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THE MORE COUNTRY PROSPERS THE RICHER IT IS

MANUFACTURES FOR ITSELF PROSPERS

NATION THAT

J. JONES TORONTO.

Vol. 17.

TORONTO, DECEMBER 6, 1889.

No. 11.

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SEE ADVERTISEMENT, PAGE 393.

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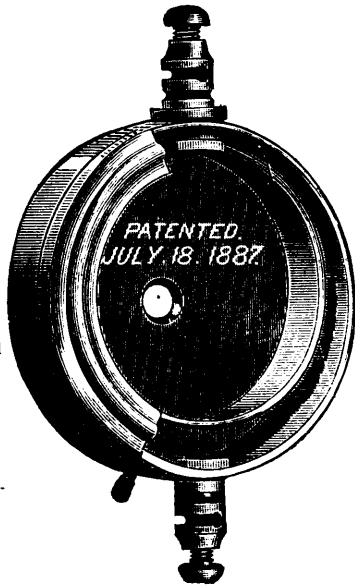
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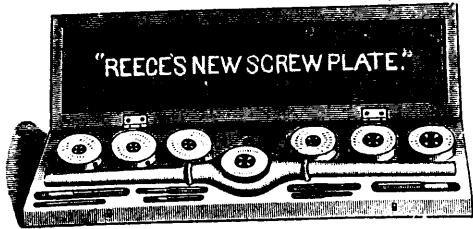
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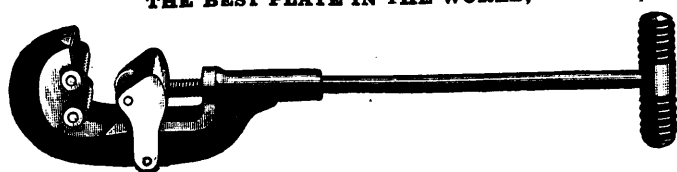
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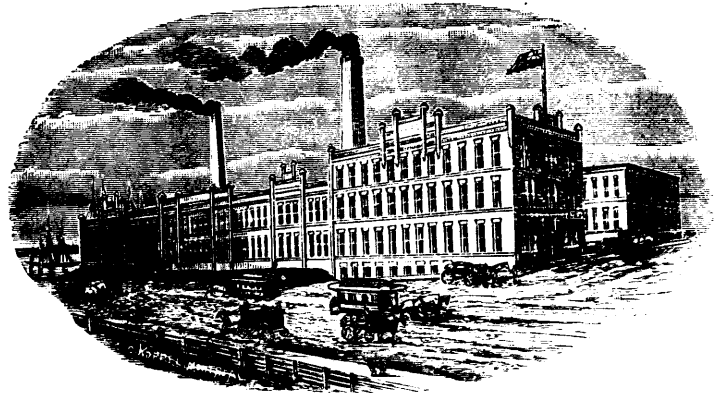
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31



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The advantages of the BATTEN FIRE ESCAPE over all others are :

That the balconies are made of the best wrought iron, of any ornamental design or pattern, and securely bolted through the walls. Can be made any length or width. The brackets and flooring are capable of bearing any number of persons standing on them. The ladders, with wide steps and of easy grade, can remain down permanently, or folded up, as desired, showing the ornamental balcony only in sight, which does not mar the architectural beauty of the building, and can be instantly released when desired. No ice or snow will remain on them, neither will the working parts rust; and they will work admirably in any weather.

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Straight Iron Ladders.

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[To complete files of this journal we desire to obtain a few copies of THE CANADIAN MANUFACTURER of April 5th, 1889. Will some friends oblige us?]

THE GALT STRIKE.

A FEW days ago the Toronto *Mail* published a despatch from Galt, Ont., which read as follows:—

The present position of the moulders' strike is thus described by the labor men:—Cowan & Co. had a foreman, four journeymen, and four apprentices prior to the strike; they now have a foreman, one journeyman, one man who worked about two years at the trade, and nine apprentices. Sixteen men came out from Goldie & McCulloch's. In place of these, eleven hands have been taken on. Only one of these eleven can be compared as a workman with the good and true men who came out on strike. Five of them have been but short terms at the moulding, ranging from five to eighteen months. The rest are men who are accustomed to agricultural work only. MacGregor, Gourlay & Co. lost eleven men by the strike and have engaged eight since. Two of the eight might fairly be classed with the poorest of the men who came out. Two were employed as laborers in a moulding shop in Montreal just before coming here, and the rest may be regarded as improvers and are working as such. With McDougall & Co., who settled with the Moulders' Union, things are working well. No spoiled jobs, no botched moulds. Notwithstanding the bug-a-boo of the "Let the union men once get a foothold and they will want to run the shop altogether," McDougall & Co. at latest accounts still own the premises and conduct their own business in their own way.

THE CANADIAN MANUFACTURER believed that there were but few words of truth contained in this despatch, and took means to ascertain the facts. These facts relating to the manufacturers whose names are mentioned are as follows:—Messrs. Goldie & McCulloch have the same number of moulders at work as went out on strike, and these are all "good and true men," and quite

as competent and skilled as those who left the firm's employ. The quality of the castings manufactured in their foundry was never better than at present, and is first-class and perfectly satisfactory in every respect. The firm have all the moulders they require, and there are more applications for places in their foundry than there are places to fill. Messrs. McGregor, Gourlay & Co. have precisely the same number of moulders and apprentices at work that they had when the strike was inaugurated, and these are actually turning out more castings than are required in the other departments of the firm's works. The cost to the firm of these castings is substantially the same as before the strike, and the quality is fully up to their well known high standard, i.e., second to none in Canada. Messrs. Cowan & Co. have the same number of moulders now that they had before the strike, and are turning out all the castings in their foundry required in the other departments of their works. Further, they are having "better luck," that is, there are fewer failures in castings coming out of the sand than there were immediately before the "good and true" union moulders went out on strike. The firm have plenty of work on hand and plenty of competent men to do it with.

The fact is, if it were not for the persistent advertising done by the strikers and their union, such as that herein reproduced, and the assistance thus given them by such newspapers as the *Mail*, and the attempts made from time to time at boycotting by these strikers and their friends, these Galt foundrymen would not realize that there was any strike on at all. Some of the strikers have left Galt to seek employment elsewhere, but those who still remain there in idleness are, we are informed, drawing pay from their organization—seven dollars per week for those who have families, and those who have no families five dollars per week; and this bonus is probably quite as much as the services of the recipients—some of them—would be worth under any circumstances.

It is evident to any one who will give thought to the matter that the strike of the Galt moulders has proved a complete failure. From the beginning there was no grounds for hope for its success; and this fact was explained in this journal several weeks ago. Had there been a glimmer of such hope there would have been some excuse for entering upon it and of persisting in it; but as it is, as is here shown, the Galt foundries are well supplied with moulders, and are entirely independent of their late employés. The condition of these misguided and mistaken strikers, however, is deplorable. Some of them having too much respect for themselves to spend their time in futile idleness, and continue the recipients of the bonuses contributed to their support by their union, have accepted the situation and sought employment elsewhere. Others of them seem only too glad to have other moulders contribute to their support while they walk the streets in idleness, devoid of that manly ambition that should make them decline to be the objects of charity, the contributions being drawn from other workmen who, at this season of the year, require all they can earn for the support of their own families. The situation discloses a condition of moral turpitude not at all creditable to those who would be respectable and self-respecting men.

The *Mail* has every reason for knowing that the despatch which we have reproduced from its columns, and many others of similar purport from the Galt strikers which it has published

are untrue, and moreover that they are intended to cripple and injure some of the most enterprising and valuable manufacturing industries in Canada. If the *Mail* desires to act justly in this matter it could very easily and inexpensively discover the true status of the situation.

IRON MANUFACTURE IN CANADA.

As general interest increases regarding the manufacture of iron in Canada, so, too, does the opposition to that industry increase and become more effusive in its pessimistic expressions. Toronto seems to be specially afflicted in this direction; and while both the *Mail* and the *Globe*, on true Grit principles, oppose this as well as every other industry the prosperity of which can be enhanced by the operation of our National Policy, the *Globe* has called in the assistance of Mr. T. D. Ledyard, who is, we believe, an American capitalist with a large investment in Canadian iron mines. Mr. Ledyard does not express any desire to manufacture iron in Canada, or anywhere else that we have knowledge of, but desires to sell the ores from his mines in the United States, where his larger interests lie. He hopes to increase his profit on the output he hopes to make from his Canadian mines, and the shipments he hopes to make of these ores to the American markets by some changes in the laws of both Canada and the United States whereby Commercial Union, Unrestricted Reciprocity, or Annexation of Canada to the United States may be brought about, either of which would have the desired effect. Therefore, through the medium of the *Globe*, he poses as an educator of the Canadian public; attempting to prove that Canada would be happier and more prosperous under the domination of the Washington Government than she could possibly be as an independent Dominion and under the National Policy. This is not because he loves either Canada or the United States with a love remarkable for its fervor, but because he loves Mr. Ledyard and his iron mines.

The fact is, Mr. Ledyard is interested in a Canadian iron mine of exceeding value. The deposit is said to contain at least a million tons of ore within one hundred feet of the surface. It is claimed to be very rich in metallic iron, contains no titanium, and is very low in sulphur and phosphorous. It is also claimed that the ore is not refractory, and that it can be reduced in the blast furnace with about the average charge of fuel to the ton of ore. Mr. Ledyard estimates that this ore can be mined for one dollar per ton, and that it can be laid down in Buffalo for \$3.25, Pittsburgh for \$4.75, and Cleveland for \$3.90 per ton, duty paid, the American duty being seventy five cents per ton. Analyses of this ore show it to contain from 64 to 70 per cent. of metallic iron, and from 1.96 to 4.5 per cent. of silica, only slight traces of phosphorous and sulphur being found. It is a true Bessemer ore. If this mine possesses all the advantages claimed for it by Mr. Ledyard—high-grade Bessemer ore; a million tons within a hundred feet of the surface; easy of access for transportation both by rail and water (being in Belmont township, Peterborough county, Ontario); and can be laid down in American lake cities, duty paid, at about the same cost as Lake Superior ores—it is indeed a valuable property, and it is most sincerely to be hoped that many blast furnaces may be erected in Canada for manufacturing the ore into iron.

Is it possible to do this? We think it is. The consumption of manufactured iron in Canada amounts to about three hundred thousand tons per year, while the production of pig-iron amounts to probably less than one-sixth of that quantity. In other words, we depend upon Britain and the United States to supply us with five-sixths or more of all the iron we use. This ought not so to be. It is the opinion of some that the present duty of \$4 per net ton on imported pig iron, together with the premium of \$1 per ton paid by the Dominion Government on all pig-iron manufactured in Canada, is sufficient to develop the industry; but the fact that it has not been very largely developed under this stimulus induces the belief with others that the duty should be raised at least fifty per cent., which would then be only as high as that of the American tariff. The *Journal* of the United States Association of Charcoal Iron-workers, discussing the possibility of manufacturing iron at Ottawa from ores found near that city, figures up the cost of the iron thus produced as follows:

	Per ton.
Raw ores at the mines.....	\$ 1 40
Add roasting and loss	60
Freight from mines to Ottawa.....	55

Cost of one ton of ore at furnace..... \$ 2 55

As this roasted ore will yield 60 per cent. or more of iron, the cost of ore for a ton of pig-iron will be:

1 2/3 tons of ore at \$2.55 per ton..... \$ 4 25

The accessibility of fluxing material will make this item small, and an allowance of fifty cents per ton of iron made should be ample. The materials and cost thereof for producing pig-iron from this ore are, according to this authority, estimated as follows:

Fuel	\$ 6 50
Ore	4 25
Flux	50
	\$11 25

To which add labor, repairs, office expenses, supplies, incidentals, depreciation, etc., say..... 2 75

Making a ton of pig-iron cost..... \$14 00

This is the cost of making pig-iron in Canada, as estimated by Mr. John Birkinbine, who is a most reliable authority on the subject, and whose opinion is quite as valuable as that of Mr. Ledyard or the *Globe*.

Upon the question of competition with foreign iron, Mr. Birkinbine figures as follows: The Canadian duty is \$4 per net ton on pig-iron—the estimated cost above given being per gross ton. The Canadian Government pay a bonus of one dollar per net ton on all pig-iron made in Canada from Canadian ores; therefore the Canadian iron would be protected to the extent of \$5 per net ton, or about \$5.60 per gross ton. If pig-iron made at Ottawa cost \$14 per ton, foreign pig would have to be delivered there at \$8.40 per ton to meet this cost. But an allowance for profit must be made; and including this as well as the usual percentage of loss from bad debts, and also adding liberally for possible discrepancies in the estimate—say \$2.60—Mr. Birkinbine thinks the Canadian product could meet the foreign competition at Ottawa at \$11 per ton. These estimates are based on the use of anthracite coal, coke, or a mixture of both; although Mr. Birkinbine believes that charcoal fuel could be economically used.

The facilities for manufacturing the ores from Mr. Ledyard's mine into pig-iron in Canada are quite as great as those

alluded to by Mr. Birkinbine; and it will be seen that Mr. Birkinbine's estimate of the cost of the ore at the mine is forty per cent. higher than that of Mr. Ledyard. Why, then, should Canada accept Mr. Ledyard's views regarding Commercial Union, Unrestricted Reciprocity, Annexation, or whatever they may be, for the sake of obtaining cheaper pig-iron, when, on the authority of a competent American expert, we can manufacture our own iron cheaper than Mr. Ledyard's American friends could sell it to us for?

THE BEET SUGAR INDUSTRY.

ATTENTION is directed to an article in another page regarding the cultivation of the sugar beet in Canada, and its manufacture into sugar. There is no class of the community of Canada more interested in the sugar question than the farmers. Constituting a large part of the community, they are large consumers of sugar, while as agriculturists they produce no crop which is convertible into sugar. This is not because no such crop can be grown in Canada. The soil and climate of Canada are quite as well fitted for the purpose as the soil and climate of Germany, Austria, Holland, France or Belgium, where immense crops of beets are raised, the sugar extracted from which amounts to thousands of tons annually.

It is only within the past decade that the manufacture of beet sugar has assumed such large importance in the commerce of the world, although the industry is no new thing. According to the London Chamber of Commerce "Year Book" for 1889, the imports of raw beet sugar into the United Kingdom in 1888, from the continent of Europe, amounted to 316,766 tons, and of refined sugars from all countries, 344,492 tons; of which latter 158,867 tons were beet sugar, received from Germany and Austria. In 1884 the total sugar production of the world, available for export, amounted to 4,683,515 tons, of which 2,523,200 tons were cane and 2,360,315 beet sugar; and this fact is remarkable in contrast with the production five years later, in 1889, which was of cane but 2,248,000 tons, and of beet 2,735,000 tons, an aggregate of 5,202,000 tons; the production of cane sugar falling off 275,200 tons, and the production of beet sugar increasing 374,685 tons.

The beet sugar industry in Germany is deserving of close attention by Canadian farmers and manufacturers. There were 343 sugar factories in operation in that country in 1882, while in 1887 there were 401. In the first named year the quantity of beet roots consumed in these factories amounted to 6,271,948 tons, while in the latter year it was 8,306,671 tons. The quantity of sugar produced was 599,722 tons in 1882, against 984,628 tons in 1887. The imports of sugar decreased from 5,733 tons in 1882 to 4,678 tons in 1887; and the exports increased from 314,410 tons to 661,128 tons in the same time, and the export drawback paid to the producers in the same years, increased from £2,249,600 to £5,709,100.

The cultivation of the sugar beet, and its manufacture into sugar on the existing immense scale, produced great commotion in the markets of the world, and the fluctuations in prices of sugar, growing out of the increasing dependence of the consumer on the new article of commerce, were very violent. In 1883, owing to the exceedingly large production that year, over 2,360,000 tons, fostered by the bounty system, prices fell from 21s. 9d. per hundredweight to 18s., for medium quality of raw

sugar as represented by 88 per cent. beet root. In 1884 the price receded to 10s. in the face of the world's production of 2,545,000 tons of beet sugar; but in 1885 there was a rise to 16s. 9d., owing to reduced acreage. In 1888 the price was 12s. 6d.; and the "Year Book" asks the question: "If a difference of 300,000 tons in a crop of 2,500,000 tons causes such changes, the question naturally arises, what would happen if political complications, or other causes, were seriously to interfere with the production of beet sugar?"

In Austria the beet sugar industry is very profitable; and the prospects for a constantly increasing production never looking more favorable than at present. The tax upon sugar there is upon the article when it goes into domestic consumption; and a bounty is paid upon it when it is exported. In Bohemia ground suitable for the cultivation of the sugar beet is worth \$250 per acre, while in Hungary it is worth but \$140. Women and children work in the beet fields for from eight to sixteen cents per day, while factory hands receive from 24 to 32 cents. On a model Bohemian farm the cost of cultivation averages about \$38.00 an acre, which includes labor, fertilizers, seed and interest on capital invested, the cost of the beets being about \$3.00 per ton, and the cost of manufacturing the sugar averages about one cent per pound. The refuse left on the farm—leaves, etc.—is valued at about \$10 per acre.

The industry in California, although a new one, and consequently subjected to many annoyances and drawbacks, is in a fairly prosperous and flourishing condition. The obstacles are high-priced labor; a difficulty in finding the best locations for growing the crop; want of facilities of transportation of crop to factories, and ignorance of farmers as to best methods of cultivation, harvesting, etc. Perhaps some of these obstacles would present themselves in prosecuting the beet sugar industry in Canada as well as in California; but it should be borne in mind that the prosperity that attends the business in Germany and Austria came only after a half century of experimenting and thorough education. Labor is cheaper in Europe than in Canada, but it is cheaper in Canada than in California; and, as we have before said, the conditions of soil and climate here are equal to, and in some respects superior to those where the industry has attained such great importance.

FUTILE EFFORTS.

IN view of the efforts of the enemies of Protection to overthrow that system, both in Canada and the United States, where it has its strongest and most intelligent stronghold, and where, as in the United States, extraordinary efforts are being put forth to influence legislation against it in the Congress just assembled, the recent utterances of Mr. Jefferson Davis, late leader of the party in the South which sought to establish a Confederacy upon the foundation stones of national disruption, perpetuation of human slavery, and a constitutional prohibition of import duties, are deserving of some notice.

To the man of ordinary intelligence it might appear strange that any importance should be attached to the utterances of such a man as Mr. Davis on any economic subject, or that his views on any constitutional question should be considered of any greater value than the paper upon which they are written; but it must be remembered that while to men of ordinary intelligence anywhere else than in the Southern States the

views of Mr. Davis carry no weight whatever, in that section they are oracular, and are received with as much reverence, respect and veneration as any words contained in Holy Writ—that is, by the old Bourbon element there, who never learn anything, even when taught by such sad experiences as those of the recent war; and who never forget anything, even the heresies that led them to accept Mr. Davis as their champion and leader, and which were exploded by the events that succeeded their efforts at secession.

This enlistment of Mr. Davis in behalf of Free Trade shows the exceeding weakness of a weak cause. For a decade past the South has been experiencing a season of activity in manufacturing industries truly phenomenal in its extent and influence; and this renaissance brings with it a remarkable change in the political complexion of many portions of the country, particularly those where these manufacturing industries are most numerous, and give employment to the largest numbers of people. As long as there were no developments of the iron mines of Tennessee, Alabama and Georgia; as long as there were no blast furnaces there burning day and night smelting the ores into pig iron; as long as there were no mills there taking the cotton from the adjoining fields where it grew and converting it into fabrics; as long as there were no factories, foundries and machine shops there supplying to a great extent the necessities of the people; as long as agricultural enterprises prevailed to the exclusion of other industrial pursuits; as long as the enterprising Yankee was kept away, and as long as the poor whites of the section were under the control of aristocratic planters, and whose condition was in no degree better than that of the unfortunate blacks by whom they were surrounded—just so long the Bourbon views of Mr. Jefferson Davis prevailed, and just so long did the South continue in the Egyptian darkness that encompassed the people. This was an agreeable condition in the eyes of Mr. Davis, of his Bourbon admirers, and of Free Traders generally; but when the influences of Protection began to permeate this darkness, and the masses became aware of the fact that a brilliant future was before them if they would but recognize Protection as the ægis under which it was to be ushered in, then all available influences were brought to bear to retain the old status; and Mr. Davis, as the Free Traders well knew, was perhaps the strongest card they could play.

The position that Mr. Davis assumes in his recent article in *Belford's Magazine*, is that a Protective Tariff is unconstitutional, and that no duties should ever be levied except "for revenue only." Discussing this question, Prof. Denslow shows that protective duties are of several kinds. He says:

"The duty may be on a foreign article, whose importation would be large or steady without the duty, but whose importation may be either prevented or lessened by the effect of the duty. It may temporarily either raise the domestic price, or extend the domestic market for the like article of domestic production, with the effect to speedily substitute a production of the article at home in quantities sufficient to supply the domestic demand. It thus in effect imports the industry which creates the product, instead of continuing the importation of the product itself."

Regarding the constitutionality of the Protective system, the same authority says:

"It immediately occurs on a consideration of the circumstances essential to make a duty Protective that they are all

exterior to the statute, and cannot be judicially determined by any court from reading the law itself, on which the duty rests. The article must be importable in the commercial sense—*i.e.*, at a profit without the duty. It must at the outset be for some reason producible more cheaply outside the country than in it. If this condition be eliminated before the act goes into effect—*i.e.*, if the article ceases to be producible abroad at all, or as cheaply as at home, then between its enactment and its operation, both the protective and the revenue qualities of the act would cease. There would be no foreign product to protect against, and no importation from which to obtain revenue."

The quality of a duty may change at any time from changes in the conditions of production, especially when these occur in the country enacting the duty and in no other; and it is to produce these changes that the duty is increased or diminished. For instance, in Canada four dollars a ton duty on pig iron is a revenue duty, because under it nearly all the pig iron consumed in Canada is made abroad; but a higher duty, say six or seven dollars a ton, would induce the manufacture in Canada of about all the pig iron we required; and under such circumstances the duty would be undoubtedly protective.

If Mr. Davis could sweep back the waves of ocean with a broom—if he could stay the aggressive waves of Protection with such weak arguments as he advances—he might hope to see the United States recede to that condition of industrial dependence upon Great Britain in which he endeavored to place the Confederacy. Mr. Davis is a relic of the dead past. He represents no element of the community but that of the Bourbons, and this element is fast dying out and becoming disintegrated under the influences of Protection and the prosperity caused by it.

FREE TRADE—ITS IMMORAL ASPECT.

FREE Traders in Canada, like those in the United States, are constantly bringing every influence possible to bear to create a change in public sentiment regarding the vital question of Protection. Some Canadian journals, such as the *Hamilton Times* and *Montreal Herald*, are trying to enlist ministers of the Gospel in their cause, while Free Traders in the United States are using such played-out politicians as Mr. Jefferson Davis in the same direction. The *Times*, alluding to a Free Trade publication issued in Britain, in 1842, which commended the act of certain Christian ministers in declaring their opposition to the protective system that then prevailed there, assures to the Christian ministers of this country that "If Protection is permitted to endure in Canada for another decade a good many ministers will find it hard to get their salaries, for the system is surely, and not very slowly, impoverishing the people." The *Herald* reproduces a portion of a Thanksgiving sermon, preached by a Halifax, N. S., clergyman, which it characterizes as "a very straight and decided indictment of the tariff policy," and on which it preaches an even more rabid Free Trade sermon. In this it tells some wondrous news (?) about how the Creator constituted the earth with different varieties of climate, resources and productions, and inhabitants whose necessities were adapted to promote interchange of products; how tariffs are human inventions which dam up the natural channels of trade, thus becoming an instrument of legalized robbery; that these bad men, the manufacturers of tariffs, set themselves up as wiser

than the Creator; that the enactment of tariff laws is in contravention of the law of God, which says, "Thou shalt not steal"; that the underlying principle of Protection is covetousness—a violation of the command, "Thou shalt not covet"; that the Dominion Government legalizes the robbery effected by the tariff in order to satisfy the greed, or covetousness of the proteges of "benevolent legislation," to wit, the manufacturers, and approvingly quotes from the *Times* the question: "Is this a state of affairs that a Christian minister is bound to pass over in silence, because the occupants of the pews may be divided in opinion upon it?" It makes a direct appeal to the clergy in saying: "It would be refreshing to have some plain speaking on this question from the pulpits of our churches."

In the United States the Free Traders have procured Mr. Jefferson Davis to write an anti-tariff article for *Belford's Monthly Magazine*, in which the argument is advanced that a Protective Tariff is unconstitutional. This is no new theme with the extinguished ex-President of the Southern Confederacy. Mr. Davis cannot truthfully be said to be a man of but one idea, for his anti-bellum course in the United States Congress, and as Secretary of War under President Buchanan, during the few days of the Confederacy, of which he was the father, and ever since, in his retirement at Beauvoir, he has persistently taught and clung to two ideas—Free Trade, and that God has given right to white men to hold colored men in personal bondage and slavery; and these two ideas are so intimately and inextricably interwoven together in the mind of the poor old gentleman, and in the minds of thousands of his deluded followers, that they cannot possibly be eradicated. Mr. Davis is to-day quite as ready to argue in behalf of the right of the people of the South to hold human beings in slavery as he is to argue against the constitutionality of the tariff laws of the United States.

This scheme of enlisting ministers of the Gospel in political crusades is no new thing. In the South, pending the settlement of the slavery question, the clergymen there were enlisted by the politicians in their behalf, and these reverend gentlemen had no difficulty in finding abundant authority in the Bible to prove that a human being, if his skin was black, was a chattel that could be bought and sold in the market the same as hogs and cattle; and if perchance any of these clergymen did not show sufficient alacrity in preaching these truths of the Gospel as they were expounded by Mr. Jefferson Davis, they were reminded of the fact that their bread and butter were at stake; even as the *Hamilton Times* and the *Montreal Herald* suggest a similar condition to Canadian clergymen, if they fail to teach Mr. Jefferson Davis' doctrine of Free Trade.

INTERNAL REVENUE WAR TAX.

It is noticeable that whenever any of the Free Trade journals and newspapers of Canada, and of the United States also, have occasion to make allusion to the protective feature of the American tariff, they speak of it as a "war measure," or a "war tax." They seem to forget, or to intentionally ignore the fact that even before the passage of the Morrill Tariff Bill and during the war the United States Congress inaugurated a

system of internal taxation the like of which had never before existed in that country, and by which a very large part of the revenues there have been raised. At first this Internal Revenue tax was levied upon almost all trades and business professions—indeed in many respects it resembled the Excise tax levied in Great Britain. The principal articles, however, upon which this tax was levied were distilled and fermented liquors, and tobacco and manufactures thereof. This Internal Revenue law went into effect in 1863, we think, and under its operation since that time up to the close of the fiscal year ending June 30th, 1889, nearly four thousand millions of dollars have been collected. The amount in round numbers was \$3,700,000,000; while the total receipts of the Government in that period were about \$8,000,000,000. Of late years the internal taxes on many of the articles and things liable to them have been removed, and the revenue from such taxes is now raised principally on spirituous and fermented liquors and tobacco. Previous to the war of the Rebellion whisky was sold at retail at about twenty-five cents per gallon; but the tax placed upon it was \$2 per gallon; and very heavy taxes and restrictions were placed upon the industry in other ways. The original tax upon manufactured tobacco was thirty-two cents per pound; and it was unlawful for the farmer who raised the article to sell it except under certain restrictions. These industries—the manufacture and sale of spirituous and fermented liquors and tobacco—were not licensed by the Federal Government—they were taxed by it. The manufacture and sale of these articles comes strictly within the police powers of the States to regulate and control. In the case of Maine, Iowa, Kansas, and other States it was entirely suppressed; and with this State regulation and control the Federal Government have nothing whatever to do. If the industries are permitted by the States, then the Federal Government imposes and collects the taxes; but no license from the Federal Government carries any authority to carry on the business in any State where it may be prohibited by the State. The revenues of the United States are not increased by any taxes on the manufacture of whisky or beer in States where Prohibition prevails; and if all the States should pass Prohibition laws, the Federal revenues from this source would be annihilated. The bonded debt of the United States reached its maximum in 1865, when it amounted to \$2,756,000,000, and the total receipts of Internal Revenue from taxes on whisky, beer and tobacco alone from 1863 to 1869 amounted to \$2,677,000,000; and the nearness of these amounts to each other is so close that the fact impresses itself that the bonded war debt of the Republic might easily have been paid by the war taxes upon liquors and tobacco. As has heretofore been shown in this journal, the large surplus in the United States treasury would disappear if all Internal Revenue taxes were removed, and this without reference to the tariff duties upon imports.

ACCORDING to the report of the United States Commissioner of Internal Revenue, the income to the United States treasury for the fiscal year ending June 30, 1889, was \$130,894,434, which amount is about five per cent. greater than that of the preceding year. This large amount is considerably in excess of the surplus in the treasury, and shows that that surplus could be abated without any reductions being made in the tariff.

EDITORIAL NOTES.

SOME of our uneducated American contemporaries labor under the impression that no Government can be "by the people" except it be Democratic or Republican. There is no government on earth in which the will of the people is more respected and responded to with alacrity than that of Canada, and all countries over which the British flag floats

AT and about Hiawatha, Kansas, corn is worth only 20 cents a bushel, while coal is worth from 21 to 23 cents a bushel. Consequently the farmers are burning their corn for fuel, they having an abundance of it, declining to burn coal because they have no money with which to purchase it. This is in that market of sixty millions of consumers which the Commercial Unionists desire that Canadian farmers have free access to.

THE revolution in Brazil has removed the last vestige of kingship from the American continent. The Pan-American Congress now sits down to its work as an exclusive representation of governments "by the people." It will be interesting to note what its wisdom shall evolve for their welfare.—*American Artisan*.

Go to school, young man, and read the history of the American continent. School children in Canada know better than that.

THE Bristol iron mines are shipping by the C.P.R. to Pennsylvania 150 tons of ore daily. A contract has been made for supplying 50,000 tons yearly.—*Monetary Times*.

American furnacemen import hundreds of thousands of tons of iron ore annually, and pay seventy-five cents per ton duty thereon. These Canadian ores are equal in quality to any found anywhere in the world, and they should be manufactured into iron in Canada instead of sending them away for that purpose.

AT the Farmers' National Congress, recently held at Montgomery, Alabama, Hon. L. B. Norton, of Wisconsin, discussed agriculture, manufactures and commerce, taking a position favorable to the extension of improvements of the Mississippi and Missouri Rivers, and the construction of the Hennepin Canal across Illinois; also advocating a deep-water harbor in Texas, and the subsidizing of steamships plying between the United States and South American points. American farmers understand that these desirable objects cannot be attained under any other financial system than that which now prevails in their country.

THE Trades and Labor Council, of St. Catharines, Ont., are on the right track in taking strong grounds against the granting of bonuses or tax exemptions to manufacturers, but they do not go far enough in this direction. The exemption from taxation of churches and church property is in the direct direction of bonuses; and there is even stronger reasons why these should not be granted than that such favors should be shown to manufacturers. Expensive churches are luxuries in which only the rich can indulge; and, this being the case, none are better able to support these luxuries than the rich. Let the rich, who indulge in expensive churches, pay for them; but do not lay any of the burden upon the shoulders of others.

If it were not that so much property is exempt from taxation, thus increasing the burden upon the tax payers, manufacturers would not have occasion to ask for bonuses and exemptions.

THE *London Advertiser* speaks of the American war as an "effort to put down the traffic in human flesh." This shows lamentable ignorance as to the cause of the "late unpleasantness," as our neighbors facetiously call it. Slavery was not an issue on the go in. It was an afterthought.—*Toronto World*.

Both technically wrong. The war of the Rebellion was the result of the dissatisfaction felt by the slave power at their failure to establish slavery in the Territories. The fight for the privilege to do so had been carried on in the Congress, where it was defeated; and, because of that defeat, under the leadership of Mr. Jefferson Davis, the South attempted to secede and establish the Southern Confederacy. The cornerstone of the Confederacy was in two pieces—both relics of barbarism—human slavery and Free Trade. By the grace of God, the proclamation of Abraham Lincoln, and the determination of the American people, the first was forever destroyed as far as the United States is concerned, and by the same or similar influences, the second has been killed and will forever remain defunct as far as such influences can effect such results.

IN dealing with the iron mining industry of Canada there are three policies to choose from. The best is unrestricted reciprocity, which would aid in the development of the mines by opening the American market to the miners. The next best is simply to leave the industry alone. The worst is that pursued by the present Government, which does not encourage either the mining or the manufacture of iron, but, under pretence of doing so, puts a heavy tax upon every industry in the Dominion, in which iron and steel are used.—*Toronto Globe*.

IN dealing with the iron industry of Canada the best policy is to protect it to such an extent that it will develop and grow into such robustness that the wants of the Dominion in that direction can be supplied from the home production. At this time Canada has no such protection. In fact our duty upon pig iron is almost entirely "for revenue only;" for facts show that with a duty of only \$4 a ton the manufacture of pig iron in Canada cannot become a success. Unrestricted reciprocity is not necessary to enable the sale of Canadian iron ore to American furnacemen, for they import hundreds of thousands of tons of ore annually from other countries. What does the *Globe* mean in saying that the next best policy under which to develop Canadian iron mines is to "simply leave the industry alone?"

RECENTLY on the occasion of the visit of Governor-General Lord Stanley and his party to British Columbia, when en route from Esquimalt to Victoria, on H.M.S. *Amphion*, in passing up the Haro channel, that ship came in contact with the rocks in that channel, by which she sustained serious damage. Under the skillful management of the officers, and the admirable discipline of the crew, the ship was safely returned to Esquimalt, where she was placed in the dry dock there, and where she is now undergoing necessary repairs. The damage sustained by the *Amphion* was as follows: Starting from under the fore yard, the starboard side had been scraped by the rock and dented for more than one third of the ship's length. The rivets had all been started in the plates affected, and there were

immense punctures in the steel side. The bilge keel, or rolling chalk, had been doubled up like a concertina, while a large portion of it had been carried away. Extending from the fore end of the bilge keel was a split some four feet in length, and as much as six inches in width, where the rock had pierced the inner as well as the outer bottom. About forty feet from the bow, where the keelson itself was bent in, was another very ugly hole; while the keel, for about twenty five feet, was bent in at intervals, and little leaks had started in consequence. All four blades of the starboard propeller were bent out of their proper shape by coming in contact with the rock in turning after the collision with it. Probably the most serious injury of all was the bending of the iron frames of the ship, necessitating the placing in of several new ribs, which cannot be done unless the ship is in a manner rebuilt. Had the ship's bottom been of anything less than steel, her loss must have been certain. As it is, the work of repair will last many months, and involve an expenditure in the neighborhood of \$100,000. The number of plates marked for removal is about thirty-five.

THE "National Society for the Exemption of Machinery from Rating," is comprised of a number of British manufacturers, who complain that the excise duty in that country upon machinery employed in their factories is so great as to seriously handicap them in competing with manufacturers in similar lines in other countries. The Secretary of the Society, Mr. G. Humphreys Davies, in a communication to the *Textile Record* discussing the situation, says:

As the local rates are seldom less than 5s., and in some parishes as high as 10s. in the pound, the very material increase in the cost of the production of manufactured goods which must necessarily follow the assessment of the machinery by which they are produced, is easily seen, particularly when, as in the Chard case, the value of the productive machinery is 200 or 300 per cent. more than the mill in which it stands, this being by no means an uncommon case. Surely our countrymen are already sufficiently handicapped in competition with foreign manufacturers, whose trade is not only protected in their own country, but is frequently bounty-fed, without being weighted with further burdens from which their foreign rivals are entirely free. English manufacturers have no desire to evade their fair share of local taxation, but they do ask that the incidence of this taxation shall not be an obstacle in the way of their attempt to earn the profits which enable them to pay the taxation, and in earning which they relieve the rates by finding employment for surplus labor. It must be apparent that to tax machinery is as much a tax on labor as would be a poll tax on the operatives who work the machines, and as much a tax in restraint of trade as a tax on exports; for in neither case does the manufacturer care in respect of what or to whom he pays the tax; his whole concern is whether he will be able, after paying the tax, to produce his goods at such a cost as will enable him to sell at least as cheaply as his competitors.

Our Free Trade friends should take notice of the fact that in Free Trade Britain manufacturers are handicapped almost out of existence by excise rates. Mr. Davies speaks of the system as being even more prejudicial to the laboring classes than to their employers, while none benefit more by the establishment and prosperity of mills and factories than the farmer and tradesman, to whose doors they bring customers, and the landowner, whose property they enhance in value.

SPECIAL ADVERTISEMENTS.

Advertisements will be accepted for this location at the rate of two cents a word for the first insertion, and one cent for each subsequent insertion.

200 LIGHT GAS MACHINE for sale, only used two winters. Apply Wagner, Zeidler & Co., West Toronto Junction.

TISDALE'S BRANTFORD IRON STABLE FITTINGS.—We lose no job we can figure upon. Catalogue sent free. The B. G. Tisdale Co., Brantford, Canada.

IRON TURNING LATHE—12 inch over sheens, 20 inches in gap, 6-foot bed, in good order—for sale or exchange for small shaper. Standard Needle Co., Paris.

I WILL give a free deed of ten lots on the Scugog River to anyone who will start a manufacturing establishment employing a certain number of hands. A. D. MALLON, Lindsay, Ont.

BISCUIT FACTORY FOR SALE IN KINGSTON.—Including land, buildings and machinery, at \$5,000; going concern; good business; fully equipped. Apply to Macdonnell & Mudie, Kingston, Ont.

FLOUR MILL FOR SALE.—One of the best Water Powers on the Welland Canal. Could be converted for other manufacturing purposes. Address Richard Wood, St. Catherines, Ont. P. O. Box, 977.

A DYER—Blue vats and fancy colors in wool and piece. Fast carriage green cloths, tricots, flannels, etc., etc. Am at present engaged in the States, but desirous of coming to Canada. Address, GUBELINUS, this paper.

FOR SALE—at Merrickville, Ont., within five minutes' walk of the C.P.R. station or the Rideau canal wharf, a first-class Water-Power with substantial buildings suitable for roller mill or other heavy machinery. Apply to Mrs. M. P. MERRICK, Merrickville, Ont.

FOR SALE.—The Wilkinson Plough Co. (Lim.), of Aurora, Ont., are moving to West Toronto Junction about the 1st January next, and offer their works at Aurora for sale or exchange. They are large, complete works, and have a capacity of from forty to fifty ploughs a day. Apply either to Aurora, or to their temporary offices, 19 Wellington street east, Toronto.

FOUNDRY AND MACHINE SHOP FOR SALE IN DUNDAS—Formerly occupied by Thomas Wilson & Co., and lately by Cochrane Roller Mill Co., very suitable for manufacturing purposes; steam engine, boiler (new), also water power; a quantity of machinery and shafting in building. Apply to Thomas Wilson, Dundas; Kingsmill, Cattnach & Symons, Toronto; or Rruce, Burton & Bruce, Hamilton.

FOR SALE—A first class (American made) automatic gauge lathe, but very little used, and in perfect condition, with counter shaft, hangers and pulleys complete; suitable for rapidly turning hoe, fork, or broom handles; also one iron top jig saw, nearly new. Apply to Samuel May & Co., 89 Adelaide street west, Toronto.

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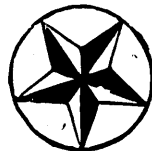
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MESSRS. TORRANCE & FINLAYSON have sold their interest in the Paris, Ont., *Review* to Mr. C. R. Fitch, of that place. A steam news press and new type are to be added to the already fine equipment of the *Review* office. This esteemed contemporary is always alive to the manufacturing interests of Paris and of Canada, and deserves all the prosperity that can possibly accrue to it.

THE Practical Publishing Company, 21 Park Row, New York, have sent us "Hints on House Building," by Robert Grimshaw. This is the second and enlarged edition of this exceedingly original and practical book. It contains a great deal of valuable information and a great many valuable suggestions regarding this important matter, and cannot but be very serviceable to the unprofessional in deciding what sort of a house they may desire to live in. The price of the book is only fifty cents, post paid to any address.

Don't fail to send twenty cents to *Boys and Girls*, Springfield, Ohio, for the Grand Christmas and New Year's numbers of that beautiful illustrated home magazine. Each number contains tales of adventure, scientific and historical articles, puzzles, fun, games and other interesting matter. A year's subscription would make a splendid Christmas present for a young friend. Regular price, one dollar. New subscribers, until December 20th, only fifty cents. This will include Christmas and New Year's numbers. Do not delay; send immediately.

"CHRISTIANITY AND AGNOSTICISM"—A Controversy. Consisting of paper by Henry Wace, D.D., Prof. Thomas H. Huxley, the Bishop of Peterborough, W. H. Mallock, and Mrs. Humphrey Ward. Paper, 30 cents. The Humboldt Publishing Co., 28 Lafayette Place, New York. The series of papers comprised in this work have been contributed mainly to the *Nineteenth Century* by the distinguished writers whose names are given above. Both sides write with vigor, and the adherents of each will probably think their champions have the better of the discussion. Therefore the book will have a popular sale, as the price, thirty cents, is a marvel of cheapness.

THE Christmas number of *Good Housekeeping* will have a paper from Edward Bellamy, author of "Looking Backward," entitled "Household Service Reform," in which Mr. Bellamy will look forward and give his ideas of how Household Service Reform may be practically developed. Subscriptions to *Good Housekeeping* will be received by agents of the American Express Company everywhere that company has agencies, and they will forward without charge to patrons. The company's money order receipt will be given each subscriber, thus guaranteeing them against any loss or miscarriage by mail. Subscribers are thus saved all risk, expense and trouble in forwarding their subscriptions.

THE *Canadian Traveller* is a journal published in Toronto in the interests of commercial travellers in Canada. It is published on the first Wednesday of every month, by the Rose Publishing Company, and that old and experienced newspaper man, Mr. John Goss, is the editor. This means that the *Traveller* will be an exceedingly interesting paper to commercial men, and to all who take an interest in the coming, going, doings and whereabouts of the "White Winged Angels of Commerce," as they are not inaptly called by Rev. Sam. Jones. The initial (November) number of the *Traveller* shows sixteen pages of appropriate matter, including a liberal display of advertising patronage. Subscription price \$1 per year.

MESSRS. G. & C. MERRIAM & Co., Springfield, Mass., publishers of Webster's Unabridged Dictionary, have sent us a copy of their special press edition of Noah Webster, "The Schoolmaster of the Republic." The picture is a memorial of the distinguished lexicographer and of his work in relation to popular education. The central object is a copy of the last edition of the unabridged dictionary, against the open pages of which lies a sheet of the manuscript of the original dictionary, which in turn bears the authentic Webster portrait. Beside the group lies an open copy of the old "Compendious Dictionary" of 1806. In the foreground, besides the library accessories, lies "Webster's Speller," of which sixty millions have been published in the United States, and with which almost every child in that country is familiar.

A LARGE portion of the *Dominion Illustrated* for Nov. 30th is devoted to the Kingston Royal Military College. The subject is fully and ably illustrated, comprising portraits of the commandants; and the historical descriptive letterpress makes the number of special interest to military and volunteer readers. A most instructive article on British Columbia, especially the wonderful growth of Vancouver, from the pen of Mrs. Arthur Spragge, will gratify those who are concerned in the progress of our Pacific Province. The rest of the number is up to the usual high standard. The *Dominion Illustrated* is published by the Dominion Illustrated Publishing Company. Mr. G. E. Desbarats, managing-director. Subscription \$4. Ad-

dress: 73 St. James street, Montreal, and 36 King street east, Toronto. For the North-West, J. H. Brownlee, Brandon.

Our Little Ones.—The Russell Publishing Company, 36 Bromfield street, Boston, Mass., are publishers of an exceedingly interesting monthly magazine bearing the above title, Volume X of which began with the November number. As its name indicates, it is specially intended for nursery use; and it is always sure of a most welcome reception by mothers who desire to interest the small people with beautiful, instructive and interesting pictures and stories. The paper is strong and heavy, well calculated to withstand much of the anxious pulling and hauling the book is sure to receive from the babies when the mail man delivers it at the door; and the type is sufficiently large to ensure easy reading by the young beginners. Subscription price \$1.50 per year.

Santa Claus is a publication recently sprung into existence in Philadelphia of that class specially intended for the delectation of young people, but of great interest to all readers. Unlike most other similar publications, and entirely unlike its great and universal namesake, *Santa Claus* makes weekly visits to its friends, there being fifty-two of these visits made during the year. The tone and morale of *Santa Claus* is all right, its special feature being its strongly practical character—a feature which is under the general direction of Professor C. M. Woodward, of Washington University, St. Louis, a gentleman who is as greatly loved as he is widely known, and who will tell the boys and girls why and how grown people do things. \$2.00 per year, but sample copies for inspection will be sent free. Address The Santa Claus Company, 1113 Market-St., Philadelphia, Pa.

Outing is a magazine probably quite as well known in Canada as in the United States among lovers of out-door sports, to which it is specially devoted. December number of *Outing* contains some exceedingly interesting articles, the leading one being "Wabun Anung," a tale of sport in the Great Lakes' region; while second place is given to "New York's National Guard in Camp," both of which are beautifully illustrated, as are many of the other articles. In the January number will appear continuations of the two articles here alluded to, begun in December, and also numerous other illustrated morceaux. The publishers of *Outing* promise rich treats that are to be extended all through the coming year, among which will be one on curling by Mr. James Hedley, the great Canadian authority. The short stories and the special articles in each number for "Sports for Women," are sure to interest most of our readers. The price of *Outing* is only \$3 00 a year. All bookstores and newstands have the magazine. Address The Outing Company, 239 Fifth avenue, New York City

THE *Scientific American*, probably the most popular scientific paper in the world, which was established in 1845 and is now in its forty-fourth year, continues to maintain its high reputation for excellence, and enjoys the largest circulation ever attained by any scientific publication. Every number contains sixteen large pages, beautifully printed and elegantly illustrated. It presents in popular style a descriptive record of the most novel, interesting and important advances in science, arts and manufactures. It shows the progress of the world in respect to new discoveries and improvements, embracing machinery, mechanical works, engineering in all its branches, chemistry, metallurgy, electricity, light, heat, architecture, domestic economy, agriculture, natural history, etc. It abounds with fresh and interesting subjects for discussion, thought or experiment. It tends to improve the mind, encourages to self-exertion, activity and development; furnishes hundreds of useful suggestions for business, and for simple, light and profitable occupations. It promotes industry, progress, thrift and intelligence in every community where it circulates. Munn & Co., publishers, 361 Broadway, New York. Terms, \$3.00 a year; specimen copies free.

THE tunnel now being constructed under the St. Clair river by the Grand Trunk Railway Company, connecting Sarnia, Ont., and Port Huron, Mich., is being pushed with great vigor. There are now about 200 feet completed on the Canadian side and between 400 and 500 on the American side. The work is progressing at the rate of about seven feet a day on each side, and will be finished, it is estimated, in about two years. The opening approaches are about a mile long on both sides of the river, and 60 feet deep at the subterranean entrances. The sides are now shored up with timbers, but will be replaced with mason work by the time the tunnel is complete. The ground under the river is a hard blue clay, and it was thought at first that the shields could be driven through this without any digging. With this idea twelve hydraulic rams were provided, each capable of exerting a force of 24,000 pounds, but they could not drive the shields an inch. The plan was then changed, and a crew of eight men, with picks and axes, now dig out a certain section in the centre, the pressure is then applied, and the

shields are driven eighteen inches, the clay curling into the centre space dug out by the men. This clay is then thrown upon cars and drawn out and the men dig out another central section. As soon as the shield is advanced, the wall, consisting of circular sections of iron, packed at the joints with asbestos, is put in. A double railroad track is also laid as the work progresses, so that when the two shields meet somewhere near the middle of the river, the tunnel will be all complete. In case water enters from the bottom of the river, freezing machines are on hand to freeze it and prevent the inflow. The tunnel will cost about \$2,500,000, and is being engineered by the Grand Trunk Railway Company.

BEET SUGAR.

We are pleased to hear that during the past season some practical steps have been taken with the view of testing the adaptation of the soil and climate of the Province of Ontario for the production of sugar beets of sufficiently fine saccharine quality to warrant the investment of the capital required for the manufacture of sugar from these roots.

Mr. Wilfred Skaife, B.A., manager of the Berthier Beet Sugar Factory, in the Province of Quebec, imported last spring some of the most approved seed from Central Germany and Bohemia. Being desirous that several experiments should be made with this seed in the Province of Ontario, he sent quite a large quantity to Mr. Robert H. Lawder, of this city, who distributed it pretty extensively through different counties, from Essex in the West to Grenville in the East. One package of the seed was handed to Hon. Mr. Drury, Ontario Minister of Agriculture, at his request, and was forwarded by him to the Government Farm at Guelph, and sowed there.

The experiments in the extreme western and eastern counties were not very successful owing to several causes: but towards the end of September the reports as to the crop, then nearly matured, were very favorable from all the points in the counties of York, Ontario, Durham, Northumberland and Peterboro', where the seed had been sown. Representations were made to the Agricultural Departments at Ottawa and Toronto, that it was desirable that all possible information should be obtained by a personal visitation of the different growers, relative to the results of the experiments made; the character of the soil, the kind of seed used, the probable yield per acre, and the cost of production. Hon. Mr. Drury, who has taken a warm interest in this matter, employed Mr. Lawder to make this tour of enquiry, and at the same time to forward samples of each lot to Professor James, at the Ontario Agricultural College, Guelph, for his analysis, and report as to quality.

Mr. Lawder procured twenty-five samples from different growers. Being unaware that beet roots are frequently severely trimmed on delivery at the sugar factory, if the growers had neglected to do this on the field, he sent samples of each lot to Mr. Skaife, for his report as to deduction for trimming; and at the same time for his analysis of quality. The number of roots taken up was 334; weight when taken up, 791 lbs; quantity deducted by Mr. Skaife, for tare or trimming, 65 lbs.; net weight, 726 lbs.; average weight of each root, 2 lbs. 2½ ozs. Most of the beets were grown in the same field and treated in the same manner as mangolds; rows about 2 feet apart, and plants about 1 foot apart in the row. Allowing the excess over 2 lbs. in average weight to cover plants which missed altogether or were defective, roots averaging 2 lbs. each, at above distances, would yield a little over 21½ tons per acre. Mr. Storey, Manager of the Ontario Farm at Guelph, estimates the probable yield at 20 tons per acre.

Unfortunately no instructions were sent along with the seed, as to proper methods of cultivation, and farmers only looked to the production of large sized roots. Most of them reported that the season had not been a very favorable one for roots, and that in an average season the weight of the roots would be considerably greater. The result of these experiments clearly establishes that the sections of the Province visited can produce much larger crops of beets than are generally obtained in the best beet-raising districts in Europe.

In order to the production of beet roots of fine shape and good saccharine quality, three important rules, among others, must be observed: deep cultivation, close growth of plants, and keeping the whole of the root within the ground. The experience, both in Europe and California, is, that with rows wide apart, and the plants at long distances from each other, larger roots are obtained, but the percentage of sugar is reduced so as to frequently render the beets of no value to the sugar factory. By reducing the distances between the rows and the plants, a much higher quality of beets is obtained, without diminishing the yield. With rows 2 feet and plants 1 foot

apart, an acre would produce 21,780 plants; with rows 18 inches and plants 7 inches apart, an acre would produce 49,808 plants; so that if the latter plants only averaged half the weight per root which the former did, they would produce more tons to the acre. This extra yield, and the higher price per ton which the factory would pay for superior quality, would abundantly pay for the extra labor and cost of close cultivation. It is to be regretted that the growers were not advised of the absolute necessity of keeping the roots continually hoed, so that every part of them would be always under ground. This is indispensable for securing good quality.

Perhaps the most unfortunate circumstance connected with these experiments was the lateness in the season in which the seed was sown. All the farmers agree that the seed should be sown as early in the spring as the soil will permit, and fully 3 to 4 weeks earlier than was done this season, when the date of sowing was from about 8th to 15th May.

Mr. Skaife's analysis and report on the quality of the beets show some very singular features. On the same field and from the same row in the field, roots were obtained showing in some cases a very high, and in others a very low percentage of sugar; some roots of very good shape, others poor shape. In nearly all cases the deficiency in quality is attributed to want of proper hoeing. Some of the roots sent were raised from ordinary seed procured at village stores. For sugar manufacture these beets are of no value. He analysed 100 roots raised from his own seed. The percentage of sugar of these varied from 9 per cent. to 17.10 per cent.; the average being 13.75 per cent. On this point Mr. Skaife reports:—"The high percentage of sugar in a great many roots would tend to show that beets, if properly cultivated, and if sowed early enough, would easily mature by the end of October, and probably equal the best European roots." "The beets would have polarised much higher, and the quotient of purity would have been much better had the roots been all below ground." "On the whole, it may be said that the results are encouraging, not that all the beets sent were good, for they were not, being unripe and most irregularly cultivated, but one can see that excellent results might be obtained." When Professor James publishes his analysis and report, further useful information as to quality will be obtained.

Many prominent and experienced farmers were consulted on the cost of production, and their estimates vary very materially, especially as to value of the manure which should be charged against the crop. One of these estimates, which was carefully prepared by two of the leading farmers in South Ontario, in which they allowed \$5.00 per acre for rent, and charged for all the labor as if done by hire, was \$26.00 per acre, exclusive of hauling to market. This almost exactly corresponds with the estimates by the Bureau of Industries of the cost of growing an acre of turnips in that section of the Province, in 1887.

It is supposed that a beet sugar factory could afford to pay \$4.00 per ton (2,000 lbs.) for fair average quality of roots delivered at the works. At 20 tons per acre, this would make amount paid for crop \$80 per acre, as compared with the Bureau's estimate of value delivered at market of crop of an acre of turnips, \$42.60, and tops \$1.33; in all \$43.93. The leaves and necks of the beets left on farm would be very much heavier and more valuable than the tops of turnips. Farmers are quite enthusiastic over the prospect of finding an extensive and reliable cash market for a root crop; not only because of the amount obtained for the beets, but because of the great advantage accruing to the land and to future grain crops from the thorough cleaning through root cultivation.

The Dominion imports annually about 200 million pounds of raw sugar for refining purposes, of which sometimes as much as 20 per cent. is beet sugar from Europe. Mr. Claus Spreckles, the celebrated sugar refiner of the United States, has invested several million dollars in beet-sugar factories, and has given it as his opinion that in a few years that country will manufacture from beets all the sugar required for consumption there. We believe that the soil and climate of this Province are especially adapted for the successful cultivation of this root. Allowing 10 per cent. of sugar as the average product from beets, there is an opening in Canada for the production of 50,000 acres, yielding to the agriculturists \$4,000,000 per annum, and causing to be erected from 30 to 40 factories, affording employment to thousands of artisans. Considering the amount to be expended in wages and material of native origin, from the sowing of the seed to the out-turn of the refined sugar, the beet-sugar industry may very soon prove to be the most extensive and prosperous enterprise in Canada. A vast number of statistics might be adduced showing the remarkable development and success of the beet sugar trade. One will suffice. Not many years ago Germany used cane sugar altogether for its own consumption. In 1886-87, it manufactured into sugar 8,306,671 tons of beet roots, and exported raw and refined sugar amounting in value to \$69,496,860.

Manufacturing.

This department of the "Canadian Manufacturer" is considered of special value to our readers because of the information contained therein. With a view to sustaining its interesting features, friends are invited to contribute any items of information coming to their knowledge regarding any Canadian manufacturing enterprises. Be concise and explicit. State facts clearly, giving correct name and address of person or firm alluded to, and nature of business.

VALUABLE beds of red hematite iron ore, of great richness, have been discovered near Canmore, N.W.T.

THE Canadian Locomotive and Engine Company, Kingston, Ont., are engaged in building fifteen locomotives.

THE Dominion Button Works, at Berlin, Ont., are running overtime to enable them to keep up with their orders.

MESSRS. C. W. LAING & Co's cheese factory at Sheffield, Ont., was destroyed by fire Nov. 27th, loss about \$1,200.

DONALDSON'S saw mill at Wilbur Station, near Kingston, Ont., was destroyed by fire Nov. 27th, loss about \$3,000.

THE saw mill of Mr. William Patterson, at Wallaceburg, Ont., was destroyed by fire Nov. 29; loss, about \$10,000.

IT is claimed that the deposits of coal recently discovered near North Sydney, C.B., contain about 20,000,000 tons.

A BED of superior fire clay has been discovered on the property of the East Wellington Coal Company, near Nanaimo, B.C.

THE Dominion Canning, Preserving and Distilling Works, at Windsor, Ont., will add a vinegar factory to their establishment.

MESSRS. CRAIG & FILS, of Montreal, have contracted to supply the town of Granby, Que., with their system of electric lighting.

THE Record Foundry and Machine Company, Moncton, N.B., are building a new moulding shop in connection with their works.

THE moulding shop in connection with Messrs. Dobbie & Stuart's foundry at Thorold, Ont., was destroyed by fire Nov. 22nd, loss about \$1,000.

THE Kingston Oil and Enamel Cloth Company, Kingston, Ont., has become incorporated with \$50,000 capital stock, and will greatly enlarge their works.

THE flour mill machinery manufacturing establishment of Messrs. Wm. & J. G. Greey, Toronto, was damaged by fire, Nov. 13, to the extent of about \$10,000.

THE Toronto Rubber Company, this city, have just furnished a Preston aerial turn-table fire escape to the city of Victoria, B.C.; also a quantity of fire hose.

THE British Columbia Tanning Company, whose extensive works are being erected at Nanaimo, B.C., will begin operations as soon as their machinery is received.

THE Standard Card and Paper Company has been incorporated at Montreal with a capital stock of \$10,000, for the manufacture of prepared paper, cardboard, etc.

MESSRS. LAW BROS. & Co., New Edinburgh, Ont., have been awarded the contract for supplying the steel water pipe for the extension of the waterworks at Ottawa, at \$7,558.

MESSRS. GOLDIE & McCULLOCH, Galt, Ont., have just placed a duplicate Wheelock engine in the agricultural implement works of Messrs. A. Harris, Son & Co., at Brantford, Ont.

MESSRS. BELDING, PAUL & Co., Montreal, manufacturers of sewing silks, etc., have merged their business into a joint stock company under the name of the Belding-Paul Company.

THE Riordan Paper Mills Company has been incorporated, with a capital stock of \$500,000, with headquarters at Merriton, Ont., at which place the well-known Riordan paper mills are.

THE Canadian Bridge and Iron Company has been incorporated at Montreal with a capital stock of \$75,000, for the construction of iron bridges, and the manufacture of iron work generally.

THE Oxford Furniture Company's furniture factory, at Oxford, N.S., was destroyed by fire Nov. 17th, loss about \$60,000. Some fifty hands were thrown out of employment by the event.

MR. AIRD, of Montreal, wants the municipality of St. John's, Que., to grant him a bonus of \$10,000 to start a boot and shoe factory there which will give employment to about 75 hands.

THE Cobban Manufacturing Company, of Toronto, whose extensive plate glass, gilding, picture frame and moulding works are in this city, have been incorporated, with a capital stock of \$150,000.

MESSRS. N. CAHILL & Co, Forest, Ont., are proprietors of a fine brick roller flour mill five stories high, 80x60 feet. There are 13 sets of rollers, 12 reels, 5 purifiers, etc. The capacity of the mill is 200 barrels per day.

THE St. Lawrence Starch Company, of Port Credit, Ont., has been organized with a capital stock of \$80,000, for the manufacture and sale of starch and other products, including grape sugar, glucose syrup and dextrine.

MESSRS. M. WILSON & Co., manufacturers of agricultural implements, Hamilton, Ont., have acquired new premises where they will greatly increase their output, and give employment to a largely increased number of hands.

MESSRS. MAITLAND & RIXON, Owen Sound, Ont., will erect a sawmill at that place with capacity to cut 5,000,000 of lumber a year. They will equip their mill with the machinery now in their mill at Tobermory Harbor, Ont.

MESSRS. BROOKS & PEARSON, who recently acquired the Russell foundry at Ingersoll, Ont., are asking that town for a bonus, or loan on long time, to enable them to extend their works and give employment to a larger number of hands.

THE Provincial Natural Gas and Fuel Company, with headquarters at Toronto and Welland, Ont., has been organized with a capital stock of \$500,000, for the purpose of boring for natural gas, etc., in the counties of Lincoln and Welland, Ont.

THE Dovern Court Twine Mills Company of Toronto has been incorporated with a capital stock of \$100,000. This is an enlargement of the business heretofore conducted by Messrs. Avis & Co., for the manufacture of twines, cordage, rope, etc.

THE Lambton Woolen Mills, at Lambton, Ont., of which Messrs. Phillips & Berry are proprietors, are equipped with five full sets of English cards and 34 looms, the products of which are blankets, flannels, etc. They give employment to about 70 hands.

THE Belleville Rolling Mills Company, Belleville, Ont., which was recently incorporated, and who are building mills at that place, will have them ready for operation early in the coming year. They are obtaining much of their machinery in the United States.

THE Glencoe Flouring Mills, at Glencoe, Ont., of which Messrs. Cameron & Cameron are proprietors, is a substantial four-story building with capacity to manufacture 75 barrels of flour per day. The machinery was all built by Messrs. Goldie & McCulloch, Galt, Ont.

MESSRS. J. THORNTON and C. MANNING, two gentlemen from Wisconsin, are staying at the Douglass House. They are out here looking for a site for a sawmill, and if they find a satisfactory one will probably erect one of the largest mills in the Province.—Vancouver, B.C., *News*.

MESSRS. ALDRED & SON, Glencoe, Ont., have recently erected a fine two-story building 120x30 feet, and an annex 80x20 feet, to be used in connection with their agricultural implement works and general foundry. This firm are manufacturing a brick machine which gives most excellent satisfaction.

THE new round house being built for the Intercolonial Railway Company at Moncton, N.B., by Messrs. Rhodes & Curry, is being pushed to completion very rapidly. The erecting shop extension, also being built, is 210 x 107 feet, and will be, when completed, one of the best equipped establishments of the kind in Canada.

THE Casselman Lumber Company, with headquarters at Casselman, Ont., has been organized with a capital stock of \$250,000 for the purpose of manufacturing timber, lumber and wood goods generally, to deal in timber limits, and run steamers and barges, to do general store, grain and milling business, to make bricks, etc.

A UNITED STATES firm owning a large timber limit on Seymour Arm, is seriously considering the erection of a large sawmill at some point in the interior of British Columbia, on the line of the Canadian Pacific Railway. The choice will likely be between Sicamous and Kamloops, if it is decided to erect the mill.—Kamloops, B.C., *Sentinel*.

MR. E. F. R. ZOELLNER, of Mount Forest, Ont., the large furniture manufacturer, reports a great demand for bedroom sets. His factory is at work night and day on these and other work, and he has been obliged to put in electric lights for this purpose, being, in this respect, probably the first in the Dominion.—*Canadian Journal of Commerce*. The factories in Ontario and throughout Canada that are equipped with electric light are to be counted by scores, probably hundreds.

THE J. C. Ayer Company, manufacturers of patent proprietary medicines, Lowell, Mass., will establish works in Montreal for manufacturing supplies for the Canadian market. The North American Glass Company, of Montreal, will make an extensive addition to their already large glass works, where the compounding of these medicines, packing, etc., will be done contiguous to the source of supply of their glass. The business will add another tall chimney to our Canadian manufacturing establishments, which will be another monument to the glory and success of our National Policy.

THE Dodge Wood Split Pulley Company, Toronto, a cut of whose factory at West Toronto Junction appears on page 391 of this issue, call attention to the fact that they are manufacturers of cone pulleys, friction pulleys, tight and loose pulleys, and all sorts of pulleys, which, they say, are from 40 to 70 per cent. lighter than corresponding sizes of iron pulleys, and which are the lightest, cheapest, strongest and best balanced pulleys in the world. They also mention their belt pulleys, which are described as strong enough for any power. These pulleys are made in all sizes from 6 inches to 16 feet diameter; and full stocks of them are constantly on hand.

THE Doty Manufacturing Company will locate at Collingwood, Ont., the town having agreed to pay a bonus of 6 per cent. per annum for ten years on the output.—*Canadian Journal of Commerce*. This item probably has reference to the John Doty Engine Company, of Toronto, who are establishing extensive shipbuilding works at Collingwood, where they will build a dozen or more large iron steamers for the lake trade, a fleet of iron steamers for the Toronto Island service, etc. This shipyard will be operated in connection with the Doty Company's engine and boiler works in this city, which will be, when the additions now being made are completed, probably the most extensive works of the kind in Canada.

JAMES D. LEARY is making preparations to build another large timber raft at Joggins, N.B., and has seventy-five men at work in the woods getting out the timber. When there will be enough snow on the ground, fifty or sixty teams will haul the required materials to the scene of building operations. The raft will consist of 27,000 sticks of timber, with about 1,000,000 feet of hardwood in the centre, and will weigh in the neighborhood of 11,000 tons. Its length will be 750 feet, 100 feet longer than the former raft; the width will be 65 feet, 10 feet wider than the other raft. The present raft will be 45 feet deep, and will draw 25 feet of water. The chains for binding the raft together, and the steel wire rope for the rigging, etc., will be imported from England.

ON Nov. 13th, the dam of Mr. Joseph McClellan's flour mill, near Alton, Ont., gave way, doing but slight damage to the mill. The flood accumulated in the pond above Mr. William Algie's woolen mill, and carried away both the dam and a part of the mill, causing a loss to him of about \$4,000. At Mr. R. Ward's woolen mill the dam and bleach house were carried away, but no damage was done to the mill proper; loss about \$2,000. Mr. R. Meek's dam was washed away, but not his mill; loss of dam and damage of stock about \$500. The damage to the dam at McKinnon's mill was about \$1,500. Mr. Thomas Harris' stove foundry was destroyed, loss about \$2,000. The flood found its way into the Credit river, and wrecked the Canadian Pacific Railway bridge spanning that stream. The total loss caused by the flood amounts to about \$25,000.

THE Toronto Lithographing Company, Toronto, have sent us a number of specimens of lithographing work recently produced by them, and the beauty and excellence of which deserve special mention. There are three-quarter size portraits of the Hon. Thomas Greenway, Premier of Manitoba, and Hon. John Norquay, ex-Premier, both of which are supplements to the *Winnipeg Sun*. These pictures are uncolored, are exceedingly truthful and life-like, and suitable for framing. Among the colored lithographs are special advertising pictures got up for the Doherty Organ Company, Clinton, Ont.; "A Day With the London Hunt," to be presented with the Christmas number of the *London, Ont., Advertiser*; a view of the ocean S.S. "Lake Ontario"; a skating scene, for the Star Manufacturing Company, Halifax, N.S.; a domestic scene for Messrs. C. C. Richards & Co., Yarmouth, N.S.; an Indian encampment scene for Messrs. Tasse, Wood & Co., Montreal; a fine suggestive picture for the Dominion Organ and Piano Company, Bowmanville, Ont., and the cover and presentation plates of the *Toronto Globe's* Christmas number. These are but few of the hundreds of beautiful plates, cards, etc., produced by this reliable Canadian concern.

THE Canada Atlantic Railway bridge across the St. Lawrence river at Coteau, Que., will probably be completed and ready for traffic by the middle of the current month. The distance from shore to shore is rather over a mile and three-quarters, but there are intervening islands, which relieve the bridging considerably, and

over which tressle-work and filling of earth must make the road-bed. Seventeen fixed spans are necessary to complete the connection, one of 139 feet, two of 175 feet each, ten of 217 feet each, and four of 223 feet each; the swinging bridge of the north channel covering 355 feet over all. The islands are Giroux Island, 905 feet wide, and Round Island, 1,220 feet wide. The approach to the bridge on the north side commences two miles from the water's edge, with a gradual rise, and reaches the height of 22 feet, from which the bridge continues a dead level and a perfectly straight line. The southern approach commences about 2,500 feet from the water's edge and rises at a grade of about 30 feet to the mile until within 700 of the river, when it runs level with the bridge. The maximum depth of water in which the piers stand is 28 feet in the north channel and minimum is 24 feet. The piers are 46½ by 10 feet at the base, and 24 feet by 8 feet at the top. They are built into the solid rock bottom in nearly every case.

A NEW YORK city electric lighting company is now erecting what are claimed to be two of the largest stationary boilers in the world. They are known as the Climax boiler and are of the vertical pattern. The inner core or cylinder is 48 inches in diameter, the tubes being of horseshoe shape, 600 in number, three inches in diameter, arranged around the outside of the shell and expanded at both ends into the same, one end about two feet above the other, thus making circulation perfect. This style of boiler is not set in brickwork, but is surrounded by a wrought iron casing, lined with firebrick, the entire diameter being 13 feet 4 inches and height 30 feet 11½ inches. This peculiar arrangement of tubes gives the greatest heating surface, in proportion to the size, of any boiler made, being in this case 6,000 square feet. This, with the 100 square feet of grate surface, shows the efficiency of this style of boiler. The weakest part of this boiler, the web between the tube holes, is said to have a factor of safety of 10. The boiler will carry a pressure of 200 pounds to the square inch. A boiler of similar type was erected some five years ago at Lorillard's tobacco works, Jersey City, N.J., and has been constantly in use, day and night, as well as Sundays and holidays, since that time, and has not cost anything for repairs beyond that to the brickwork in the furnace, which has been very trifling.

MESSRS. WILLIAM KENNEDY & SONS, of Owen Sound, Ont., are establishing the water works for the town of Niagara Falls, Ont. The work is interesting from the fact that a greater part of it is being done near the brink of nature's great wonder, the Horseshoe falls. A tunnel 125 feet long, six by seven feet in size, the mouth of which is 35 feet below the brink of the precipice, and which has now reached a depth through solid limestone rock of about 50 feet, is being made to serve as a tail race from the wheel house, which will be 20 by 16 in size, and stands next to the pump house, the size of which will be 36 by 36 feet. These buildings will stand just beyond the Table Rock house. The necessary water to operate the works will come to the wheel house through a wooden tube 6 by 8 feet in size and about 600 feet long. A shaft is being sunk through the rock to allow of the discharge of the volume of water coming through the tube on to the water wheel and into the tail race or tunnel. At the upper end of the wooden tube will be an open cut 12 feet wide and 11 feet deep, extending about 150 feet outwards towards the northern end of Cedar Island, where the water is deep



NOTICE.

THE tamarac, spruce, jackpine and small red pine timber of not less than eight inches in diameter, on the Indian Reserve situated on the east side of the Lesser Wabigon Lake, Ontario, will be offered for sale at auction at the Court House, at the town of Port Arthur, on Monday, the 2nd December next, at the hour of 2 p.m. The Reserve in question contains 7,730 acres, and is favorably situated for getting out the timber cut thereon. The large red and white pine timber is reserved from sale.

CONDITIONS OF SALE.—Bonus cash at time of sale, and dues to be paid before removal of timber on all timber cut on the limit in accordance with tariff of dues of this Department, also an annual ground rent to be paid of \$3.00 per square mile, and a license fee of \$4.00. The purchaser to remove the timber within three years from date of sale.

For further particulars please apply to John McIntyre, Esq., Indian Agent, Fort William, or to the Department of Indian Affairs, Ottawa. No other paper to insert this advertisement without authority through the Queen's Printer.

L. VANKOUGHNET,
Deputy of the Supt. Genl.
of Indian Affairs.

Dept. of Indian Affairs,
Ottawa, 2nd Nov., 1889.

and will assure a good power supply. Outside or inside the wooden tube, more probably the latter, will be placed a 14-inch pipe, the end of which will be extended some few feet beyond the mouth of the open cut near Cedar Island, and through this pipe will come the water that will be furnished throughout the town for general use. There will be two sets of pumps, three in a set, each set having a capacity of 1,500,000 gallons every twenty-four hours.

MESSRS. BINGHAM & WEBBER, the "premier" catalogue printers of Canada, whose extensive printing works are at 25½ Adelaide street east, Toronto, have recently got out some of the finest jobs of printing ever produced in the Dominion, and equal to any ever produced in any country. A specimen of their work now before us is a new catalogue of Messrs. J. & J. Taylor, proprietors of the Toronto Safe Works, and manufacturers of fire and burglar proof safes, bank locks, prison locks and other securities. This catalogue covers considerably over a hundred pages, illustrated throughout with representations of the many different styles of safes, locks, etc., manufactured by the concern. And it is regarding the excellence of these illustrations—their clearness and distinctness—that special mention should be made; and not of these only, but also of the text descriptive of them. There is no meretricious attempts at fancy displays in the work or in the selection of the type, but the *tout ensemble* is just what business men of good taste would naturally select whereby to present their business to their patrons and friends. Of course the paper on which the printing is done is of the very finest and best quality. Another remarkably fine specimen of work turned out by Messrs. Bingham & Webber is the Christmas souvenir number of the *Toronto Globe*. This beautiful publication is in line with similar publications published in the United States and in Europe; and while without doubt it is the equal of any of them, it is emphatically and distinctively Canadian in every feature from cover to cover, and including the covers, which are beautifully lithographed, and the large lithograph pictures for framing, given with the souvenir. This lithograph work was done by the Toronto Lithographing Company, but all the type-setting, printing, binding, etc., is the work of Messrs. Bingham &

Webber. The subjects discussed in this souvenir are all Canadian, by Canadians, and the pictures are all of Canadian people, places and things; and in getting out this most creditable Christmas number the *Globe* has demonstrated that neither Commercial Union nor annexation to the United States, its peculiar political heresies, were necessary in the production of its souvenir.

In the last issue of this journal mention was made of the scheme then materializing to utilize the immense water power of Kakabeka Falls, near Port Arthur, Ont. Since then the American capitalists who have the enterprise in hand have been continuing negotiations and completing arrangements for the full consummation of the undertaking. Matters are now in such a forward state that nothing remains to hinder the commencement of active operations for carrying into effect the great scheme and developing the water-power of the rushing cataract. All necessary land has been secured, and the capital stock of company and bonds subscribed, so that the money is now up for carrying the undertaking to completion. Work will be commenced at once by day and night gangs in putting in the necessary tunnel along the bank of the river for utilization of the water power. This tunnel will be ready for early spring. The first enterprise undertaken will be the establishment of concentrating and smelting works in which all the heat will be generated by electricity. This will certainly prove a great boon to the mining district. Instead of prospectors investing their money in erecting mills they can ship their ores, both low and high grade, to the concentrating and smelting works at the falls, and with the product go ahead with future development. It will make it possible for men with limited capital to enter actively into mining operations, and is bound to give a great impetus to mineral development throughout the entire district. A blast furnace, pulp mill, flouring mills and other industries will follow the erection of the smelting works. Work on the new hotel will be commenced early next year, and will be completed by the last of June. A large number of dwelling houses, as well as other buildings suitable for business places, will be erected as soon as the snow leaves the ground. In the meantime engineers are laying out the town site,

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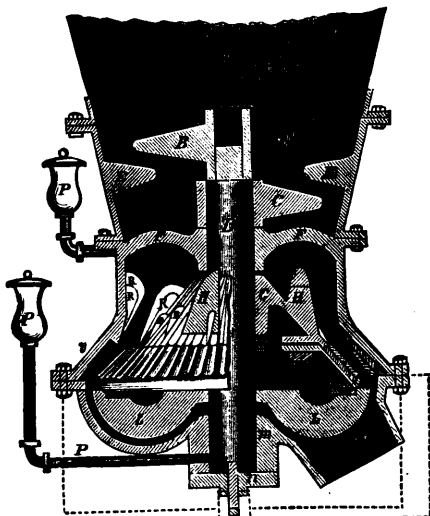
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The Segments will retain their cutting edges longer than those of any other Mill, and when dull can be quickly and cheaply renewed.

It has the following good qualities, viz.:—Fast grinding evenly prepared bark; is easily erected and small power required to drive it.

It works with ease in damp or frozen bark, and breakages are prevented by safety coupling.

PAXTON, TATE & CO.,
PORT PERRY, ONT.



timber is being cleared off and streets laid out. In fact, everything in connection with the work will be pushed forward with the utmost speed, and next year the long neglected and great Kaka-beka falls on Kaministiquia river will be a scene of bustle and activity. The promoters of the mammoth scheme are thoroughly enterprising and energetic men, and neither money nor effort will be spared in making the undertaking a triumphant success.

CANADIAN NAVAL ARCHITECTURE.

ONE of the finest specimens of naval architecture and marine engines ever produced in Canada, and equal to any ever produced any where else, is the steam tug *Lorne*, recently built by the Albion Iron Works Company, of Victoria, B.C., for the Messrs. Dunsmuir of that city. THE CANADIAN MANUFACTURER, desirous of giving its readers an accurate description of this vessel, has procured the following authentic information regarding her.

The *Lorne* is the property of the Messrs. Dunsmuir, and was built for towing purposes in and about the harbor of Victoria and along the Pacific coast. Her dimensions are: 154 feet 8 inches length over all; depth of hold, 14 feet 3 inches, and molded breadth of beam 25 feet 10 inches; her timbers, planking, ceiling, decks, houses, etc., are of the very best quality of timber to be found in British Columbia, and the construction is all that could be accomplished by the very best skill and workmanship. She is copper fastened, and her bottom is coppered with extra heavy metal. Planking is five inches thick; ceiling seven inches, and frames 7x10 inches, double spaced twenty-four inches between centres. The propeller or screw, which is of bronze, is four bladed, twelve feet in diameter, and weighs 8,000 pounds. The blades are smooth finish and are detachable, being affixed to the hub or centre-boss by screw bolts, so that in case of accident to a blade it can be replaced without having to reject the entire screw. It is arranged to have a variable pitch, with a mean of 15 feet 6 inches, and will, when working at one hundred revolutions a minute, propel the vessel about fourteen knots an hour, and under very favorable circumstances fifteen knots. The vessel is fitted with steam capstans and windlasses, and every other desirable modern appliance. Below deck, aft, is a comfortable cabin, well ventilated and lighted, from which access is had to four staterooms. Forward of the coal bunk-

ers is the fore-castle for the crew; on the main deck are the engine room and the galleys, which are equipped with a complete outfit of steam cooking apparatus, utensils, etc. Under the pilot house is a comfortable cabin for the chief engineer, and another for the mate. On the upper deck are two commodious and handsomely finished state rooms, one for the use of the captain and the other for the proprietors of the vessel.

The engines are claimed to be the finest of the type ever built in Canada. They are tri-compound, or triple expansion, direct acting with inverted cylinders. The diameters of the cylinders are 18, 28 and 48 inches respectively, with 36-inch stroke. The crank shaft is of steel, ten inches in diameter, in three interchangeable pieces, with solid forged couplings. The main shaft is 9½ inches in diameter; the connecting rods are of the T-end style, double-eyed at top, the brass fittings being very heavy and very beautifully finished. The valve of the high pressure cylinder is of the piston type; those of the intermediate and low pressure cylinders being of single and double ported D style respectively. These valves are operated by a well-designed and finished gear, the links being fitted in such a manner that the throw of each valve can be altered independently of the others. The air, feed and bilge pumps are actuated by a lever operated by an intermediate engine, there also being an independent centrifugal circulating pump, capable of throwing a thousand gallons of water per minute. This circulating water passes through a condenser, which forms the main back frame of the engine, and which is fitted with 1,400 square feet of cooling surface. The starting and reversing gear is operated from the top platform. The reversing engines are double-acting, and operated with a worm and wheel. There is a turning gear by which the engines can be turned over when there is no steam in the main boilers. All of the forge work in connection with the engines and equipment of the vessel, cranks, etc. was done in the Albion Iron Works, and indicate the capacity of the concern for turning out such work.

There are two cylindrical multi-tubular boilers, each 18 feet long by 8 feet 6 inches in diameter, equipped with Fox's corrugated steel furnaces, two to each boiler. These furnaces are 42 inches in diameter and 7 feet long. Each boiler contains 222 3-inch tubes, and a heating surface aggregating 2,782 square feet. The plates used in the construction of the boilers are of steel, capable of withstanding a pressure of 150 pounds of steam to the square inch.

The cost of this steamer was in the neighborhood of \$95,000.

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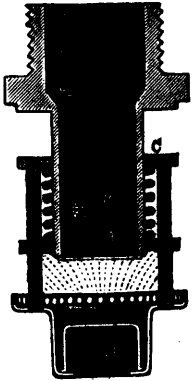
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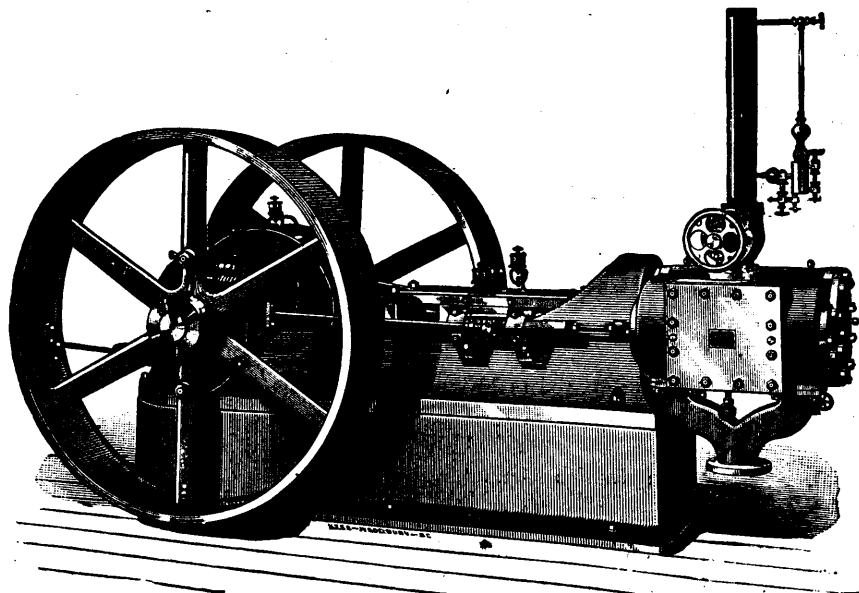
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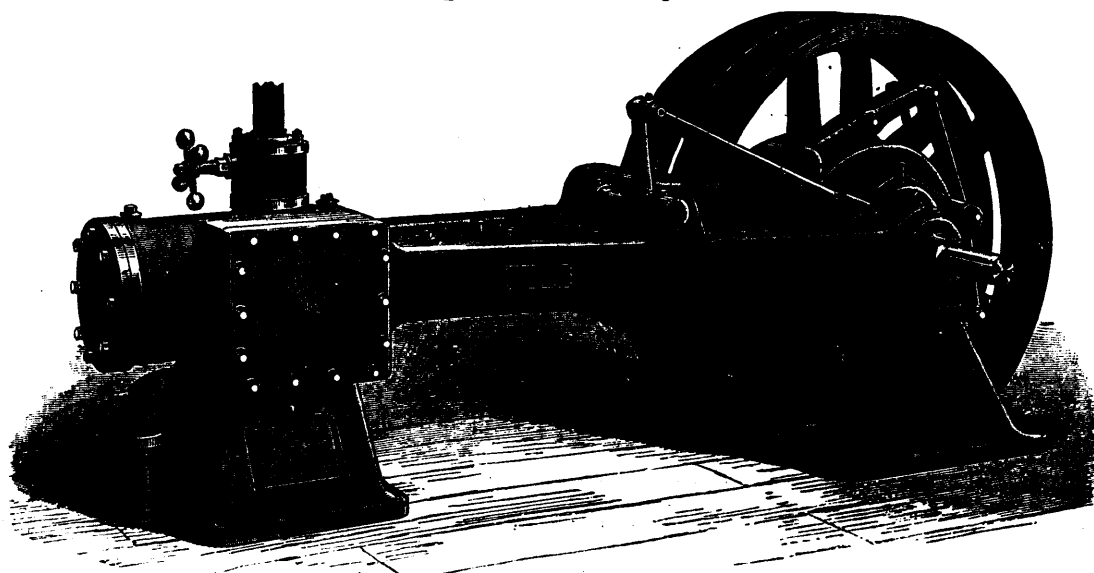
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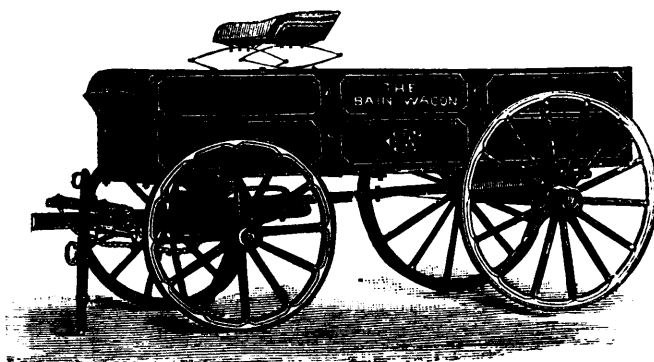
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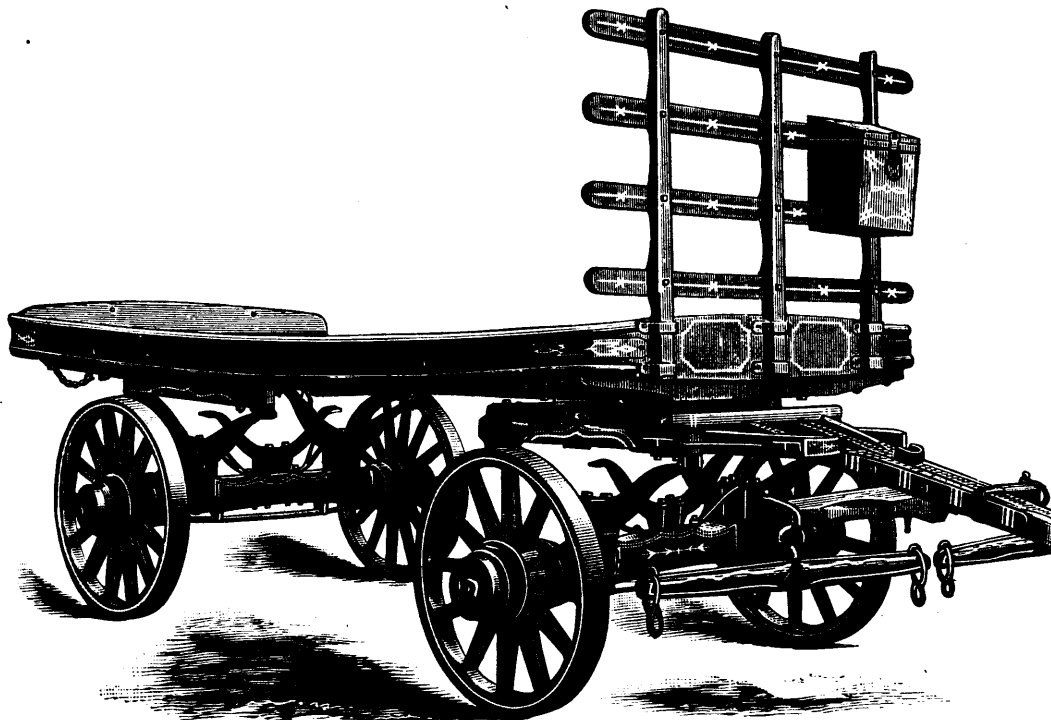
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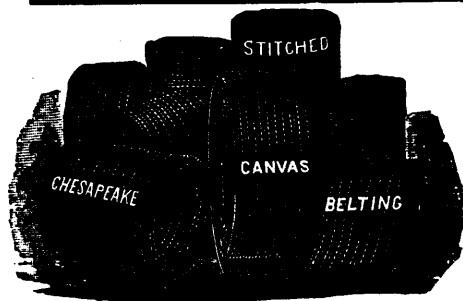
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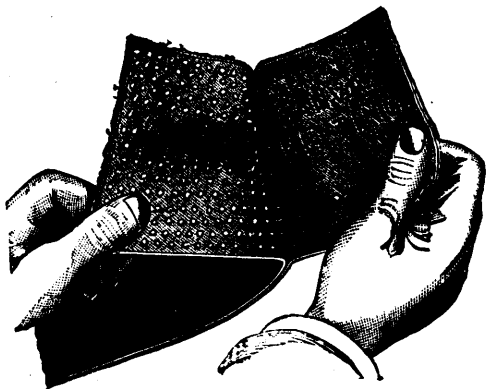
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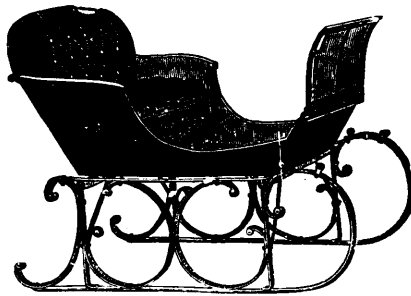
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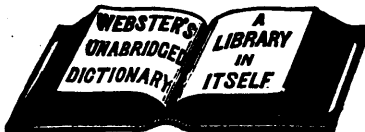
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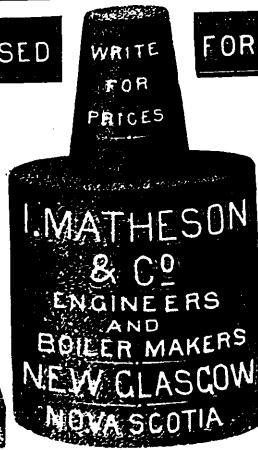
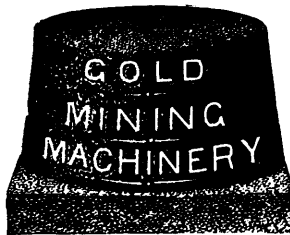
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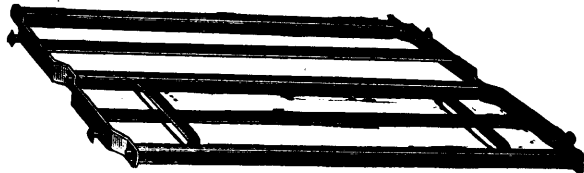
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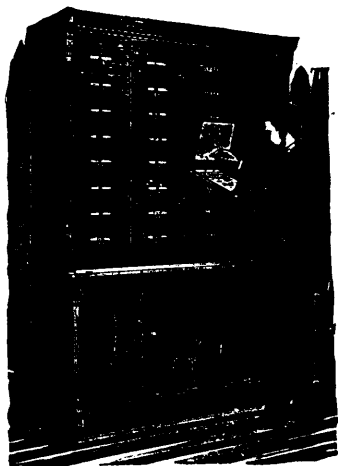


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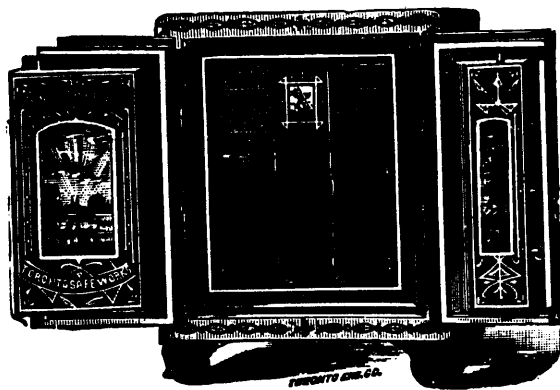


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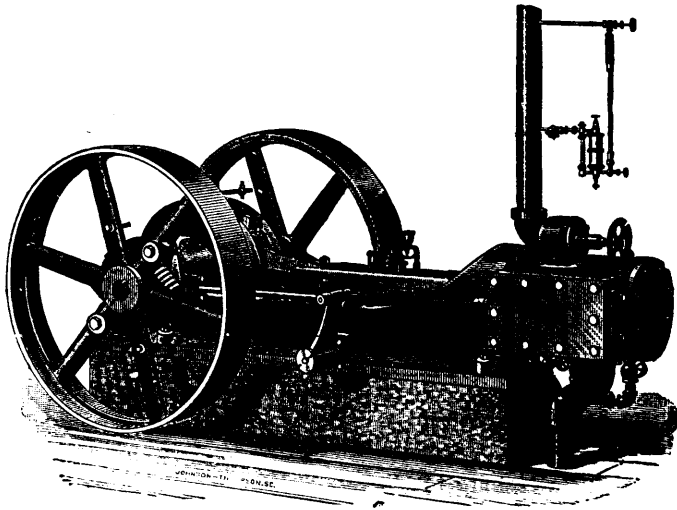
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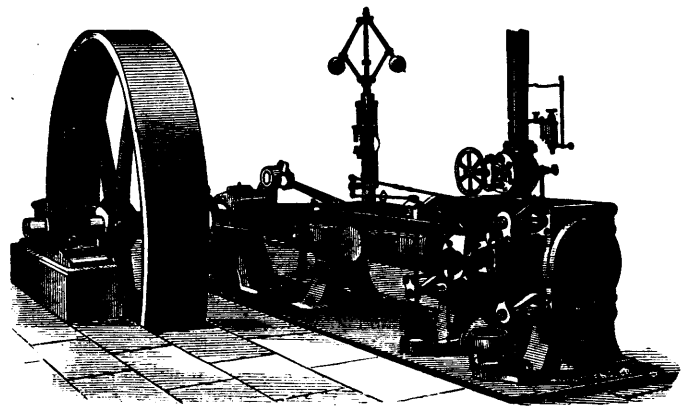
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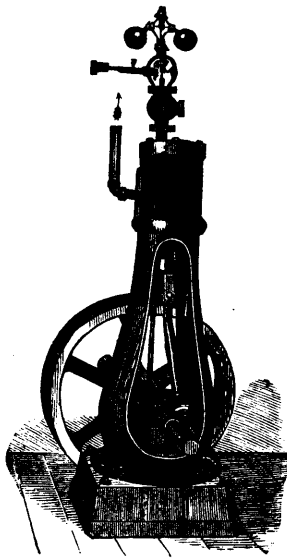
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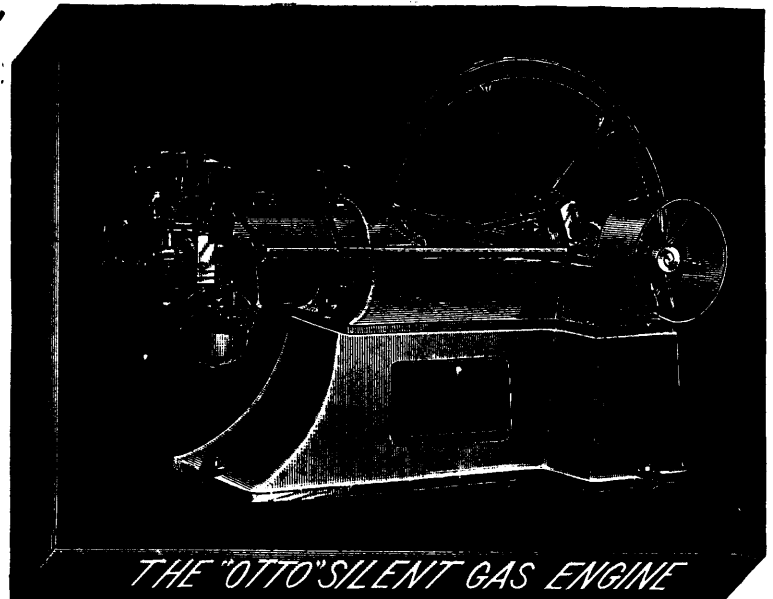
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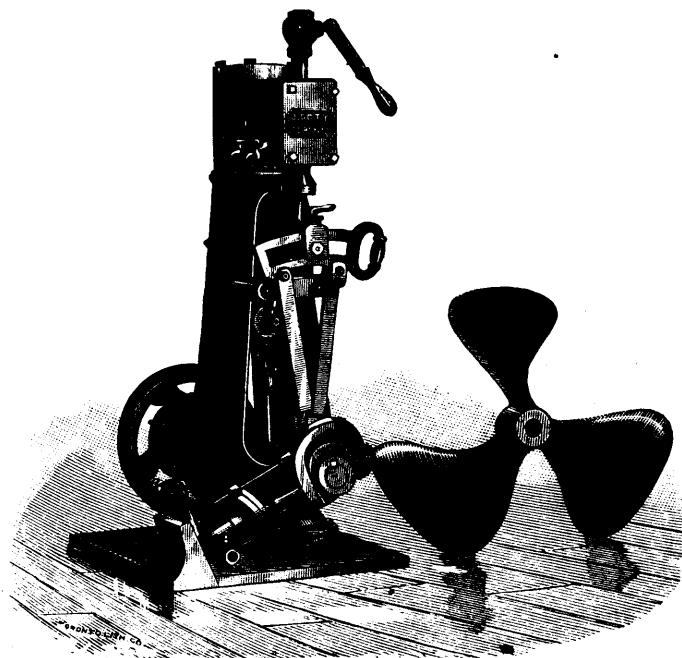
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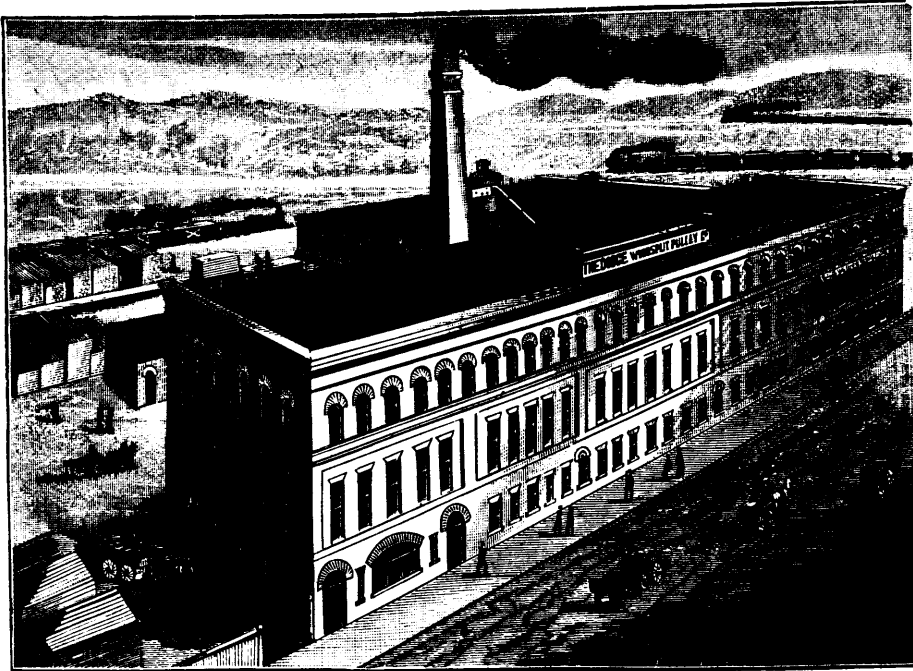
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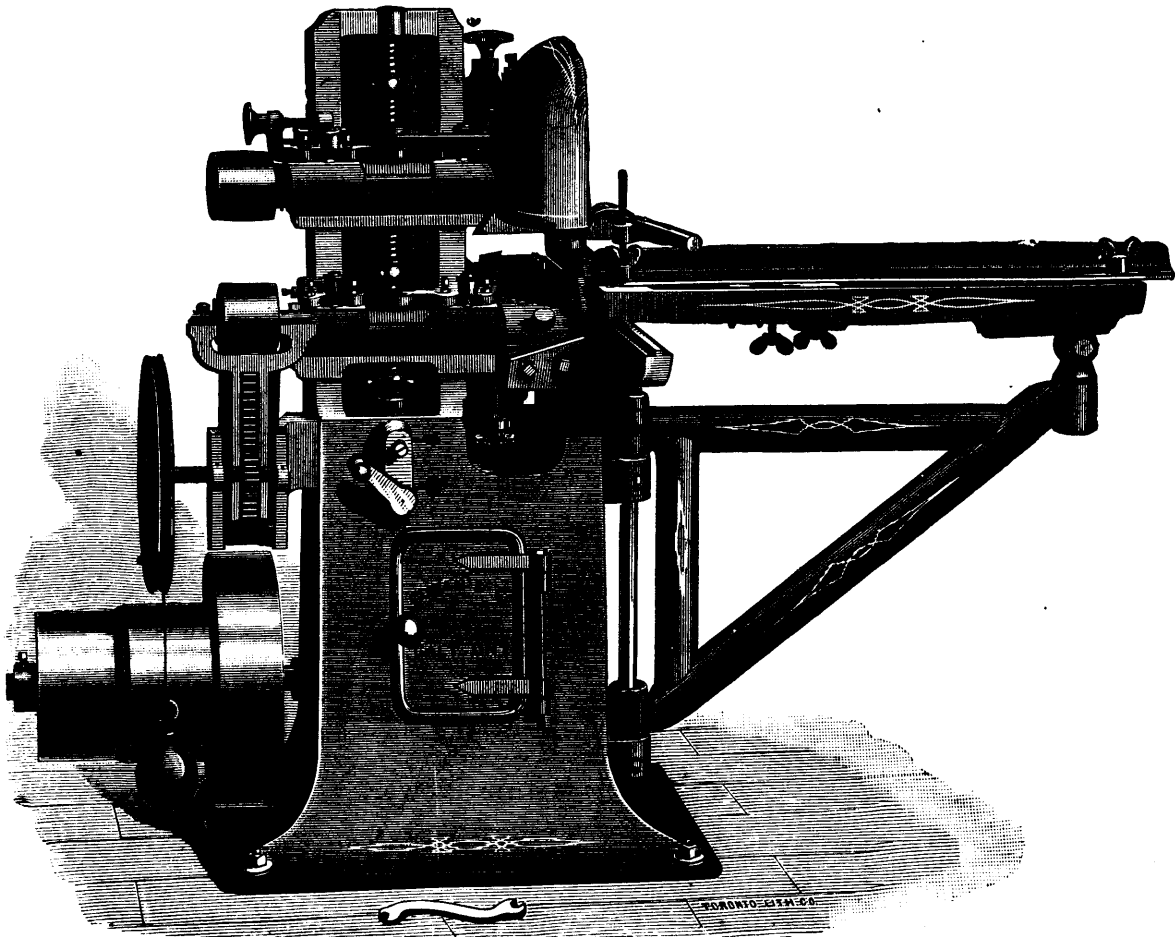
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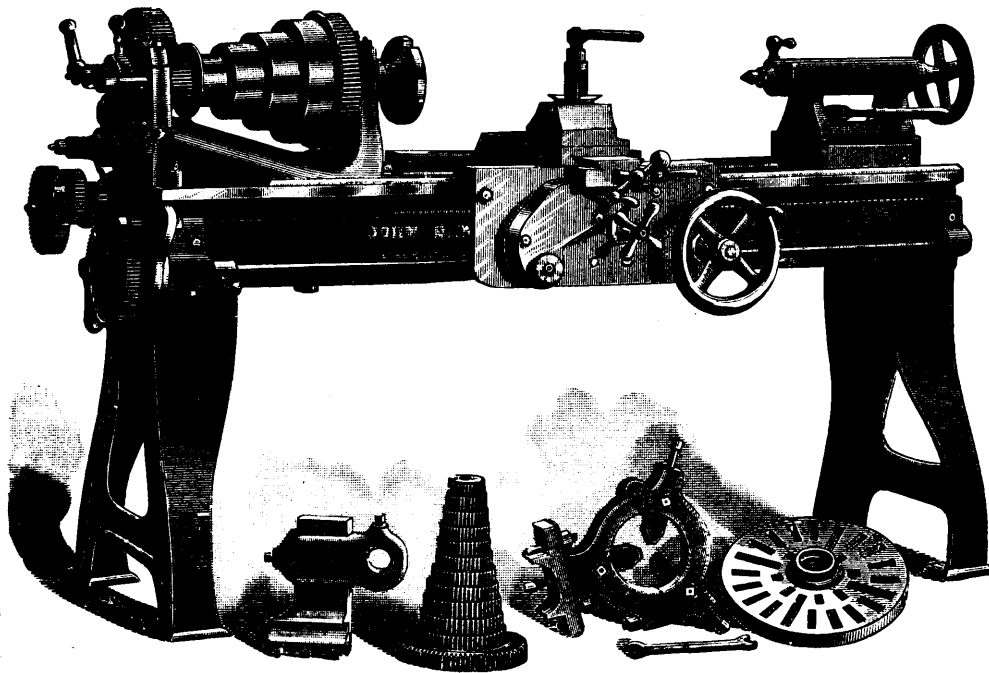
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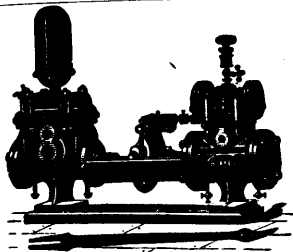
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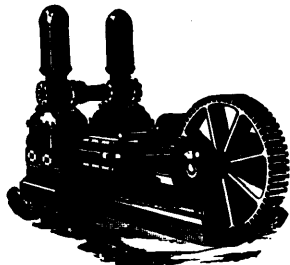
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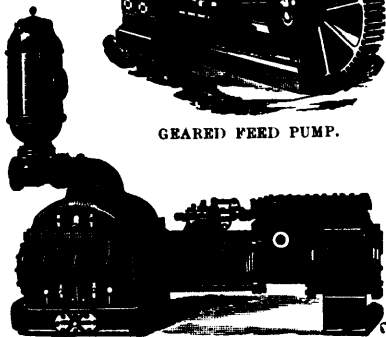
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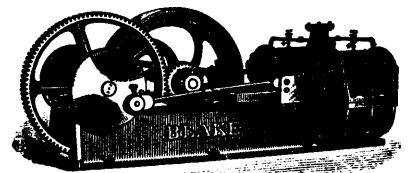
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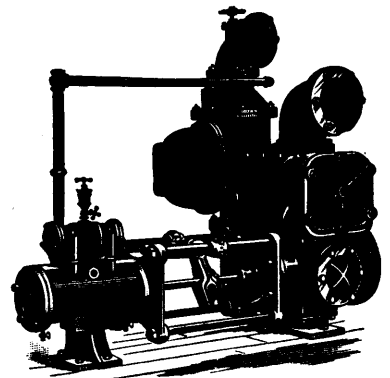
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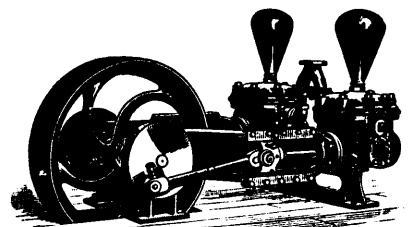
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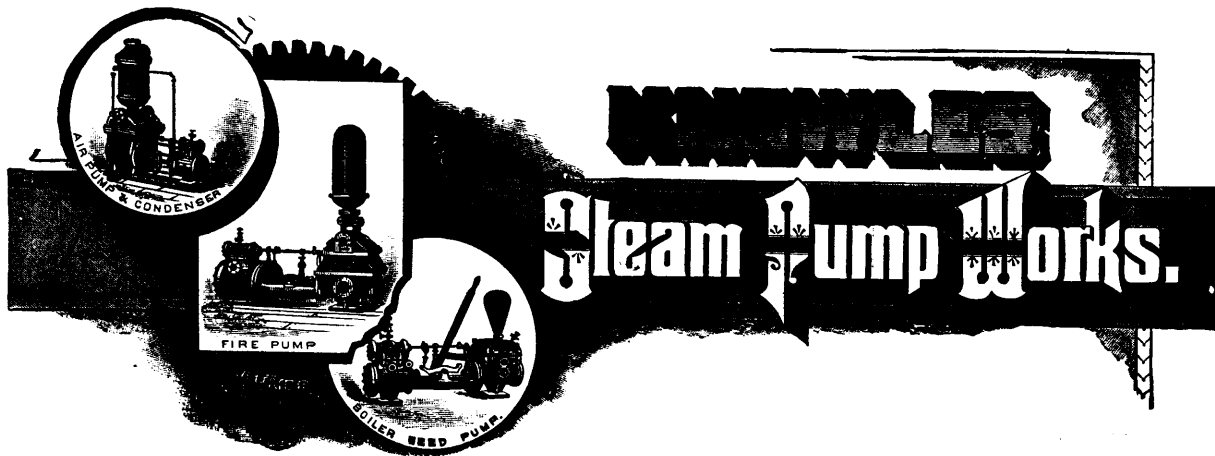
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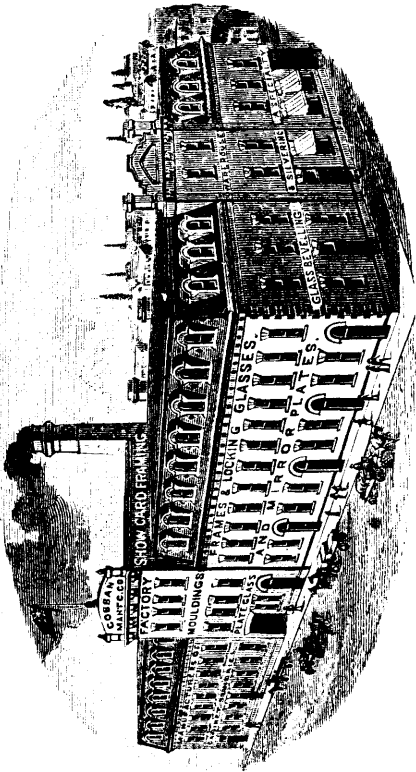
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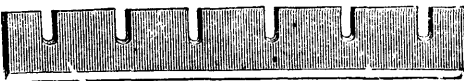
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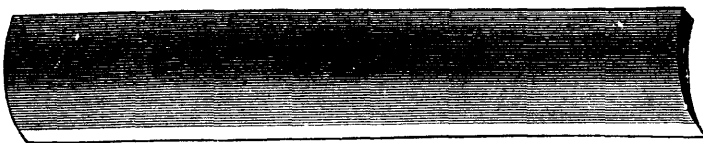
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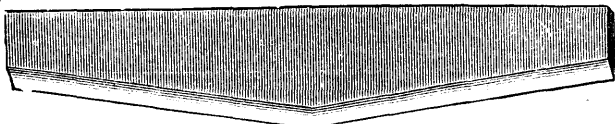
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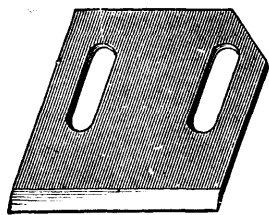
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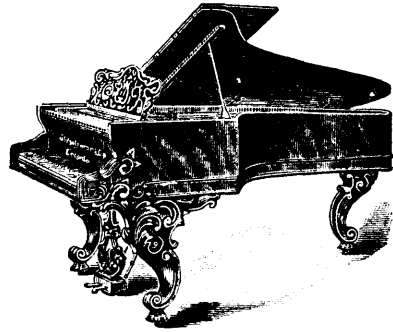


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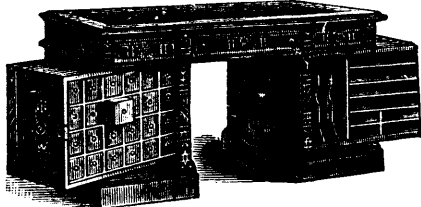
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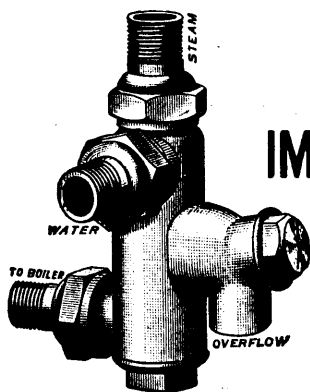
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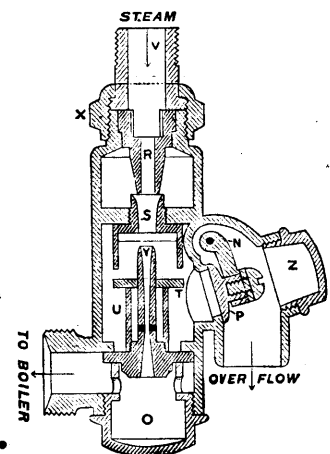
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