfactorily, the product being of the finest description, and one of its

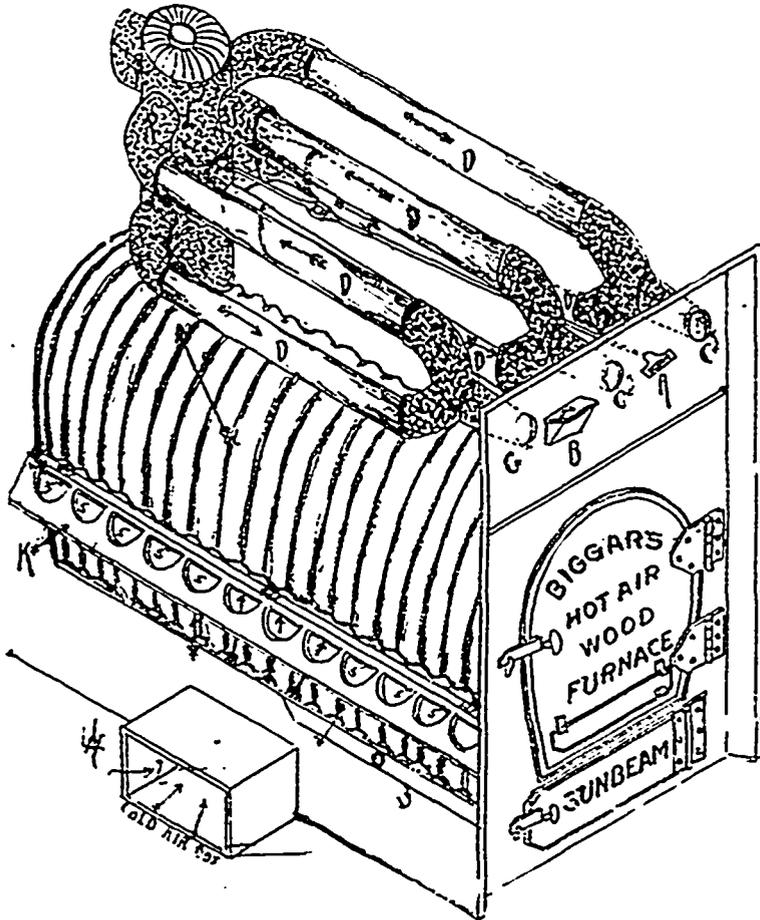


great advantages over the old style of mills is that it produces XXX or XXXX sugar without the use of a bolting machine. All who have to use a bolting machine know the trouble and expense of getting fine sugar in this way. The Woodburn Pulverizer does away with all this trouble and expense; it works equally well with cream of tartar, spices, drugs, paints, black lead, etc., etc. It is now being used by a large number of bakers and confectioners in England and the United States, as well as in Canada, and many of the spice and drug houses in these countries are now running them satisfactorily. There is nothing complicated about the pulverizer, and it is easily run and requires little or no attention. Messrs. Stephenson & Co. are also manufacturers of shafting, pulleys, and hangers, as well as other kinds of machinery. Those who are interested should send for a circular.

A NEW WOOD FURNACE.

There are many parts of Canada where, owing to the dearness of coal and the abundance of cheap wood, furnaces especially built for wood will be in good demand for a long time to come, and any efforts to improve the construction of this class of heater will be welcomed. The accompanying outline sketch shows a new wood furnace, patented by the inventor, R. W. Biggar, of Hamilton.

This furnace has a peculiarly constructed cast iron dome, with elbows in one piece, for the rear and front, made of cast-iron, and connected with steel tubes, which form six radiators. These radiator-pipes are so arranged that they can be easily and quickly cleaned by means of a metallic brush, and the series is provided with a damper, which gives a direct or indirect draught. Attached to the outside of the lower part of the furnace is a shield, where the cold air is drawn to the sides from cold air ducts outside the



casing. No cement is used in making the joints, but a V-shaped joint is used—the first joint of the kind applied to a furnace—to prevent smoke or dust escaping. The circular damper is placed in the large upright tube at the rear over the dome, and is worked by a rod and handle extending to the front at the point A. When the damper is opened, which is usually done when lighting the fire, there is a direct draught from the furnace fire. When the damper is closed the products of combustion are checked at that point and pass along the bottom radiators towards the front, whence they return along the top radiators to the back and pass out through the exit pipe above the damper. The ends of the tubes in front are provided with movable stoppers, C, to permit the insertion of the metallic brush for clearing. The metal shield K is bolted to the sides of the furnace at the joints, its outer edge inclining downwards and the cold air is drawn in here through the openings S and becomes heated as it rises. One of the objections to the old style of wood furnace is that the cement used in the joints falls out by the expansion and contraction of the metal, and cracks develop through which the dust escapes through the house. The V-shaped flange obviates this difficulty very successfully. The furnace is provided with an ash-pan at O, and a water-pan for moistening the air, if required, is placed in front at B. The frame is so constructed that the brick work is not liable to break.

We understand that R. McDougall & Co., of Galt, are arranging to manufacture this furnace for the inventor.

THE Ontario Government is being asked to bear a portion of the expense which will have to be incurred in repairing the county buildings at Sandwich.

CANADIAN SLATE

In a recent number we referred to the reopening of the slate quarries at Danville, Que. Slate was quarried at that place nearly forty years ago, and for a long time they were profitably operated and gained quite a reputation. Work was carried on by old methods, however, and all the slate produced was taken from a bed the maximum depth of which was 50 feet. At this depth a "clayfoot" was met, and this seemed to be the limit. The slate there found, though of excellent color and texture, was too fine and soft for the requirements of the roofing trade, and in course of time the quarry ceased to be operated. When the present company—of which Feodor Boas, the enterprising manufacturer of St. Hyacinthe, and R. A. E. Greenshields, solicitor, of Montreal, are the principals—took hold of the quarry, they determined to pierce the clayfoot and see what would be developed below. Mr. Boas made a tour through the slate regions of Vermont and Pennsylvania, and invested in about \$30,000 worth of the newest and best machinery. The clay-foot was penetrated, and they were rewarded with the discovery of an immense bed of what is said to be the most perfect slate ever quarried on this continent or in Europe. It combines with the finest grain a deep blue color and remarkable toughness and solidity. Its qualities are much complimented by foreign firms in the trade, and already preparations are being made to export it to the United States and Europe in competition with the best slates in those markets. The improved appliances now in use at the Danville quarries will enable the proprietors to supply the home trade for roofing, flooring and other building and industrial purposes, for the difficulty hitherto has been more a question of the sufficient supply of a uniform material than any lack of demand. The company now have 100 men at work, with two shifts of hands running night and day, and already quite a village has grown up in connection with the works. The place is lighted by electricity, and as noted elsewhere, it is proposed to build an electric railway to connect with the Grand Trunk in order to facilitate shipments and passenger traffic. It is very gratifying to know that Canada can produce a slate which for most industrial purposes ranks higher than even the best foreign varieties, and it is gratifying to learn that the enterprise of the promoters has been rewarded with such immediate success.

MINING SOCIETY OF NOVA SCOTIA.

The third annual meeting of the Mining Society of Nova Scotia was held at Halifax, on 7th March. Officers for ensuing year were elected as follows:—

President—John E. Hardman, manager Oldham Gold Co. and West Waverley Gold Co.

Vice-Presidents—R. G. Leckie, manager Londonderry Iron Co., Ltd.; David McKeen, manager Dominion Coal Co., Ltd.; Geo. W. Stuart, Truro.

Secretary-Treasurer—H. M. Wylde.

Honorary-Secretary—B. T. A. Bell, Ottawa.

Council—W. R. Thomas, Montague, R. H. Brown, Sydney Mines, Durcan Macdonald, Truro, Chas. Fergie, Westville; W. L. Blackmore, Glace Bay, C.B.; W. G. Matheson, New Glasgow; C. E. Willis, Halifax, Graham Fraser, New Glasgow; Geoffrey Morrow, Halifax.

A committee was appointed to consider the feasibility and advisability of federation with the General Mining Association of Quebec and other similar associations, to report at the next regular meeting.

A resolution was passed altering the number of meetings a year from four to three.

The following papers were read: "On the Value of Furnace Materials," by R. E. Chambers, Ferrona, "Some Remarks on the Gold Production of Nova Scotia, and how it may be Increased," by B. C. Wilson, Waverley; "On the Relative Costs of Mining—Air Drills vs. Hand Drills in Narrow Veins," by J. E. Hardman, Oldham.

The following were elected members: Capt. A. L. Howard, Brownsburg, Ont.; Robert Archibald, Manager Canada Coal and R'y Company, Joggins, Dr. Martin Murphy, C.E., Halifax; W. L. Blakemore, Asst. Manager Dominion Coal Co., Limited, Glace Bay; H. A. Saunders, Lake Lode, Cariboo, and A. B. Sheraton, Halifax.

QUEBEC RAILWAY WORKS.

The Quebec Government has voted subsidies as follows for railways that are to be constructed during the present year in whole or in part:—

Quebec Central; an extension from a point at or near Tring station to a point at or near Lake Megantic; 59.36 miles; \$260,237.35.

United Counties Railway; two sections, one between Ste. Angeles and Iberville and between St. Hyacinthe and Sorel; 41.36 miles in all; \$144,760.

The East Richelieu Valley; starting from Iberville to a point of junction with the Canada-Atlantic on the banks of the Richelieu River, opposite Lacolle, a distance of 24 miles; \$83,100.

Lake Temiscaming Colonization Railway; for sections between the Ottawa River, near Mattawa on the C.P.R., and the foot of the Long Soo Rapids and Lake Temiscaming, 35.88 miles; and from the Ottawa and Gatineau Valley, from the end of the 40th mile to the end of the 75th mile in the direction of the River Desert; including a junction with the C.P.R. and Pontiac and Pacific Junction at Lake Flora, within the limits of the town of Hull; 35 miles; \$114,622.

The Pontiac & C. P. R. Junction Railway, from the end of the

71st mile to the end of the 85th mile at Pembroke, and of the section of 9.82 miles, from Aylmer to the Ottawa river opposite Hull. \$142,920.

The Baie des Chaleurs; the last twenty miles of the hundred-mile section between Metapedia and Paspébiac; \$140,000.

Lower Laurentian; 33 miles, including a bridge over the River St. Maurice at or near Grandes Piles, starting from the present terminus of the road near the junction at St. Tite, and then crossing the St. Maurice to the town of Joliette; \$222,750.

The Great Northern Railway, a section of 15 miles, starting from the present terminus near St. Julienne, to the town of Joliette; \$52,500; thence to Lake Kippewa, a distance of nine miles, \$265,005.82.

Quebec, Montmorency & Charlevoix, an extension starting from the end of the present line at St. Joachim to Murray Bay; 56 miles; \$302,400.

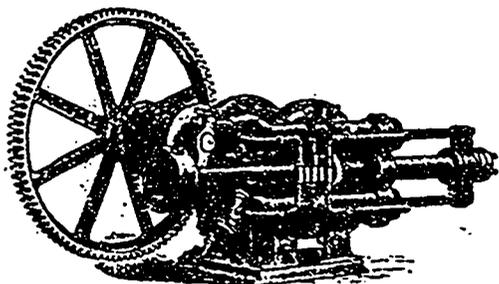
A SIMPLE method of measuring belting in the roll, and which is said to be very closely correct, is as follows: The sum of the diameter of the outside and inside on the roll in inches, multiplied by the number of turns made by the belt, and this product multiplied by the decimal .1309, will be the length of the belt in feet.

The Jenckes Machine Co., SHERBROOKE, Quebec.

BUILDERS OF

**Power Plants
Mining Machinery, Boilers and
General Iron Work**

MONTREAL OFFICE: 16 VICTORIA SQUARE

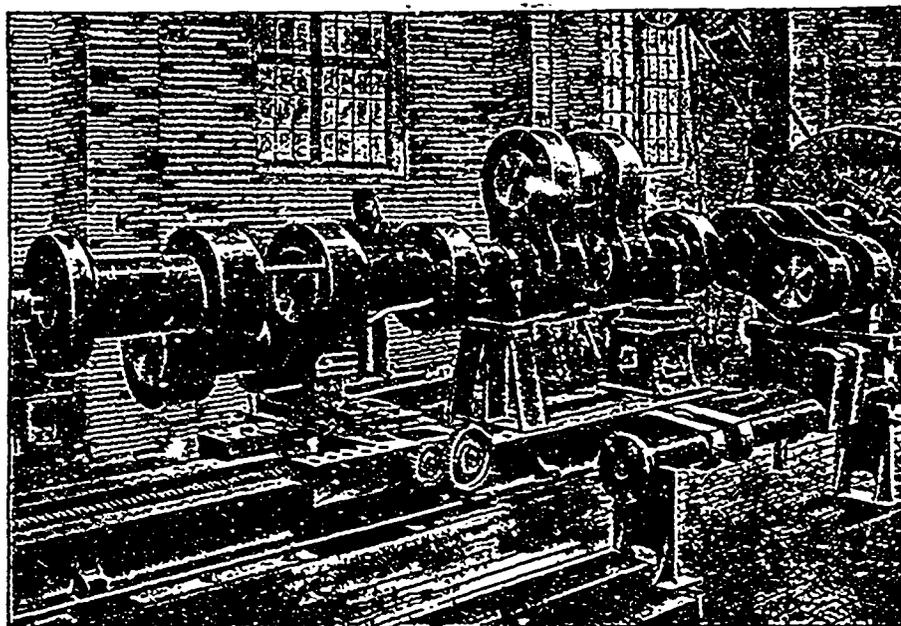


NOVA SCOTIA STEEL AND FORGE CO., Ltd.

MANUFACTURERS OF

STEEL AND IRON FORGINGS AND ROLLED STEEL BARS

NEW GLASGOW, N.S.



SPECIALTIES:

**Forged Steel
Crank Shafts
Finished Complete**

**Stern Frames
and Rudders
For Steamers up to
4000 tons**

**Shafting and Forgings
of all descriptions for
Marine, Mill and
Railway work**

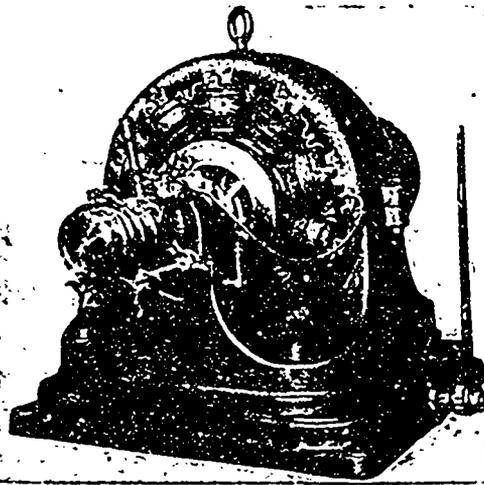
**Rolled Steel Bars,
Angles and Shapes**

**Polished Shafting
5/8 to 5 inch dia.**

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Agents for Canada for the
WESTINGHOUSE ELECTRIC & MANUFACTURING CO.

MULTI-POLAR RAILWAY GENERATORS
SINGLE REDUCTION RAILWAY MOTORS
ALTERNATING SLOW SPEED DYNAMOS



DIRECT CURRENT DYNAMOS
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Every successful and dividend-earning railway in Canada is equipped with our Motors.

OTTAWA CAR CO., Ltd.,

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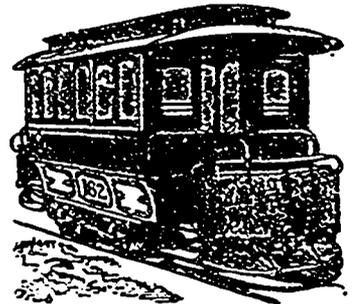
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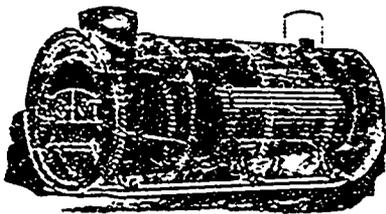


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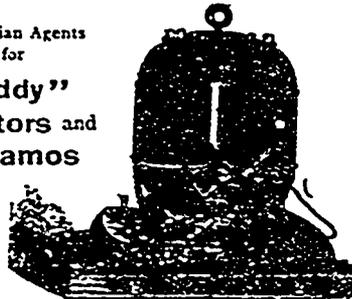
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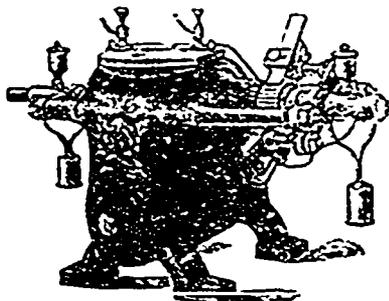
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STATE VOLTAGE REQUIRED

Electrical Department.

A QUANTITY of editorial matter on electrical subjects is unavoidably crowded out of this issue.

A COMPANY of Canadian capitalists are pushing an invention of Thomas Harris, by which it is thought the necessity for a trolley on electric railways will be done away with. The chief points in the system are a third rail and two brushes placed beneath each car, while placed underneath the ground is the main wire which feeds the third rail by means of a switch.

A DEPUTATION representing the electric light, gas and telephone companies of Toronto, St. Catharines, Kingston, Stratford, London, and other Ontario towns, recently waited on the Ontario Government, to protest against recent legislation which looks upon their poles, wires, pipes, etc., as taxable property. They claimed that they had a right to exemption privileges in the same degree as railways and other corporations. Their grievances were promised early consideration.

AN exhibition will be held at the Imperial Institute, London, Eng., during the summer, of artistic and decorative pottery, china and glass manufactured in the United Kingdom, with which examples from India and the Colonies will be included. All exhibits, fittings, etc., must arrive at the Institute not later than the 9th of May next, and communications should be addressed to the secretary of the Pottery, China and Glass Exhibition (1894), Imperial Institute, London, S.W.

Electric Flashes.

LETHBRIDGE, Alta., is to have telephone communication with Cardstone.

CARBERRY, Man., electric light plant has been bought in for H. Boyd, for \$3,950.

THE Packard Lamp Co., Montreal, have received an order for 10,000 lamps for Brazil.

A TELEPHONE line is to be constructed between Stittsville, Munster and Richmond.

MONTREAL Electric Street Railway Co. will increase their capital stock from \$2,000,000 to \$4,000,000.

THE projected electric railway between London and Woodstock is to carry freight as well as passengers.

ROBERT THOMSON has been elected president and John Knox vice-president of the Hamilton Electric Light and Power Co.

A COMPANY is being formed to supply power for the electric lighting of St. Anne de Beaupre, from the Chateau Richer Falls.

THE Niagara Falls Electric Railway is double-tracked from Dufferin Island to Chippewa and from the Whirlpool to Queenston.

AT the annual meeting of the Valley Telephone Company of Annapolis, N.S., last month, a dividend of 11½ per cent. was declared.

THE Electric Storage Battery Co. of Philadelphia purpose the establishment of a factory somewhere in Canada during the next few months.

COTE ST. ANTOINE council, Montreal, have granted a franchise to the Westmount Electric Road, which, it is expected, will be built by July 1st.

EFFORTS are being made by the Hamilton & Durdas Railway Co. to get permission to introduce electricity instead of, at present, "dummy" steam engines.

WM. SMITH read a very interesting paper a week or two ago before the Junior Electric Club, Montreal, on electric bells and batteries and how to set them up.

A NEW system of electric lighting is to be put in at Nanaimo.

THE Grand River overflowed its banks at Fergus, Ont., last month, causing damage and irregularity at the electric light works.

THE Bertram Engine Works, Toronto, have the contract for building a new 1,000-horse power engine for the Toronto Street Railway.

WORK has commenced on the west end cross-town line, Toronto. The idea of continuing the line to the beach has been abandoned.

THE Toronto Street Railway Co. are pushing on with their extension to Toronto Junction, and have only about an eighth of a mile to finish.

AN Ottawa journal suggests that water power sufficient to run ten electric plants in that city could be obtained from the Chats Falls, Fitzroy Harbor.

BY the sudden rise in the Grand River, the Brantford Electric and Power Co.'s embankment was carried away and their whole works were endangered.

C. C. PAIGE, of the Packard Lamp Company, Montreal, has returned from Detroit and the principal cities of Ontario, after a most successful business trip.

JAMES ARMSTRONG's action to have York Township's bonus of \$20,000 to the Toronto and Richmond Hill electric railway quashed has been dismissed by the judge.

THE City and Suburban Electric Railway Company, of Toronto, have decided to extend their track to the water-works on the lake front near the Humber.

THE amalgamation of Ottawa's three electric light companies will come into effect about June 1st. The object of this combination is believed to be to cut down the expenses of management.

A LARGE portion of Windsor, Ont., was last month thrown into complete darkness owing to the burning out of an armature at the electric light works. The light committee are negotiating for a new one.

A CHARTER is being applied for by a new telegraph company, which proposes to construct a line between New Westminster, Vancouver, Victoria and Nanaimo, making connection with the Great Northern system.

THE Commercial Cable Company's report shows that the gross earnings for 1893 amounted to \$1,842,346, and expenses to \$784,600, leaving a balance of \$1,057,746, a decrease in net earnings compared with the previous year, of \$41,840.

IT has been decided by the Government to refund the amount paid by the Hamilton, Grimsby & Beamsville Electric Railway, as duty upon iron rails, though the question as to whether such articles are dutiable or not has not yet been settled.

AHEARN & SOPER, Ottawa, have the contract for all the electrical appliances, including two vestibuled cars, required by the Galt and Preston Electric Railway. The same firm have a contract for building five miles of the road.

IN the case of the old street railway at Winnipeg against the electric street railway, on the ground that the former company held a monopoly of the streets, Privy Council has decided in favor of the electric system. Numerous extensions will now be made.

THE cost of a single track railway from Hanlan's to Ward's, including four motor cars and four trailers, is estimated by Toronto city engineer at \$50,000. This estimate is based on the provision that power can be obtained from the city by means of a cable.

RAT PORTAGE, N.W.T., town council call for tenders to be sent in before May 1st, for lighting the town by electricity. The requirements are 22 arc lights of 2,000 candle-power, or a combination of 14 arc lights of 2,000 candle-power and 14 incandescent lamps of 64 candle-power.

IN the case of the G.T.R. and C.P.R., respecting the crossing of their tracks by the Toronto Electric Street Railway, the former companies claiming that the latter ought to cross either above or below their lines, the counsel for defendants put in the novel plea that an electric railway was not a railway at all, but merely a highway with facilities for transporting passengers. The point will probably come before the Supreme Court.

THE Danville Slate Co. contemplate running an electric road for freight and passengers from their quarries to Danville station on the G T R., a distance of 3 1/4 miles They now have the quarries lighted by electricity

T. W NESS & CO., Montreal, are applying for incorporation under the title of the T W. Ness Electrical Co (Limited), with a capital stock of \$150,000. The applicants are T W. Ness, P. H. Davidson, J L Rankin, J. E Adams, and N W. McLaren, all of Montreal.

THREE routes are proposed for the Park and Island Electric Railroad between Cote St. Antoine and Lachine, Que., all running through the Kensington Estate. The proprietors of the latter are talking of making liberal grants to the company to induce them to do so.

THE new electric railway in Kingston is running very satisfactorily, and it is the intention of the company to extend their lines from the city to Portsmouth on the one side and Kingston Mills on the other, also to Cataragui Cemetery and village, as traffic may warrant.

R WILSON SMITH, Montreal, and others are applying to be incorporated as the Toronto Suburban Railway Company, with power to take over the franchise and property of the City and Suburban Railway Co. and the Davenport Street Railway Co.

MONTREAL Street Railway Co. will spend about \$1,000,000 in improvements. Car sheds and shops are to be built at Hochelaga, and car storage sheds at Cote St Louis and St. Henri. Cars have been put on the Notre Dame street route between Hochelaga and Chaboillez Square.

IN the action brought by Cooke & Son, furnishers of electric power, St. Catharines, Ont., against the Reliance Electric Mngf. Co., on the ground of breach of warranty, the defendants settled the matter by agreeing to pay plaintiffs \$2,400 and allow them a dynamo valued at \$400

THE electric mail service in Ottawa is pronounced a success. Each mail car is 20 feet long, with vestibuled platforms, and is driven by a 30 horse-power motor, the interior being provided with the facilities for loading and unloading It is proposed to extend the service to suburban districts.

PROPERTY owners in the Mount Royal Vale district, Montreal, want the electric railway system to pass along Molson avenue from Sault au Recollet, to be joined in the Vale by the Mountain circuit and Lachine line. Molson avenue would thus become a through highway to Sault au Recollet, instead of a by-way.

IT has been decided by the Montreal Street Railway Co. to make the following, besides the special knowledge required, a standard of qualification for motormen He must be of a minimum height of 5 ft. 5 in., and weight of 150 lbs., and must be able to write and speak both languages so as to be able to make a proper report on each day's journey

A SERIOUS collision occurred on the Craig street route of the Montreal Street Railway one day last month. Fortunately there were only two passengers on board at the time, and these were only slightly injured. The accident was caused by a switch being covered with half-melted snow and ice, thus preventing its displacement from being noticed.

AT the annual meeting of the Montreal Park and Island Rail. way, held the other day, it was decided to build a line around Outremont, Cote des Neiges and Notre Dame de Grace during the coming year, the lines entering the city by way of Sherbrooke and St. Catherine streets. The line to Lachine may also be built during the summer, and also the road to Longue Pointe and St Vincent de Paul. The intention is later on to extend to other points on the Isle Jesus, such as Terrebonne, etc A board of directors was elected as follows. Hon Louis Beaubien (president), Hon. J R Thibaudeau (vice-president), Henry Hogan, R L Gault, David Morrice, M. S. Lonergan, and J. S Bousquet.

FEODOR BOAS, head of the large knitting mills at St. Hyacinthe, Que., proposes to use the surplus water power controlled by his company in lighting St. Hyacinthe and supplying electric power Enough power now goes to waste to supply the whole city for years to come, and Mr Boas has obtained permission to erect poles and lay cables, etc., through the city to carry out his design. Thus, with the company whose charter is referred to elsewhere, there will be three light and power corporations in the field in St. Hyacinthe. Mr. Boas contemplates adding a department for the manufacture of electrical plant and supplies.

AMONGST the latest of our new electrical advertisers is John Forman, of Montreal, who is establishing himself in large premises at 650 Craig street. Mr. Forman makes specialties of the Crompton

dynamos, Crompton's direct connected apparatus and the Crompton-Howell storage battery. He also has the agency for the Edison & Swan United Manufacturing Co., who are the largest manufacturers in Great Britain for all styles of electric apparatus. The Swan lamp is a specialty Mr. Forman purposes to give an electric opening at an early date, showing all the various apparatus at work, followed by a supper cooked by electricity, and many other novel and interesting items.

"LA COMPAGNIE DES POUVOIRS HYDRAULIQUES DE ST. HYACINTHE," is the name of a new company just formed at St. Hyacinthe, with a capital of \$50,000. The chief object is the working of electric power and light for all kinds of industrial purposes. The promoters are Louis Cote, of Louis Cote & Frere; Paul Payan, of Duclos & Payan; J B. Lalime, of Seguin & Lalime; J. T. Godbout, of Paquet & Godbout, A. M. Morin, of Paris, France, E. Morin, O. Chalifoux, and M. Beland The company propose to get their power from a dam in the river three or four miles below St. Hyacinthe. All the promoters except M. Morin belong to St Hyacinthe.

REVIEW OF THE METAL TRADES.

MONTREAL, April 2nd, 1894.

There is very little change to report in prices. So far as is known, the importation by early ships will be very late for both Scotch and English pig-iron, and the same will apply to some other lines that buyers are procuring in the United States.

METAL IMPORTS FROM GREAT BRITAIN.

The following are the values in pounds sterling of shipments of metals, etc., from Great Britain to Canada, as shown by the British Board of Trade returns for February and for the two months ended February, compared with the same periods last year.

	Month of February.		Two months ended February.	
	1893.	1894.	1893.	1894.
Hardware and Cutlery	£ 5,175	£ 4,647	£10,854	£11,214
Pig iron	642	539	2,298	2,092
Bar, etc.	982	1,092	2,575	3,057
Railroad	9,972	3,565	9,972	7,017
Hoops, sheets, etc.	1,575	1,455	3,551	4,350
Galvanized sheets	1,448	2,254	1,746	4,210
Tin plates	6,395	12,188	17,061	30,327
Cast, wrought, etc., iron ..	4,638	3,152	8,370	8,487
Old (for re-manufacture) ..	2,169	365	3,884	1,098
Steel	6,396	5,705	15,505	13,318
Lead	50	93	264	333
Tin, unwrought	484	1,117	632	2,867

So far this year there has been no copper ore exported from this country to Great Britain, compared with £2,700 worth for the same period last year

It is stated that Mlle. Calve, the singer, and Henri Cain, the Parisian painter, who are engaged to be married, have each a phonograph into which, when away from one another, they speak for an hour or more every day, the voice strips used during each week being then sent by mail and read—or listened to, rather—by the receiver

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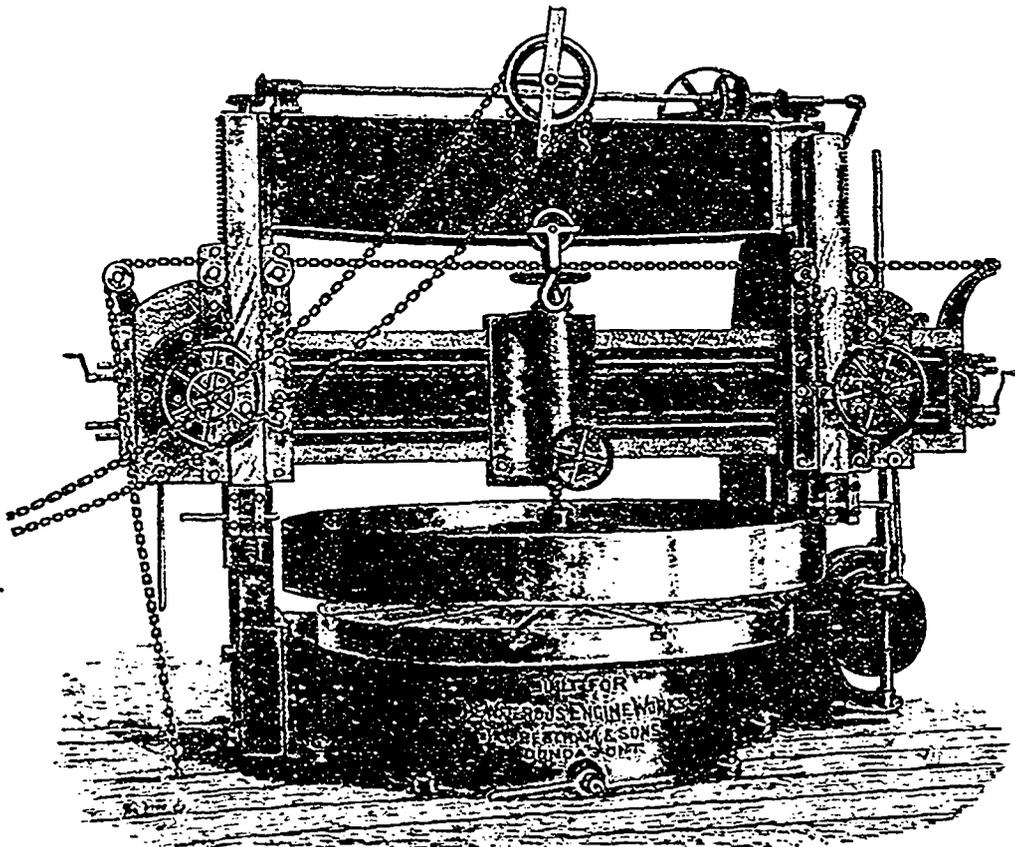
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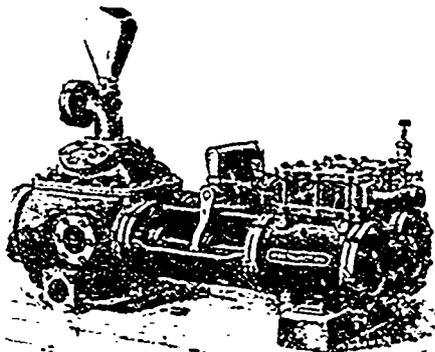
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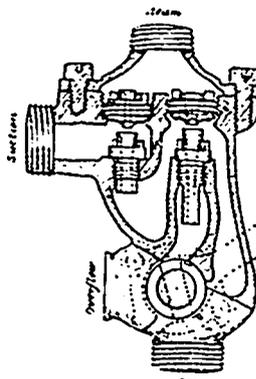
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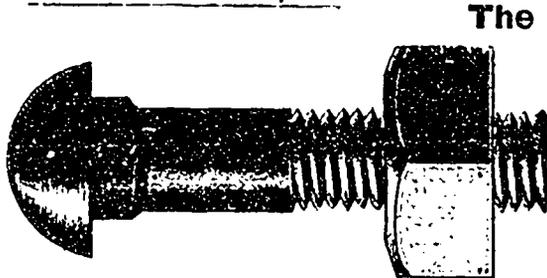
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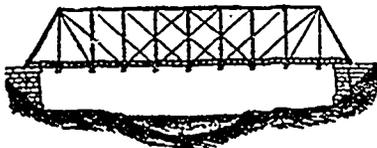
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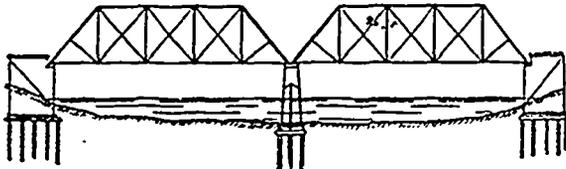
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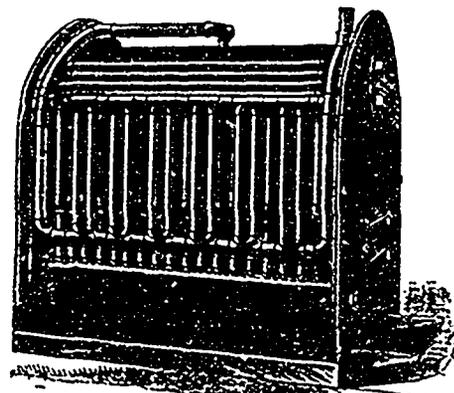
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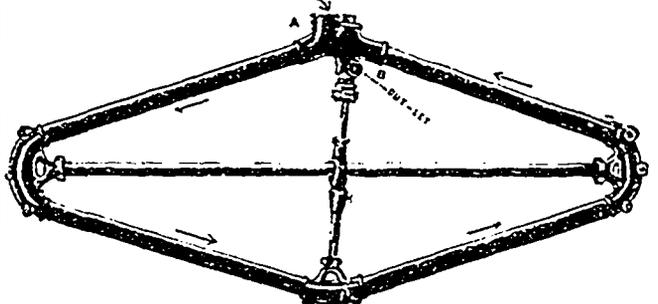
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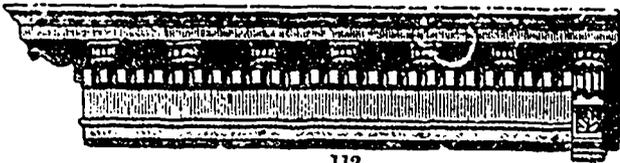
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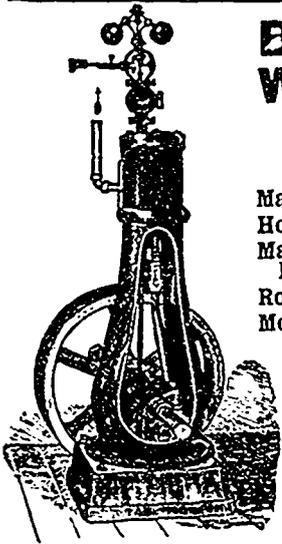
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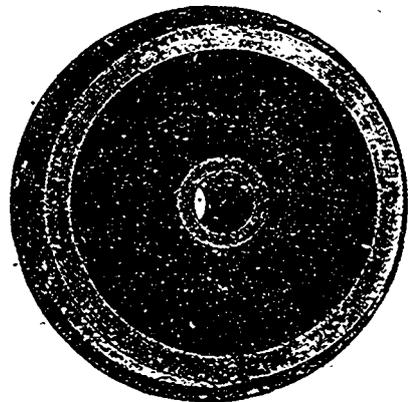
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Industrial Notes.

ARNPRIOR Ont., council want a new chemical engine

MR. HANSON intends erecting a saw-mill at Fort Steele, B.C.

THE bridge across the Bell River, at Golden, B.C., is finished.

AMERICAN capitalists are to build another theatre in Montreal.

MELBOURNE, Que., is soon to have a saw-mill run by water-power.

THE iron bridge over the Niagara Whirlpool ravine is being enlarged.

THE Toronto Hardware Company's Works have resumed operations.

PORTAGE LA PRAIRIE, Man., is to have a new court house, costing \$20,000.

THE bridges over the Aqueduct, Montreal, are reported to be in a very bad condition.

A COMPANY has been formed at Winnipeg to build a large opera house in that city.

THE Bickell Bridge, at Quebec, has been sold at sheriff's sale to C. T. Cote for \$1,000.

D. GUAY & Co., tanners, Quebec, have failed. Liabilities, \$34,769; assets, \$25,242.

A COMPANY is being organized to start a beef and pork packing establishment in Pictou, N.S.

THE combine known as the Dominion Paint Grinders' Association has died a natural death.

THE new steel bridge across the Fraser River at Westminster, B.C., will cost about \$500,000.

DAVID D WIGLE has purchased the hardware business of D. L. Wigle & Co., Amherstburg, Ont.

A MOYER has just put in a new 75-horse-power steel boiler at his flour mills at Palmerston, Ont.

A FORTY horse-power engine is being put in at C. Houde & Cie's tobacco factory at Levis, Que.

DAVIS & SONS have begun work excavating for the retaining wall in front of the Stormont Mill, Cornwall.

REPAIRS are being made at the Chatham, N.B., Pulp Mill, owned by Mr. Mooney. They will cost \$20,000.

THE Carmosky Wood Mfg Co. (Ltd), Kingston, Ont., has been incorporated with a capital stock of \$10,000.

THE estimated cost of the proposed new bridge across the Saskatchewan, at Edmonton, N.W.T., is \$75,000.

THE furniture factories at Berlin, Ont., owned by H. Krug and Kreiner & Co., are having extensive additions made.

A BUILDING will be built in Toronto for the reception of the disinfecter in the rear of the new Isolation Hospital.

B. V. STAFFORD, Arnprior, Ont., has the contract for the erection of a new Methodist church in that town, to cost \$8,832.

LUCKE & MITCHELL, Sherbrooke, Que., have the contract for supplying the inch piping required for the Cookshire water-works.

THE Hanover Furniture Co have added a 225-horse-power engine. The fly-wheel is 50 feet in circumference, with a 20-inch face.

CAMPBELLTOWN, N.B., has decided to grant ten years' exemption of taxes to the company that will put in a system of water-works.

J. K. BLAIN'S grist mill at Stirling Falls, Ont., has been destroyed by fire. Loss, \$3,000. Partly insured. Cause of fire unknown.

THE flour mill at Marquette, Man., which was recently destroyed by a boiler explosion, has been rebuilt. New machinery is being added, and in a month or two it will again be ready for operations.

A LARGE building will shortly be erected on Germain street, St. John, N.B., which probably will be used as a cold storage warehouse.

THE Rathbun Co., of Deseronto, Ont., are issuing \$1,125,000 of debentures, secured by first mortgages on timber, mills and factories.

THE water committee of the Montreal city council contemplate an appropriation for extending the waterworks' shops on St Charles Borromeo street.

WATERWORKS are proposed for Stadacona, Que.

PORTAGE LA PRAIRIE will raise \$15,000 for the erection of new school buildings.

ROSENFELD, Man., is to have a roller flour mill, with a capacity of 100 barrels a day.

W. H. OLIVE, machinery agent, Montreal, is asking for an extension of time. Liabilities, \$5,000.

T. PARADIS, saw-mill and lumber merchant, Levis, Que., has assigned, with liabilities of about \$65,000.

THE question of a bridge over the Assiniboine River is being discussed by Portage la Prairie, Man., Council.

AN isolation prison has been built at Kingston penitentiary, which will be used for such convicts as are incorrigible.

Two wooden bridges at St. Hyacinthe, Que., over the Yamaska, have been condemned and will be replaced by ones of iron.

THOS WILSON & Co., hardware merchants, Montreal, have assigned at the demand of Robert Benny. Liabilities, \$5,900.

ONE of the iron purifiers at Waterloo, Ont., Gas Works exploded the other day, causing some injury to Manager Stewart.

J. L. MORRIS' tender for plans, specifications, etc., for the new bridge across the Bonnechere river, at Renfrew, Ont., have been accepted.

R. E. FITZ RANDOLPH has been elected president, and W. A. Craig, secretary-treasurer of the Bridgetown, N. S., Foundry Company, Ltd.

J. R. BLAINE'S grist mill at Stirling Falls, Ont., has been consumed by fire, the origin of which is unknown. Loss, \$3,000; partly insured.

JAS. SHEARER, Montreal, is putting in his saw-mill a new Lane pattern mill, manufactured by the Jenckes Machine Co., Sherbrooke, Que.

STOCK has been subscribed for the proposed carriage works in Palmerston, to the amount of \$50,000. The works will be exempted from taxation.

THE following were elected officers of the Canada Paper Company: President, John Macfarlane; vice-president, Andrew Allan; and secretary-treasurer, J. G. Young.

THE B. C. Jute and Cooperage Company's Works, Vancouver, which were burned down recently, have been rebuilt, and have now started up again with new machinery.

LEWIS KRIBS' flour mill at Hespeler, Ont., which has been renovated and fitted with new machinery, is now nearly completed. Its capacity will be 200 barrels per day.

THE Dominion Gas and Electric Company are applying for incorporation. Capital stock, \$1,000,000. Their object is to produce gas and electricity for any purpose. Their head office will probably be Winnipeg.

JAMES PENDER & Co. (Ltd.), the well-known nail manufacturers, St. John, N.B., have elected William A. Murray, president, and Eben E. Perkins a director in the place of Wm Wheeler, who previously held both positions.

H. B. SMITH, C.E., of Keefer & Smith, has been examining, on behalf of the British Columbia Government, the site of the proposed bridge across the Thompson river, near Kamloops, and to obtain the necessary data for designing a suitable structure.

THE Dodge Wood Split Pulley Co., of Toronto, have recently supplied the Rathbun Co., of Deseronto, with several of their new patent split friction clutch pulleys. The Dodge Patent Split Clutch is something new on the market, and many special advantages are claimed for it.

THE Government has made a contract with the Ottawa Gas Company at a rate of \$1.50 per 1,000 cubic feet when 3,000,000 feet or more are supplied, or \$1.75 when less than that amount is required. The annual consumption in the Government Buildings is usually about 9,000,000 cubic feet.

CANADIAN architects are loudly complaining at the manner in which Americans are employed to design large buildings in this country in preference to themselves. They suggest the establishment of architecture at McGill College, Montreal, which would, they think, tend to give Canadian architects a wider reputation.

THE Dodge Wood Split Pulley Company of Toronto have just shipped three car loads of their patent pulleys to their general European agents whose headquarters are London, Eng. Among others were extensive orders from Antwerp, Belgium, and South Africa. The Dodge patent wood split pulley, with patent interchangeable bushing system, now enjoys a world-wide reputation.

THE Roman Catholic Church at Sudbury, Ont., has been burned down. Loss, \$15,000; insurance, \$7,000.

THE Toronto Paper Co.'s mill will probably be closed down till water is let into the canal about the last week of this month.

LISTOWEL, Ont., will pay bonuses of \$2,500 to Morris Field, Rogers & Co. piano manufacturers, and \$2,000 to Gillies & Martin, iron founders

J. A. PICKETT, C.E., of New Glasgow, N.S., has plans for a new water-works system at Lunenburg, N.S., at an estimated cost of \$70,000.

JOHN A. RUSSELL, of Detroit, has purchased the Dominion Typograph Works at Windsor, Ont., for \$25,000. The works are running as usual.

GEO BULL's grist mill, at St Albert, near Edmonton, has been burned down. Loss, \$10,000, including 5,000 bushels of wheat. No insurance.

THE Dominion Government estimates for the year ending June, 1895, give \$1,603,430 for Public Works, a decrease of \$708,598 on hose for the year past

WE are requested to note that the boiler invented by the proprietor of the London Bolt and Nut Works, in use at that place, and referred to in last issue, is patented.

THE road committee of the Stormont county council are conferring with Mr. Greenwood, of the Dominion Cotton Mill, Cornwall, as to a new bridge over the canal

THE wire manufacturers of Ontario have made an all round reduction of 10 cents in the prices of their goods. The cut is intended to shut out the American makers

It has been resolved to build the Robert Jones Convalescent Hospital on the Lachine road, near Verdun, Que. The required land has already been purchased for \$12,000.

S. C. HONSBERGER's carriage works at Jordan, Ont., have been destroyed by fire. Loss, about \$5,000; insured for \$2,000. The town hall and other buildings were also damaged.

THE suspension bridge across the mouth of Niagara gorge, connecting Queenston, Ont., with Lewiston, is now in a ruinous condition. It was built just over forty-three years ago.

H. A. GAUTHIER, A. J. VINCENT, and L. A. DUFRESNE, Montreal, have joined together in partnership as architects and civil engineers, under the name of Gauthier, Vincent & Dufresne.

JOHN STEVENS has purchased Jackson's old biscuit works at Galt, Ont., and, after putting in \$2,000 worth of new machinery, will commence the manufacture of biscuits and confectionery.

THE centrifugal pump reported in last issue as being shipped to Gilmour & Co., Trenton, was supplied by M. Beatty & Sons, Welland, whose name was misprinted in the item referred to.

THE Tisdale Iron Stable Fittings Co., Brantford, Ont., are applying for incorporation, with a capital stock of \$50,000. They will manufacture iron stable fittings, and do business as general founders

GEO ELPWICK's roller flour mill at Pinkerton, Ont., has been burned down. The fire, from which nothing was saved, is supposed to have been caused by lightning. Loss, \$18,000, insured for \$7,000

MEETINGS have been organized recently in Edmonton for the purpose of considering how best to bring pressure to bear on the Dominion Government to induce them to aid in building the proposed bridge.

THE boot and shoe factory lately carried on by O. L. Richardson & Son at Levis, Que., has been purchased by Messrs. Campbell, Brodie and Fresque, who are resuming operations under the name of the Standard Boot Co.

JOYNER & ELKINGTON, of the Qu'Appelle Valley, Assa., flour mills, have been making extensive alterations. They have put in a new steam plant, increasing their capacity to 120 barrels per day. They contemplate building an elevator.

WM. JOHNSON, the well-known paint manufacturer of Montreal, has resumed business at the factory in Mill street, the style of the new firm being Wm. Johnson, Dickson & Co. Mr. Johnson was the pioneer in fine paint manufacturing in Canada.

THE building used by the E. B. Eddy Co., Hull, as a tub and pail factory, is to be converted into a paper mill, where bags of all kinds and qualities will be made. The former industry will have a new home, stone buildings for which will shortly be erected.

THE Canadian Power Co. has been trying to secure a right of way through the Queen Victoria Park property, to empty their tunnel into Niagara River. This the Niagara River Power Co. object to, and an interesting tussle is the result.

THE Canadian Construction Company, Toronto, who are applying for incorporation, N. K. Connolly, of Quebec, and M. Connolly and James Swift, of Kingston, being interested, will take over the plant of the Trinidad Asphalt Company, Toronto

It is proposed to build the projected bridge at Renfrew, Ont., as follows: an iron girder bridge of three spans; a central span of 80 feet, with two approaches of about 36 feet, with a roadway 20 feet wide, and a sidewalk six feet wide at each side.

E. VANIER and T. C. Keefer have handed in their report upon Montreal's water system. They recommend an enlargement of the aqueduct, an extension of the wheel-house, and the purchase of new hydraulic machinery, turbines, etc. Estimated cost, \$1,500,000.

ON the 12th March a boiler exploded at Vale's saw-mill, near Dresden, Ont., killing Mr. Cornell, the engineer, and three of his children, who were in the engine-room at the time. The boiler was thrown over the house adjoining the mill. Mrs. Cornell has one child left.

WE have received THE CANADIAN ENGINEER. Its entrance into the uncertain arena of journalism, where many are called and but few are chosen, augurs a prosperous career. Its field is indicated by its name, and we would add that it covers it in first-class style—*American Artisan*.

SPENCER & TUCKER, of Cape Tormentine, N.B., have ordered from the Robb Engineering Co., Amherst, N.S., a vertical boiler for their lobster works. The same firm of engine manufacturers is equipping H. M. Coates' children's shoe factory at Cape Tormentine with a steam plant.

THE defences to be constructed at Esquimalt, B.C., are to be on a large scale, and will cost \$5,000,000. There will be four miles of gun wells and a system of tunnels with underground mines. The harbors at Victoria and Esquimalt will be protected by submarine mines. Work was commenced last month.

COSSITT BROS., Brockville, will start the manufacture in Canada of the James McCormick Binders. The McCormick Machine Company of Chicago had intended starting a branch factory in Canada, but instead of doing so have arranged with Cossitt Bros. to manufacture for them in this country.

THE Montreal Sanitary Association have elected its council as follows: John Kennedy, C.E.; P. A. Peterson, C.E.; Geo. Gillespie, S. P. Stearns, Hugh Graham, J. Cradock Simpson, A. W. Morris, D. Morrice, H. M. Allan, D. Burke, Ald. Penny, Ald. R. Wilson Smith, Sir Joseph Hickson, Drs. A. A. Browne and Craik, and Prof. Bovey

A MANUFACTURERS' section of the Toronto Board of Trade was formed last month, with officers as follows: Chairman, Edward Gurney, vice-chairman, L. M. Jones, and secretary-treasurer, Edgar A. Wills. It will look after manufacturers' interests of all kinds, but will not interfere in any way with the Canadian Manufacturers' Association.

A SCHEME is on foot to construct two dams across the Shubenacadie from Maitland to Black Rock. Between these two dams will be placed all the machinery necessary for electric plants, factories, &c., of all kinds, which will no doubt not be long in following the completion of the work. Over one dam it is proposed to run cable cars from Truro to Maitland.

W. P. McNEIL & Co., founders, New Glasgow, whose loss by fire was mentioned last month, are not dismayed by their loss, but have already got in shape for work, and not only so, but they propose to embark in a new line not hitherto undertaken in Canada—that is steel castings. Mr. McNeil has made some experiments in this line and has been quite successful in producing some special lines of castings for mining and other machinery.

THE projected bridge across the St. Lawrence from Brockville, Ont., to Morristown, N.Y., plans and specifications of which have been accepted by the U. S. Government, will be 5,064 ft. in length from shore to shore, 150 ft. above high-water mark, with four spans of 700 feet each, built on the cantilever principle. Work is expected to commence on the caissons by about the end of May. W. B. Smellie and C. J. Pusey, of Brockville, are the Canadian engineers.

As foreshadowed in a recent number, an amalgamation of the Canadian Brass Manufacturers is under way, by which, it is believed, a saving of \$100,000 to \$150,000 will be effected in working expenses. There would probably be two new manufactories started, one in the east, at Montreal, and the westerly one at Toronto. The goods produced at these two factories would be handled by the present manufacturers. The Brass Association expect to be able to arrange matters more definitely after the next meeting in July.

A NEW boiler has been put in at the Baden Oil Works.

PORTAGE LA PRAIRIE is to have a new court-house, to cost \$25,000.

ARRANGEMENTS are being made for the rebuilding of the Nithvale Bridge at Ayr, Ont.

ROURKE'S new saw mill at St. Martin's, N.B., is now complete. The rotary is running.

THE machinery of the tannery at Uxbridge, Ont., has been overhauled for repairs.

COCKBURN & SONS are preparing to build a saw-mill this spring at Cache Bay, Ont.

J. LYDIATT, of Toronto, is thinking of establishing a glass works at Leamington, Ont.

BARRETT'S flour mill at Port Hope, Ont., has been burned down. Insured for \$7,000.

HAMILTON, Ont., is to spend during the coming season \$34,000 in improving roads and sidewalks.

GEORGE JASPERSON has been making extensive improvements in his roller mills, at Kingsville, Ont.

BERLIN, Ont., will shortly have a new foundry for the manufacture of broom-handle machinery and elevators.

ISAAC HARRIS, of Tacoma, is going to set up a machine in New Westminster, B.C., for the manufacture of ice.

J. C. FERGUSON and W. M. McKinnon, of Vancouver, B.C., have entered into partnership as hydraulic engineers.

PLANS and estimates are being prepared for the extension of Bonsecours Market, Montreal, at a cost of about \$3,000.

THE Board of Education are asking that debentures be issued for \$52,000 for new schools and college buildings in Hamilton.

THE B.C. Government have guaranteed the interest on \$500,000 for the projected bridge at New Westminster across the Fraser River.

J. P. MURRAY, J. E. Thompson and others, Toronto capitalists, are taking steps towards the building of a large first-class hotel in that city.

THE Strathroy Town Council have recommended the purchase of a new pump for the water-works, from the Doty Engine Works, Toronto.

F. ADAMS, Victoria, has the contract for the mason work of the new British Columbia Parliament buildings at the price of \$441,508.

DONALD FRASER, of River du Chute, has purchased the Jewett mill site above Fredericton, N.B., and will build a lumber mill this summer.

THE Dominion Bridge Co. are to put a new iron bridge over the Nappan River at Nappan, N.S. It will be 16 feet wide and 80 feet long.

THE Hamilton Hardware Co. (Ltd.), are applying for incorporation. Capital stock \$75,000. The applicants are J. Ferres, C. Whitman and others.

THE Roman Catholic church at Thurso, Que., constructed only a year ago, at a cost of \$20,000, has been burned down. Insured for \$14,000.

SUBSCRIPTIONS of stock are being taken at St. Johns, Nfld., for a new oil company called the Newfoundland Oil Co., Ltd. J. A. Pippy is one of the promoters.

S. P. & S. B. CHUTE are putting in the machinery in their new saw-mill, at Berwick, N.S., which was built to replace the one burned down a short time ago.

HAMILTON City Council have decided to submit by-laws for the issue of debentures for \$22,000, to be divided equally between a new House of Refuge and a Fever Hospital.

HUMPHREYS & TRITES' saw-mill at Petitcodiac, N.B., which was burned down some months ago, is being rebuilt, and is expected to be in working order in time for the spring work.

CHARLES BARKER, of Meaford, Ont., offers to Toronto city his device for raising the pressure in the bay conduits, and thus preventing sewage being sucked in. The price he asks is \$50,000.

THE new St. Antoine market, Montreal, will cost about \$93,000. The exterior will be of pressed red and white brick, the roof ornamental iron, floors of fire-proof arches, finished in asphalt. The cellars and stalls will be heated by steam. There will be "Pontifex & Wood" cold blast refrigerators. The market will be fitted with an elevator. Each butcher will have his own refrigerator.

MILLER BROS. & TOMS, machinists, etc., of Montreal, have gone into liquidation. This step was rendered necessary owing to complications arising from the retirement of Mr. Toms a year or two back.

THE business of Thorpe & Co., manufacturers of soda and aerated waters, Victoria, B.C., has been taken over by a joint stock company, under the name of Thorpe & Co., Ltd. The capital stock is \$25,000.

A NEW flour mill has been started by J. G. Oliver, at Whitefish Lake, Sask., and by Mr. Cochrane, at Glenboro, Man. A new oatmeal mill was also recently started by Dow & Curry, at Pilot Mound, Man.

THE Acton, Ont., flour mills, of which John Harvey has been proprietor for the last eight years, have been sold to Cheyne Bros., Guelph. They will remodel the mill and convert it into a roller process establishment.

A FIRE broke out in the folding room at the Government Printing Bureau at Ottawa last month, destroying the contents of that department. The fire was put out before serious damage was done in other parts of the building.

A. C. HUTCHINSON has prepared plans for a new Y.W.C.A. building at Montreal. It will be five stories high, with a frontage of 79 feet and a depth of 127 feet, and the material will be red pressed brick, with stone dressing.

THE engine at the new twine factory at Kingston Penitentiary is a 125 h.-p. Corliss. The plant consists of a breaker, two spreaders and three drawing frames for preparing, forty-four jennies for spinning and five balling machines.

THE boiler of the new grist mill at Marquette, Man., exploded recently, completely wrecking the building. John Reid, who was running the engine, was instantly killed. He was fearfully mangled, the head being blown several feet from the body.

WM. MILNER, of Chatham, Ont., has offered to start a wagon factory in Strathroy, if the town gives a bonus of \$10,000. A committee of the Strathroy council had recommended a bonus of \$5,000 under certain conditions, but the new proposal is now being considered.

THE officers of the Metal and Hardware Association, recently formed in connection with the Montreal Board of Trade, are: President, James Crathern; vice-president, Thomas J. Drummond; treasurer, J. B. Learmont. Directors—F. Fairman, James Phymister, Wm. McMaster, A. C. Leslie.

ON the report of Mr. L. A. Vallee, engineer of the Department of Public Works, Que., an order-in-council has been issued declaring the Bickell Bridge over the St. Charles, between Quebec and Limoilou, dangerous, ordering it to be closed, and taking away all the privileges of the proprietor.

SOME Cleveland capitalists will build a 200-room hotel on the Sulphur Springs property, Sandwich, Ont., and will make a grand health resort of the place. The present hotel will be turned into a bath house, and the necessary appliances will be added. The canal will be dredged, and many other improvements made in the property.

THE Robb Engineering Co., Ltd., of Amherst, N.S., have recently built three of Hughes' patent hydraulic pulp grinders for the Morgan Falls Pulp Co. at New Germany, N.S. These pulp grinders are known as four pocket machines, weigh about five tons each and have a much greater capacity than the old style of machine.

THE Dodge Wood Pulley Co., some four years ago, put into the E. B. Eddy mills at Hull a small rope drive of about 20-h.-p. A year and a half ago they put in three drives, each of 500-h.-p. and another of 30-h.-p. Last year again they put in one 400-h.-p. drive, one 300-h.-p. and another of 200-h.-p. We hear from the Eddy Co. that all these drives have given entire satisfaction, and they recommend them strongly to persons requiring similar power. The Dodge pulley took the highest honors at the World's Fair, Chicago.

THE new steel bridge over Hammond river, N.B., is now completed. The *Sussex Record* says: "It is built of steel imported from Belgium and framed by the Record Foundry, of Moncton, from plans by the same celebrated American engineer who made the plan for the British Government for the famous tower at Woolwich, England. Every piece of steel and rivet and joint was cut and fitted under the eye of the Government's assistant engineer, who remained in Moncton all the time the bridge was being constructed for the express purpose of overseeing the work."

THE Steam Boiler and Plate Glass Insurance Co. of London, Ont., are gradually extending their field of operations and acquiring equipment for a large business. They have appointed local agents in New Brunswick, the firm of Cornwall & Tilley, St. John, being the principal. Mr. Cornwall has long experience in the insurance business, and many connections, while Mr. Tilley, a son of Sir Leonard Tilley, brings to the work an excellent business reputation, and many friends among manufacturers. They have secured the services of W. J. Coleston as travelling inspector. Mr. Coleston is a practical boiler maker and has hosts of friends among the engineers. He is a poet, too, as will be seen by his verses on the "Boiler Brigade" printed in this issue. We understand that the company have appointed Fred. Stancliffe, the well known insurance man of Montreal, as their Quebec agent, and that E. D. Montgomery, for a number of years inspector for the Boiler Inspection and Insurance Co. of Toronto, will act as inspector for the new company in Mr. Stancliffe's territory.

Mining Matters.

W. B. MALCOLM proposes to establish a blast furnace at Toronto

KINGSTON city council has given property valued at \$25,000 to the School of Mines

WEBSTER BROS., salt manufacturers, who sunk a mine at Mooretown, Ont., have assigned.

PETE LAWRENCE and his partner have struck a good ledge carrying copper and silver, on Hall Creek, B.C.

THE bounty of \$2 per ton on pig-iron amounted last year to \$93,896, representing an output of 47,000 tons.

SOME masses of rock caved in at the Ophir Gold Mine, Algoma, Ont., early last month, and three workmen were killed.

JAMIESON & WRIGHT's mica mine, in the Gatineau Valley, turned out over 80,000 pounds of mica one week last month.

THE bond on the Josie Gold Mine in the Trail Creek district, for \$12,000 has been taken up. The ore in this mine averages \$54 to the ton.

J. T. BURGESS and a company of Halifax capitalists have purchased the Cochran Hill, N.S., gold property, and hope soon to be in operating order.

SOME Scotch capitalists have a bond on some property near Sumas Lake, B.C., where a valuable discovery of coal was made some little time ago.

THE "Hidden Treasure" claim, near Maryville, B.C., owned by A. Barrett and Geo. Platt, contains free milling ore assaying \$9 of gold to the ton.

D. D. DUHIG has started work on his claim at Lytton, Botanic Creek. The scows are completed, and the men are now waiting for the machinery.

THE receipts of the New Brunswick Crown Lands Department for mining and prospecting licenses, etc., for the past year, were \$2,605, against \$1,731 for 1892.

WE understand that the debt of \$70,000 on the Blockhouse Coal Company's property at Cow Bay has been paid off, and that the mines will soon be opened up again.

AMERICAN capitalists are looking into the capabilities of Hastings and Frontenac counties as talc-producing districts, with a view to the establishment of mills, etc., for working it.

R. C. CAMPBELL-JOHNSON, consulting engineer to the Botanic Creek Gold Mining Co., of Nelson, B.C., has recommenced operations on the company's property on Thompson River.

THERE is a rumor that some Colorado capitalists are going to take over the gold mines near Buckingham, Que. If so, they will soon build crushing and smelting works on the property.

J. P. CLEGHORN has been re-elected president of the Intercolonial Coal Mining Co. (Ltd.); Hy. A. Budden has been re-elected vice-president and W. J. Nelson, secretary-treasurer.

THE Memramcook, N.B., Gold Mine Company are considering putting in a plant for crushing and treating the quartz by the new electrical process. Samples from their mines recently gave over \$3 to the ton when so treated.

H. H. ST. JOHN has at present twenty men at work at the Idaho mines, Slovan district. Nearly 500 lineal feet of tunneling have been executed. The ore is in a vein about 3 ft. wide, with 160 ozs. of silver to the ton.

THERE is a report that a tin mine has been discovered in the Sudbury district. If this be true, it will, we believe, be the first tin mine on the continent.

THE Dominion Coal Company are now at work sinking a new shaft at Old Bridgeport, C.B. It is intended to start raising coal with the opening of navigation.

THE Eureka Mine at Wine Harbor, Guysboro' county, N.S., will be re-opened on May 1st. Two leads on this property, says the Halifax Herald, yield $8\frac{1}{2}$ ozs and 4 ozs. respectively to the ton.

ALEXANDER BENSON, Buckingham, manager of the General Phosphate Corporation, is making arrangements for the sale of some of the company's plant and for re-organization of the company.

DOUGLAS & SCHOFIELD, who are driving a tunnel to the bottom of the Stemminder mine near Kamloops, B.C., finds the body of the ore to be about sixty feet wide. Much of it samples \$50 in gold to the ton.

THE vein at the Riverside claim on Trout Lake, B.C., shows fully five feet wide. The quartz is sulphide in character, yielding, besides silver, from \$17 to \$40 in gold. The owner of the claim is H. A. Brown.

J. J. MOREHOUSE is going ahead with his arrangements for the Hamilton Smelting Works. He has purchased a stone quarry in the east end, and is to receive a large quantity of building material from various dealers.

DEVELOPMENT work on the "Silver King," which has been going on apace under the superintendence of Engineer Harvey, is temporarily suspended, until it has been decided in London what further steps to take in the future.

AT a meeting in Ottawa recently of the Kootenay and Columbia Prospecting and Mining Co., the following directors were appointed: Archibald Stewart, Hector McRae, S. H. Fleming, W. A. Allan, and G. P. Brophy, all of Ottawa.

JOHN W. Y. SMITH, John M. Beaton, Matthew Lodge, Wm. B. Chandler, and Clifford W. Robinson are applying for incorporation as the Moncton Gas, Oil, Mining and Development Company. The office is to be at Moncton. The capital is \$25,000.

THE Canadian Pacific Mining Company are sinking a shaft at the Wakefield claim on Woodberry Creek, Ainsworth District, where gold-bearing ore was discovered a few months ago. A thirty-pound sample recently assayed \$150 gold, 2 ozs silver, and $62\frac{1}{2}$ per cent. lead.

MINERS say that since 1888 there has not been such a demand for gold claims as at the present time. Eastern and English capital is fast coming in. Three hundred miles of land along the banks of the Fraser River has been acquired or leased in the last 60 days.—*Victoria Colonist*.

A SCHEME is on foot, backed chiefly by American capital, to establish a number of smelters in Sudbury, Ont., at a cost of \$1,000,000. It is proposed to utilize the Dominion Coal Company's Nova Scotia product for smelting purposes. A subsidy will be asked from the Government.

AT the annual meeting of the Intercolonial Coal Mining Company, held in Montreal, the following were elected directors: James P. Cleghorn, president; Henry A. Budden, vice-president; H. S. MacDougall, W. M. Ramsay, Thomas Wilson, E. G. Penny, A. W. Hooper, Alexander Gunn, and W. J. Nelson. The last named was re-appointed secretary-treasurer.

A BILL is being brought before the Ontario House to prevent the rumored attempt to pump natural gas from Essex county to Detroit. It is claimed by the introducers of this bill that the compressors which would be used for this purpose create a vacuum in wells which prevents a further accumulation of gas, and that wells that would ordinarily last twelve years are by their use exhausted in four or five.

THE New Glasgow Iron, Coal and Railway Co., the Pictou Charcoal Iron Co., the Canada Iron Furnace Co., and the Nova Scotia Steel and Forge Co. have joined together in building a booth constructed of native woods in the vestibule immediately inside the main entrance of Parliament Building, Ottawa. It is under the charge of B. T. A. Bell, and its object is to remind the Government of the vast interests represented by the iron-masters of Canada.

A RECENT test of ore from Lac a la Tortue, in the St. Maurice, Que. district, shows as follows: ferric oxide, 70.04; manganic oxide, 1.78; alumina, 2.20; lime, 0.32; magnesia, 0.27; phosphoric anhydride, 0.76; sulphuric anhydride, 0.23; silica, 7.84; loss on ignition, 16.84. The percentage of metallic iron is 49.03; of phosphorus, 0.331, and of sulphur, 0.093.

S. S. BAILY, manager of the Payne group of mines, in the Kaslo-Slocan district, has been taking some fine samples from the Mountain Chief claim. Some assays show 250 ozs. in silver, while a few picked samples have assayed as much as 1,000 ozs. to the ton.

INTERESTING news has been received at Ottawa by Dr. Selwyn, Chief of the Geological Survey. Nearly a year ago an expedition was sent under A. P. Low, M.E., to explore the interior of Labrador. He left Ottawa on June 5th last with equipment to cover a year and a half's absence, as the trip was expected to prove tedious, and all access to Labrador is shut off during the six winter months of the year. He went by way of Quebec, and from Lake St. John struck into the wilderness with a dozen voyageurs and Indians and six canoes. Word was received from Mr. Low on the 9th March from Rigolet, a Hudson Bay post, on Hamilton Inlet, on the extreme north shore of Labrador. His exploration, which is the first made by a white man in the Labrador interior, tells a story that Dr. Selwyn says will open the eyes of scientific and geographical circles. It is to the effect that the climate in the interior, in which there are many great sheltered valleys, is far milder than was supposed, and that the vast district is thickly wooded with spruce, mixed here and there with poplar. There are thousands and thousands of square miles of spruce, sufficient to last for many years after other Canadian forests are done out. The majority of the spruce trees, he says, would make timber eighteen inches square. Also here and there over the country there are indications of vast deposits of the richest of iron ore. The whole of the route traversed was a revelation.

Railway and Marine News.

THE Montfort, Que., Colonist Railway is now nearly completed.

WORK is making good headway at the new Union Station, Toronto.

THE Dominion Line will put a new boat on their route early this season.

THE I.C.R. have had several freight engines built for them at Kingston, Ont., lately.

THE Caraquet, N.B., Railway is open as far as Caraquet, and is doing a large traffic.

EFFORTS are again being made to push the Niagara Central Railway on to Hamilton.

TENDERS are invited for making repairs to a pier on the Lachine Canal above Cote St. Paul.

THE C.P.R. have given a contract to the Joggins Mines, N.B., Company for 70,000 tons of coal.

HON. L. E. BAKER has been re-elected president of the Yarmouth, N.S., Steamship Company.

A 26 horse-power engine is being put in by J. Roblin in the "Startled Fawn" at Belleville, Ont.

THE O. A. & P.S. Railroad Co. have placed an iron bridge across Dochert Creek, near Arnprior.

THE T. H. & B. Railway will be put under contract between Welland and Hamilton during the coming summer.

THE C. P. R. has received a building permit for the erection of a freight shed on Esplanade west, Toronto, to cost \$20,000.

THE Dominion Government Dredge "Queen," and her dump scows, are being thoroughly overhauled, at Belleville, at a cost of \$5,000.

THE Ottawa Government has re-voted \$2,000 for the purpose of removing obstructions in the Mississippi River channel in Dalhousie township.

C. E. BARING YOUNG and others have bought the Elgin, Petibodioc & Havelock Railway, and are seeking a new charter to operate the same.

THE Cobourg, Northumberland and Pacific Railway Company want power to extend the term allowed for commencement and completion of their line.

CANADIAN insurance companies are grumbling at the action of the C.P.R. in placing the accident insurance privileges of the line in the hands of a United States Company.

A GOOD deal of progress has been made in construction work on the O. & P. S. Railroad above Golden Lake during the past few weeks. The contractors have decided to sub-let the contract for another 35-mile section, to be completed during the summer.

THE Yarmouth, N.S., Steamship Co.'s profits for last year amounted to nearly \$14,000.

THE Portlock and Desert Lake Iron Mine Railway Company, East Algoma, has been incorporated.

THE C.P.R. will build a freight shed and office on the Esplanade, Toronto. The building is to cost \$20,000.

THE Hamilton Steamboat Company is improving its dock. An addition to the freight house is also being erected.

POULIN & FITZPATRICK, contractors, are hard at work on the Parry Sound Railway, about 110 miles west of Ottawa.

THE T. H. & B. Railway will probably make a fresh start upon the road near Brantford, and build the line to Hamilton.

By the agreement between the C. P. R. and Amherstburg, the extension of the line to that town is to be completed by Oct. 1st.

IT is believed in Galt, Ont., that the C. P. R. intend replacing the bridge there by an entirely new and much heavier structure.

THE townships of Bastard and South Burgess have granted a bonus of \$7,500 to the Kingston, Smith's Falls & Ottawa Railroad.

TWO large C.P.R. conveyors at Sand Point, Carleton, N.B., were blown down in a gale last month. Loss, \$10,000; not insured.

THE Lake Ontario and Bay of Quinte Steamboat Company have elected H. J. Swift, president, and H. Gildersleeve, manager.

NO trains have been running lately on the Northwest Central Railway. The road will probably be re-opened during this spring, however.

THE "Carmona" has been refurnished in readiness for the coming season, when she will run as usual between Toronto and Rochester.

THE Atlantic & Lake Superior have the option of purchasing the Baie des Chaleurs Railway for \$500,000 cash and \$400,000 in shares of the company.

CAPT. GEO. SHANKS has purchased the "Imperial," and will place her on the Windsor, Amherstburg and Pelee Island route. She will also run to Sandusky.

THERE is some talk of a company being formed to run the "Garden City" and "Lakeside" in opposition to the "Empress of India" between Toronto and Port Dalhousie.

SCOTT & BEEMER have a contract with the Quebec Government for the construction and working of a steamer on the rivers Asshuapmanchouan, Mistassini, Tekouabe, Peribonka.

THE Richelieu and Ontario Navigation Co. has decided to run the steamer "Columbian" in connection with the Niagara Falls Electric Railway between Chippewa, Ont., and Buffalo, N.Y.

THE "Halifax City," the new boat built for the Furness line, is of 1,377 tons register, 311 feet over all, 37 feet beam, and 24 feet hold. She can carry nearly 3,000 tons cargo, besides about 48 passengers.

THE Toronto Ferry Co. will this year have running four double-ender boats. The "Sadie" has had a new inclined double-jet condensing engine put in, has been converted into a double-ender, and will be re-christened the "Shamrock."

TORONTO City Engineer thinks the idea of connecting the lagoons of the island by means of canals and constructing a water route through the island, is worthy consideration, as it would probably be a less costly scheme than a railway.

THE C. P. R. has a long stretch of trestle work on the Caughnawaga side of the Lachine Bridge which needs filling in, and it is proposed that the company take all the city of Montreal's refuse for that purpose till incinerators are erected.

IT is reported that Mr. White, who supervised the building of the "Campania" and "Lucania," will do the same office for the new fast Canadian steamers, if Mr. Huddart's scheme is carried through. The tonnage of these vessels is to be 10,500 tons each.

A COMPANY has been formed and is seeking incorporation, for the purpose of constructing and operating a railway from some point on the I. C. R. between Ste. Flavie and Little Metis, to tide-water in the Parish of Matane (Rimouski district), and thence in an easterly direction to tide-water in Gaspé Basin near Point St. Peter or Douglastown.

THE Haplan Ferry Co., Toronto, is applying for incorporation. The applicants are R. J. Coleman, M. Keachie and R. A. Dickson, of Toronto; Michael Connolly, of Kingston; N. Connolly, of Quebec; Jas. Swift, of Kingston; and E. Lavigne, of Montreal. The company will build wharves and an hotel, and build and operate dredges, sand pumps, and an electric light plant on Toronto Island, besides carrying on a general business as steam boat owners.

A STEAMER is to ply during the coming season between Baie Verte, N.B., and Summerside, calling at Cape Tormentine, Cape Traverse, and Crapaud.

THE shore sheds of Richelieu and Ontario Navigation Co. at Longueuil have been destroyed by fire. A large number of life belts, chairs, etc., were burned.

THE Erie and Huron Railway Co. have purchased for \$50,000 the "Campana," which they will run as a passenger and freight boat between Cleveland and Rondeau, Ont.

THE Collingwood, Ont., Dry Dock & Shipbuilding Co. will build a towing tug, to be 110 feet over all in length, 20 feet beam, and 9 feet deep. Doty Bros. have the contract for the engine.

THE East Hamilton Improvement Co. is petitioning the city council to grant exemption of taxation for ten years on any improvements which may be made incidental to the projected incline railway.

THE St. Lawrence & Chicago Navigation Company's steamer "Rosedale" will continue plying between Chicago and Kingston, and it is probable they will add another steamer and double their capital.

DUE to the flooding of the Grand River at Brantford, much damage has been done in the neighborhood. The G. T. R. bridge at the Tilsburg branch is stated to have been put eight inches out of place. A bridge on the T. H. & B. Railway was another sufferer, a large quantity of earth having been completely washed away from near the piers and other injury done. The canal banks near the starch works have given way.

THE bridge to be constructed by the G.T.R. over John street, Toronto, will be of iron, will have six spans, two of which will be 140 feet and the others 100 ft. The roadway will be 30 ft. wide, besides two six feet sidewalks.

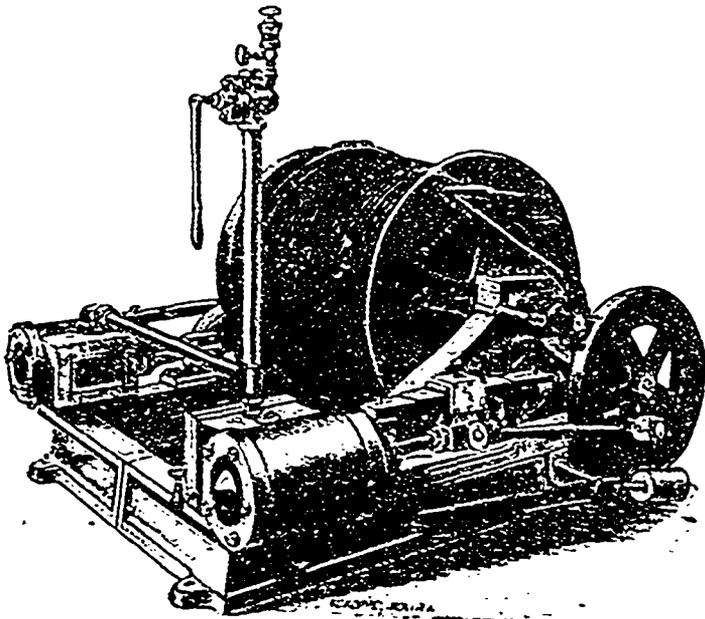
THE company which built a branch railroad from Brantford to Waterford last year, now proposes to build another portion between Tilsburg and Port Burwell, provided an additional bonus be granted of \$10,000.

ACTIVE preparations have been made for the resumption of work on the guard pier and harbor, Montreal. It will be impossible to complete the guard pier this year, but efforts will be made to bring it as near completion as possible.

THE Ste. Emmelie Railway Co. is applying for incorporation, with power to construct and operate a railway from Gabriel de Brandon to St. Michel des Saints, passing through St. Damien, Ste. Emmelie, St. Come and St. Zenon.

THE large dam at Caledonia, providing water power for two or three mills, has been ruined by the recent floods. Over 600 ft. of the apron have been carried away, and it will cost nearly \$15,000 to put the whole structure into proper repair again.

A RIVAL to the Richelieu and Ontario Navigation Co. is seeking incorporation. The promoters hope during the summer to put on the Quebec-Montreal route two new upper-deck fast steamers, which it is expected will be able to accomplish their journeys in two hours less time than the R. & O. N. Co.



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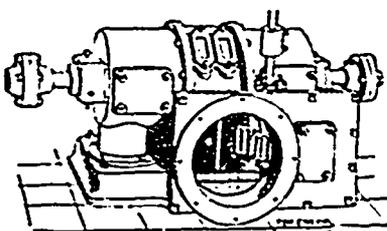
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BEARINGS, etc.**

Write for Catalogue and Gear List.

J. G. WILSON & COMPANY
CLENORA, Ont.

Personal.

CAPT. RICHARDSON, of the Allan line "Sardinian," is dead.

EDWARD MANY, of Lauzon, Que., has been appointed Quebec provincial examiner of boilers

A. R. WETMORE has been appointed chief engineer of the New Brunswick Provincial Board of Works.

H. W. WOODMAN, Montreal, has been appointed electrician to the corporation of Joliette, Que.—*Canadian Electrical News*.

We are glad to hear that J. A. Grenier, civil engineer, Montreal, who was laid up with inflammation of the lungs has now quite recovered.

HOWARD D. BLACK, formerly with the Royal Electric Co. of Montreal, has been appointed electrician to the Chateau Frontenac, Que.

CAPTAIN GOLD, a Haida Indian, who is supposed to be the first discoverer of gold in the coast islands of British Columbia, died a month or two ago.

ALEX. MILLOY, traffic manager of the Richelieu and Ontario Navigation Co., has just completed his fifty-fourth year of uninterrupted service in that company's employ. Mr. Milloy was born in Scotland in 1822, and still enjoys excellent health

CAPT. JOHN H. SCOTT, for many years master of the "Persia," is now captain of the "Carmona," of Toronto. Few captains on the great lakes are better known or more generally liked than Capt. Scott, and the "Persia" will now lose its charm for travellers between Montreal and the west

J. A. L. WADDELL, a Canadian and a graduate of McGill University, Montreal, has designed a unique bridge, which is to span the south branch of the Chicago River. This bridge has iron towers on each bank of the river, 191 ft high. The span is 130 ft long, 60 ft wide and weighs 300 tons. By an arrangement of cables and counterweights, this can be raised 155 ft. above the water, thus enabling ships to pass under it without any need for a draw-bridge.

On the 25th March, Graham Fraser, general manager of the Nova Scotia Steel and Forge Co. of New Glasgow, was taken down with pneumonia while on a business trip to Toronto. Upon the advice of his physician Mr. Fraser went to a private hospital where the complaint soon took a favorable turn. Mr. Fraser's many friends throughout the manufacturing and metal trades will be glad to hear that he is now out of danger. He will probably spend a couple of weeks in a sanitarium before returning to Nova Scotia

W. A. JOHNSON, for over ten years general manager of the Ball Electric Light Co., Ltd., of Canada, and lately general manager of the Canadian General Electric Co., has just severed his connection with the latter, and will engage in general electric engineering and contracting work on his own account. Mr. Johnson has manufactured and installed many thousand electric arc-lamps with dynamos, alternating and direct current dynamos, electric elevators, etc. If experience counts for anything, he has certainly had it, and his many old customers will no doubt be pleased to have direct dealings with him again.

C. F. GILDERSLEEVE has been appointed new manager of the Richelieu and Ontario Navigation Co., and is removing his residence from Kingston to Montreal. Mr. Gildersleeve served twenty years in the city council of Kingston, and was mayor for one term. He was favorably known, both in social and business circles, in Kingston, and his appointment is looked upon as a good omen for the company's future. The past month he has spent inspecting the company's works and property at various points, such as Montreal, Quebec, Three Rivers, etc., and in making himself familiar with the details of the work he is undertaking.



We understand the *Canadian Lumberman* and *Canadian Miller* have been taken over by Chas. H. Mortimer, the enterprising publisher of the *Canadian Architect and Builder*. Mr. Robertson will continue the editorship of the two first named papers

WM. McMILLAN, Mgr. JNO. S. TOWER, Supt. H. S. BURRELL, Sec.-Treas.

The Mac Machine Co.
BELLEVILLE, Ont.

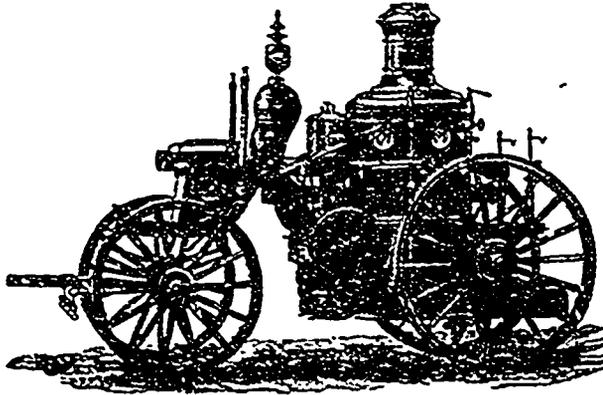
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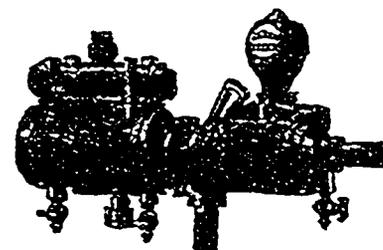
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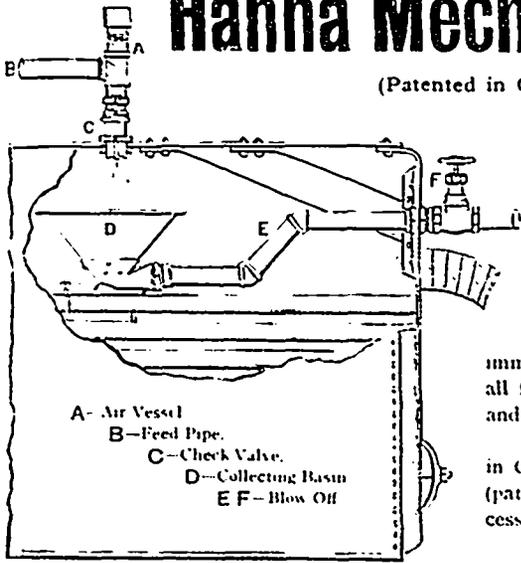
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Prevents scale formation and removes all old scale

THE attention of steam users is directed to this system of *MECHANICALLY* freeing the feed water of all its impurities before it comes in contact with the heating surfaces of the boiler

The process consists in injecting the feed water into the steam space, where it is immediately vaporized by the heat of the steam. In vaporizing the water parts with all foreign matter held in suspension or solution These impurities fall into the basin and are blown off outside the boiler

In another but imperfect form the same process has been in successful operation in Canada and the United States for several years The new and improved apparatus (patented 1891-1893) is now placed on the market, having a record of three years' successful work, as will be seen by the accompanying partial list of users of the Purifier.

For simplicity, cheapness and efficiency nothing more could be desired than is guaranteed with this process, and the fullest investigation and trial is invited. It costs less and will give better results than compounds, and with this advantage that it is a prevention rather than a temporary relief from the bad effects of scale-producing water

Partial List of Names of Parties using this Purifier:

- | | |
|-----------------------------------|----------------|
| Montreal Transportation Co | Montreal |
| Harbor Commissioners of Montreal | " |
| Gilbert Bros. Engineering Co | " |
| Wm Kennedy & Sons | Owen Sound |
| M. Beatty & Sons | Welland |
| Paton Manufacturing Co | Sherbrooke |
| Department of Public Works | Canada |
| Department of Railways and Canals | " |
| J. M. Birkett | Kingston |
| J. H. Hannan, Contractor | Ogdensburg |
| Daly Bros., Contractors | " |
| Murray & Cleveland, Contractors | Cardinal |
| Poupore & Fraser, Contractors | Morrisburg |
| St. Lawrence State Hospital | Ogdensburg |
| Asile d'Alienes | Beauport |
| Geo. Hall Coal & Forwarding Co. | Ogdensburg |
| Ogdensburg Coal & Towing Co. | " |
| Can Pac. Car & Pass. Trans. Co. | Prescott |
| Collins Hay R. & T. Co. | Collins Bay |
| Rathbun Co. | Deseronto |
| Thos. Marks & Co. | Port Arthur |
| Alexandria Bay Steamboat Co. | Alexandria Bay |

MONTREAL TRANSPORTATION COMPANY, LIMITED
 KINGSTON, Ont., March 2nd, 1893.
 Mr. W. L. Scott, No. 1 Custom House Square, Montreal.
 Dear Sir.—The four Hanna Water Purifiers that were put on our boats last spring gave perfect satisfaction. You will please therefore furnish us with machines for the balance of our steamboat boilers fitting out this spring.
 Yours truly, JOHN GASKIN.

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CROMPTON-HOWELL ELECTRICAL STORAGE CO., Limited
 LLANELLY, South Wales

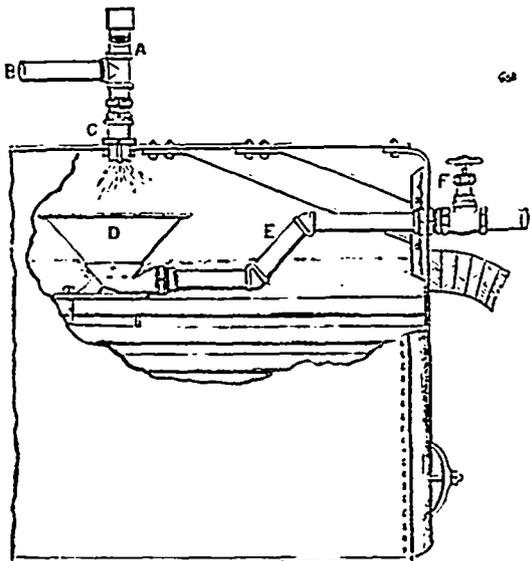
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Incandescent Lamps, etc.

HANNA'S MECHANICAL FEED WATER PURIFIER.

The purifying of feed water for boilers is recognized as a most important question to engineers, as upon the degree of purity depends economy in fuel, and in firing, the life of the boiler, freedom from explosions and steady steaming. Captain Hanna's Purifier aims at preventing the deposit in boilers rather than the cure, but if put into an old boiler will gradually loosen the deposits, as well as prevent any increase. As will be seen by the accompanying illustration, it does not rely upon chemicals to dissolve the foreign



A - Represents Air Vessel on feed water pipe, made of 1 to 3 in. iron pipe and 2 to 4 ft. high, according to space available.
 B - Feed Water Pipe, from Pump or Injector.
 C - Patent Check Valve.
 D - Circular Copper Pan for collecting impurities.
 E - Blow-off from Collecting Pan, which may be carried out at side of boiler as shown, turned up and carried out through top of shell or carried out through either end of boiler.
 F - Blow-off Valve.

matter, but is purely mechanical; the feed water entering the boiler, while the deleterious substances held in suspension in the water are released as the water turns into steam and falls into the copper pan which connects with a blow-off pipe. The simplicity of the idea commends it to anyone conversant with boilers, as the mode of working explains itself on sight, and the numerous testimonials from practical men who have tried it, show that the theory of the invention is perfectly sound. It may be assumed in a general way that all water is bad for boilers, for however small the proportion of injurious matter may be, yet the constant accumulation by condensing the water, makes even the best water dangerous in time. The results from practical experiments show that the adoption of this

purifier has been a great saving in every way, and the receipt of orders to equip extra boilers from those who have tried on only one, shows that the apparatus is a success pecuniarily to the user. Among those who have tried the Purifier and recommend it, are the Gilbert Bros. Engineering Co., Montreal, Wm. Kennedy & Son, Owen Sound, Ont., the Harbor Commissioners of Montreal, the Montreal Transportation Co., M. Beatty & Son, Welland, the Department of Railways and Canals, and many others.

The Welland Canal will be officially open for navigation on the 19th April. Navigation began in the Upper St. Lawrence and Lake Ontario practically about the middle of March, which is earlier than for the past 30 years.

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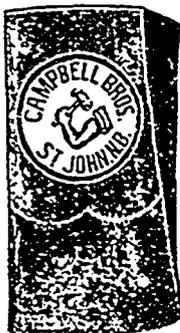
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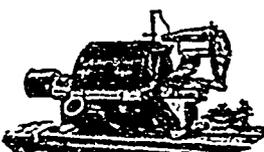
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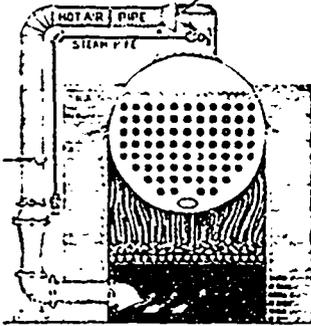
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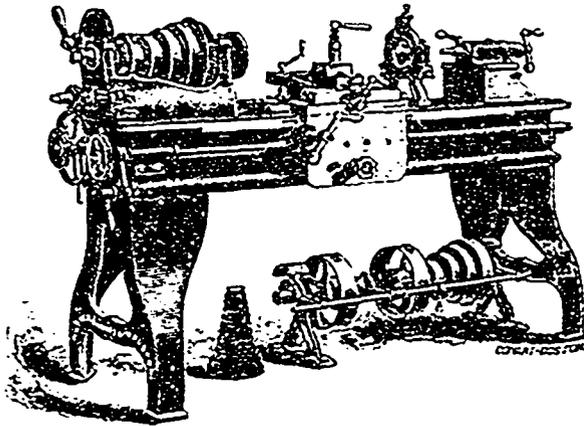
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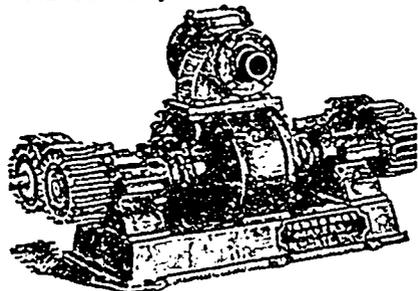


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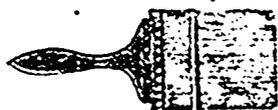
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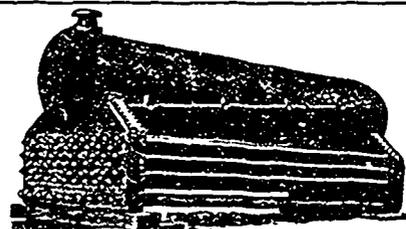
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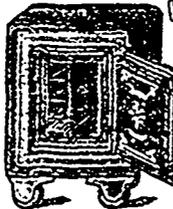
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 Hearn & Harrison ... Montreal, Que.

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 Steam Boiler and Plate Glass Ins. Co. of Canada... London, Ont.

Insurance, Mills and Factories.
 Johnson, C. R. G. ... Montreal, Que.

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 New Glasgow Iron, Coal and Ry Co. ... Ferrona, N.S.

Kilns, Machine, Etc.
 Whitman & Barnes Mfg. Co. ... St. Catharines.

Lathes.
 Bertram, John & Sons... Dundas, Ont.
 Gardner, Robt. & Son... Montreal, Que.
 Nolan, W. H. ... Montreal, Que.

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 Dominion Leather Board Co. ... Montreal, Que.

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 Chester Steel Casting Co. ... Philadelphia, Pa.
 Nova Scotia Steel & Forge Co. ... New Glasgow
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 Samuel, M. & L. Benjamin & Co. ... Toronto, Ont.
 Taylor, J. & H. ... Montreal, Que.

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 Burrell-Johnson Iron Co., Ltd. ... Yarmouth, N.S.
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 Rice Lewis & Son, Ltd. ... Toronto, Ont.
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 Taylor, J. & H. ... Montreal, Que.

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 Metallic Roofing Co. ... Toronto, Ont.

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 Bertram Engine Works Co. ... Toronto, Ont.
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 Buchanan, R. H. & Co. ... Montreal, Que.
 Burrell-Johnson Iron Co., Ltd. ... Yarmouth, N.S.
 Dobbie & Stuart... Thorold, Ont.
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 Jenckes Machine Co. ... Sherbrooke, Que.
 Mac Machine Co. ... Belleville, Ont.
 McNeil, W. P. & Co. ... New Glasgow
 Northey Mfg. Co. ... Toronto, Ont.

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Oils. (See Lubricants.)

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 Garlock Packing Co. ... Hamilton, Ont.
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 Wilson, J. C. & Co. ... Glenora, Ont.

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 Dom. Leather Board Co. ... Montreal, Que.

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 Buchanan, R. H. & Co. ... Montreal, Que.
 Gillies, John & Co. ... Carleton Place.
 Hamilton, The Wm. Mfg. Co. ... Peterboro, Ont.
 Jenckes Machine Co. ... Sherbrooke, Que.
 Northey Mfg. Co., The... Toronto, Ont.
 Young Bros. ... Almonte, Ont.

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 St. John Bolt and Nut Works ... St. John, N.B.

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 Dominion Leather Board Co. ... Montreal, Que.
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 Canadian Canoe Co., Ltd. ... Peterboro, Ont.
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 Hamilton, The Wm. H. Mfg. Co. ... Peterboro, Ont.
 Record Foundry & Machine Co. ... Moncton, N. B.

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 Dodge Wood Split Pulley Co. ... Toronto, Ont.
 Doty Engineering Works ... Toronto, Ont.
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 Gillies, John & Co. ... Carleton Place.
 Hamilton, The Wm. Mfg. Co. ... Peterboro, Ont.
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 Nova Scotia Steel & Forge Co. Ltd. ... New Glasgow
 Record Foundry & Machine Co. ... Moncton, N.B.
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 Douglas Bros. ... Toronto, Ont.

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 Canadian Canoe Co., Ltd. ... Peterboro, Ont.
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Steam Pumps.
 Burrell-Johnson Iron Co., Ltd. ... Yarmouth, N.S.

Steam Traps.
 Down, Thos. & Co. ... Toronto, Ont.

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 Chester Steel Casting Co. ... Philadelphia, Pa.
 McNeil, W. P. & Co. ... New Glasgow

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 Nova Scotia Steel & Forge Co. Ltd. ... New Glasgow

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 Pritchard & Andrews ... Ottawa, Ont.
 Tingley & Stewart Mfg. Co. ... Toronto, Ont.

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 Record Foundry & Machine Co. ... Moncton, N.B.

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 J. St. Charles Omnibus Co., The... Belleville, Ont.
 Ottawa Car Co. ... Ottawa, Ont.
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Surveying Instruments.
 Hearn & Harrison... Montreal, Que.

Telephones.
 Bell Telephone Co., The... Montreal, Que.
 Starr, John, Son & Co., Ltd. ... Halifax, N.S.

Track Bolts
 St. John Bolt and Nut Works ... St. John, N.B.

Trestles.
 Dominion Bridge Co., Ltd. ... { Montreal and Lachine.

Loignon, A. & E. ... Montreal, Que.

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 J. St. Charles Omnibus Co., The ... Belleville, Ont.

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 Scott, Wm. L. ... Montreal, Que.

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 Hamilton, The Wm. Mfg. Co. ... Peterboro, Ont.
 Kerr Water Motor Co. ... Niagara Falls.
 Wilson, J. C. & Co. ... Glenora, Ont.

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 Bertram, John & Sons ... Dundas, Ont.
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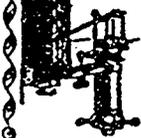
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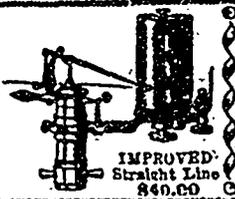
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