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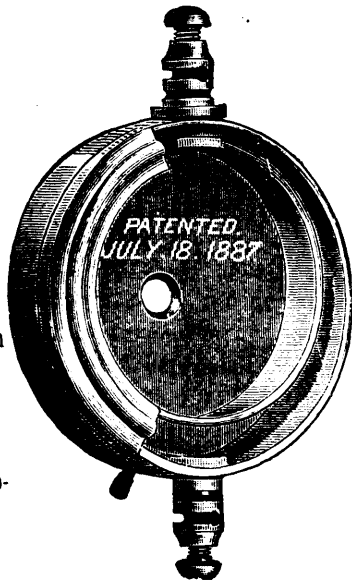
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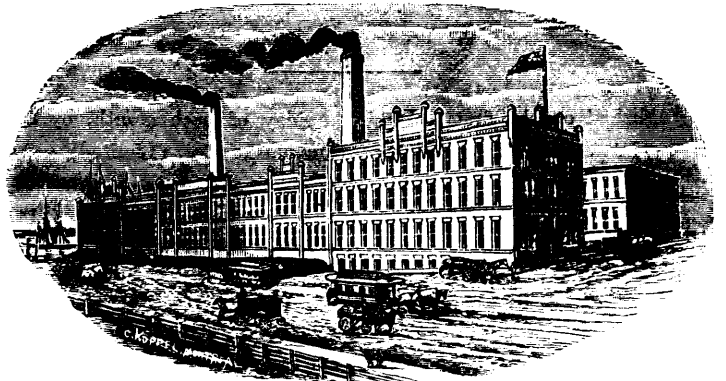
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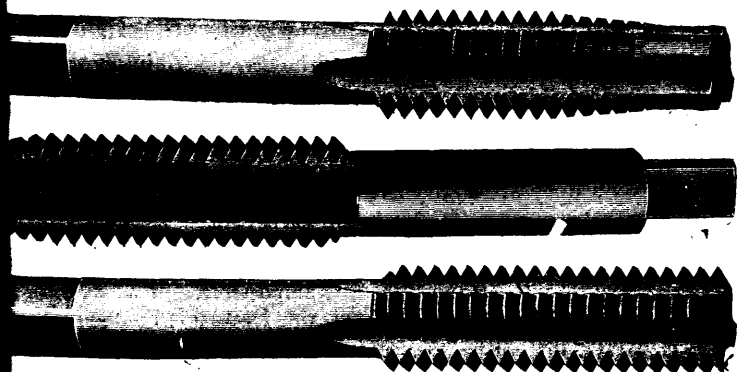
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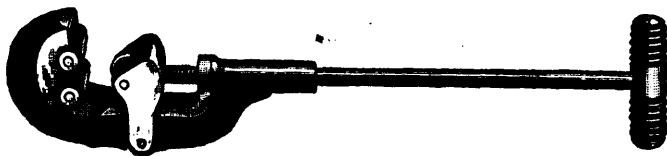
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### CANADIAN IRON ORE.

In a letter published this week in the *Toronto Globe*, Mr. T. D. Ledyard, arguing in favor of Reciprocity, whereby the rich ores of his Peterborough iron mine would be admitted into the United States duty free, says:—"Andrew Carnegie, the great authority on iron and steel, has just expressed himself to the effect that cost in manufacture is only one element. To manufacture cheaply the works must be large, and so situated that they can reach a market which will absorb all their products without too heavy freights. The Canadian market is too small and too scattered for large furnaces to be profitable."

The language here attributed to Mr. Carnegie does not express the meaning of what Mr. Carnegie said. Mr. Ledyard used only that portion of it that suited his purpose in endeavoring to show that Reciprocity with the United States is essential to the development of the iron manufacturing industry in Canada, the object being to show that the industry would be unprofitable if confined to the Canadian market, because extensive plants could not be used; while, with the additional sixty million market, Canada might reasonably hope to establish such works, selling the surplus in the United States.

Mr. Carnegie was speaking of the great activity in the iron trade in the United States; and he alluded to the present condition as being due to the fact that prices have advanced so much in Europe as to prevent the iron manufacturers there seeking a market in America. Discussing the effect that a reduction of duties would have on the country, Mr. Carnegie said:—

The revenue reformer of free trade proclivities always makes two assumptions which are incorrect. First, he compares costs on both sides of the Atlantic, adds the freight charges

to America, and assumes that this should be the measure of the tariff against the foreign product. Now, difference in cost is only one element. To make iron and steel articles cheaply a manufacturer must make, let us say, 1,000 tons a day. If he can find a market for 750 tons a day to net a small margin of profit, he had better sell the remaining 250 tons in America at an actual loss of several dollars per ton than to restrict production.

Mr. Ledyard quotes Mr. Carnegie approvingly on this point, and we accept him as authority. But Mr. Carnegie's contention is that American Protection must prevail against the surplus of foreign manufacturers; and this is where Mr. Carnegie's theory agrees with Canada's National Policy. If it is essential that the United States, with its innumerable metallurgical works and its unmeasured wealth invested in them, in this its spring time of prosperity, find Protection necessary to defend them against being made the slaughter market of European works, how much more is Protection necessary to Canada against similar encroachments from the United States, which Reciprocity would remove?

Speaking of the demands of the South as well as the West and the North-West for the continuance of the tariff on iron ore, Mr. Carnegie, alluding to the iron and steel works in Western Pennsylvania in which he is interested, says that he can use foreign ore or Lake Superior ore indifferently; that he has used many hundreds of thousands of tons, in some years, of the foreign article, but nevertheless he is certain that the permanent prosperity of the United States will be promoted by retaining the present duty on iron ore. This is very good testimony from Mr. Ledyard's witness; and indicates very strongly that our American neighbors are not at all willing to admit Mr. Ledyard's Canadian ores free of duty. In sustaining his views Mr. Carnegie shows that the ores mined in Cuba can be placed on shipboard at a cost of \$1 a ton; and he argues that as Cuban labor cost only sixty or seventy cents a day, and as no royalties have to be paid on the mined ores, they can well afford to pay a duty of seventy-five cents a ton, while American ores are mined at a cost for labor three times as great. Says Mr. Carnegie:

It is always folly to attempt what is impossible. It is not the East nor the West, especially not the State of Pennsylvania, which is most vitally interested in the development of American mines, but the South. When the Mills Bill was under consideration not a voice was heard from Pennsylvania in regard to the ore, iron and steel branches. It was gentlemen from Alabama, Tennessee and Virginia who protested; and so it will be in the future. So strong is the desire to develop the mines in the United States that at the last revision of the tariff this sentiment was able to increase the duties on ore. We can never maintain our industrial supremacy if we have to depend for one or other supplies upon foreign markets. We must be sure of a home supply.

Speaking of the growing competition of the South in the manufacture of iron, Mr. Carnegie said at a recent banquet in Birmingham, Alabama: "There is room in the United States for a dozen Birminghams, and Sheffields, and Bristols and Pittsburgs; the only article for which there is not room for more than one is the American flag." This ought to satisfy Mr. Ledyard, the *Globe* and the rest that Reciprocity stands no sort of a chance there.

The Reciprocity fad should be abandoned, and the construction of iron furnaces in Canada be begun.

## THE IRON INDUSTRY.

IN recent issues of this journal we have stated the fact that there is an iron mine in Canada, within one hundred and twenty-five miles of Toronto, in which there is a million tons of ore within a hundred feet of the surface; that this ore is of the best quality and richness, entirely suited for the manufacture of Bessemer pig iron, and that it can be laid down, duty paid, in Buffalo, N.Y., for \$3.25 per ton, in Pittsburgh, Pa., at \$4.75, and in Cleveland, Ohio, for \$3.90 per ton. Mr. T. D. Ledyard, of this city, is, we understand, largely interested in this iron mine; and it is on the authority of statements made by him that we gave the above facts. It is also Mr. Ledyard's statement that this ore can be reduced in the blast furnace with about the average charge of fuel, and that it can be mined for one dollar per ton. We have also showed that ores similar to those of Mr. Ledyard's Canadian mine were worth \$7 per ton in Cleveland, Ohio.

The discussion of this matter in these columns arose from the fact that both Mr. Ledyard and the *Toronto Globe* had advanced the contention that these rich ores would forever remain valueless and unavailable to Canada unless there was some sort of political unity of Canada and the United States. The unity that Mr. Ledyard and the *Globe* advocated they called "Unrestricted Reciprocity," but in our view it meant Annexation, and we said so; declaring the advocates of it to be "Annexationists." Unfortunately we spoke of Mr. Ledyard as an American, but he declared himself to be a Canadian, and we promptly apologized to the United States for the mistake, sorrowfully admitting the Canadian birth of the gentleman. This latter issue, however, is not material to the question.

Mr. Ledyard, in reviewing what we have said regarding him, his views, and his rich iron mine, says, "I have proved that iron manufactures cannot prosper in Canada until we get Reciprocity." We suppose the gentleman means to say that the business of converting ores into iron cannot prosper, because, with the exception of the blast furnace industry, the "iron manufactures" of Canada are in a healthy and prosperous condition. From the appearance of the political sky at this time, particularly that above Washington City, it will be many long days before any closer political ties exist binding Canada and the United States together. In fact, all the indications point the other way; and neither Mr. Ledyard nor the *Globe* are endowed with very keen perceptive faculties if they cannot see that if any step whatever is made in this direction, it can only be towards absolute political annexation. If Mr. Ledyard and the *Globe* desire to assume this position, abandoning the subterfuge of "Reciprocity" and come out openly for "Annexation," well and good. This would be unequivocal ground upon which there could be no concealment of position.

Why do Mr. Ledyard and the *Globe* depend upon so many "ifs" in making their arguments? They might as well argue that "if" there are blast furnaces in the moon; "if" these want Canadian ore; "if" a railroad were built from the Peterborough mines to the works of the Full Moon Blast Furnace Company, and "if" the moon levied no import duty on the ore, then the industry of mining the ore would give employment to thousands of idle Canadians. These conditions are not within the ability of Canada to fill, neither is it within the ability of

Canada to bring about any Reciprocity with the United States, whereby Canadian ores will be admitted there free of duty. No doubt Annexation could be effected, but Mr. Ledyard disclaims any desire in that direction.

Mr. Ledyard alludes to the fact of seventy-five cents a ton duty on iron ore imported into the United States being "a pretty heavy tax on an enterprise, whereas if we had Reciprocity there would be no duty." Any child would comprehend this fact if it thought of it; but as Canada has nothing whatever to do with the duties levied by the United States, it is evident that Mr. Ledyard must either pay this duty on his exportations, or abandon his shipments. It is unreasonable in him to expect that Canada will consent to become annexed to the United States merely to save Mr. Ledyard seventy-five cents a ton on his iron ore sent there.

We have heretofore invited Mr. Ledyard to inform us if we had done him any injustice in what we have said concerning his Peterborough mine—the cost of mining, and transportation to Cleveland—where it could be laid down at \$3.90 a ton, duty paid, and the value of it there—\$7 a ton. This is the issue; the political features of the discussion are collateral thereto.

## PER CAPITA TAXATION.

IN 1865, the year in which the war of the rebellion in the United States was brought to a close, the excess of payments for the carrying on of the Government, over the revenues received from all sources, was \$963,000,000. This was the largest deficiency ever experienced by the Government, and 1865 was the last year in which there was an excess of payments over revenue. The population of the United States in that year was 34,750,000; the amount of revenue actually received into the treasury was \$333,700,000; the receipts per capita of population were \$9.60; the actual payments made by the Government amounted to \$1,297,500,000; and the payments per capita of population were \$14.68. In that year the receipts from customs were \$84,928,000, and from Internal Revenue \$209,464,000, while the receipts from loans and treasury notes were \$1,472,224,000. The expenses of the War Department that year were \$1,030,690,000, and of the Navy Department, \$122,617,000. The total interest bearing debt was \$2,221,311,000, the annual interest charge against which was \$137,742,000. The debt per capita was \$76.98, and the interest per capita \$3.97.

The amount of the public debt of the United States, including accrued interest thereon, less cash in the treasury, on July 1, 1888, was \$1,087,930,703. In that year the amount actually received into the treasury was \$379,266,000, which was \$6.32 per capita of the population, which was then estimated to be 60,018,000 souls; the actual payments were \$267,924,000, which was \$4.47 per capita of population, and the excess of revenue over payments was \$111,341,000. The receipts from customs were \$219,091,000, and from Internal Revenue \$124,296,000; and the balance in the treasury at the end of that fiscal year was \$659,450,000. At this last named date the debt per capita of population was \$17.71, and the interest thereon .65 cent per capita.

The State, county, and municipal debts of all of the States and Territories of the United States, in 1870, aggregated

\$868,676,000, and in 1880 it was \$1,056,584,000, an increase of \$187,908,000 in ten years. In 1880 this debt averaged \$21.07 per capita of the population, the debt of the State of New York being \$218,723,000, the per capita distribution of it being \$43.03. The funded and unfunded debts of the several States of the American Union for the last obtainable year (but not of the Territories), as given by Mr. A. R. Spofford in his American Almanac for 1889, aggregated \$221,785,205, the aggregate value of all taxable real and personal property as assessed, \$22,637,383,298; and the amount raised by taxation in these States that year was \$70,995,039. Massachusetts owes the largest debt—\$31,429,681; and New York raised the largest amount by taxation—\$9,075,046. The highest levy for State tax was 90 cents on the \$100 in Nevada; in Nebraska it was 75 cents, and Louisiana 60 cents. The lowest levy was in Massachusetts, where it was 11.5 cents on the \$100. The States of Colorado, Illinois, West Virginia, and Wisconsin owe no debts. Mr. Spofford, while stating the debts of the several States, does not give the county and municipal debts of them, neither does he give the debts of the Territories.

As we have shown, the State, county and municipal debts of the several States and Territories increased nearly \$188,000,000 in the decade from 1870 to 1880; what the increase will be shown to be in the next decade ending with 1890 cannot now be stated. In 1880 the population of the United States was 50,155,000; and the average per capita distribution of this State, county and municipal debt in that year was \$21.07, while the per capita distribution of the debt of the United States was \$38.27—a total per capita of all debts of \$59.34.

As regards per capita taxation, Canada compares very favorably with the United States, with the United Kingdom, or with any British possession. According to the Statistical Abstract and Record for 1888, the estimated population of the Dominion was 4,972,101, upon which the per capita revenue for that year was \$7.22, and the expenditure \$7.38. In the United Kingdom the per capita revenue that year was \$11.60, and the expenditure \$11.29; the expenditures of Newfoundland were \$8.93; Bermuda, \$9.11; New South Wales, \$42.39; Victoria, \$30.82; South Australia, \$32.89; Western Australia, \$53.32; Queensland, \$44.43; Tasmania, \$22.84, and Falkland Islands, \$24.10. The revenue of the United States is \$6.32 per capita, and the expenditure, \$4.32.

The following is a table showing the per capita taxation in certain countries in 1887:—

Canada.....	\$ 5 88
United Kingdom.....	9 93
New South Wales.....	12 68
Victoria.....	13 56
Queensland.....	18 37
W. Australia.....	22 03
New Zealand.....	15 31
Austria.....	7 08
France.....	11 69
German Empire.....	2 70
Italy.....	8 22
Spain.....	8 05
United States.....	5 75

The net debt of Canada on July 1, 1888, was \$234,531,358; and considering the revenue for that year, it would require six and a half years for such revenue to extinguish the debt. The principal objects embodied in this debt were the assumption by

the Dominion of the debts of the various Provinces; the construction of the Intercolonial and Canadian Pacific Railways and numerous public works, the enlargement and improvement of canals, harbors and rivers, and the acquisition and management of the North-West Territories. The total assumption of Provincial debts by the Dominion amounts to \$109,430,148, leaving the sum of \$125,101,210 as the actual net liability created by the Dominion Government since Confederation. The net per capita debt of the Dominion on July 1, 1888, was \$47.17, the net per capita interest paid upon which was \$1.79.

#### PRODUCTION AND CONSUMPTION.

THE *Mail*, speaking of the trade of the Dominion for the past year, alludes to the fact that the exports for last year were a million dollars less than the previous year, while the imports—goods entered for consumption—increased \$6,800,000. It says:

“Protectionists and Free Traders will agree in regarding the decline in our exports as an unsatisfactory thing. The fact that while our exports declined, we used nearly seven million dollars more of foreign goods than in the preceding year, is a peculiar phenomenon. In a normal and healthy state of trade, an increase of exports means simply an increase of consumption. But the complaints of our millers and manufacturers lead to the belief that the seven million dollars' worth of foreign goods have, in spite of a high tariff, displaced that quantity of goods of Canadian manufacture.”

The falling off of exports last year, valued at a million dollars, means either one of two things. It means either that there was a falling off in production to that extent, or that the home consumption increased to that extent. The figures are not at this time available, showing in what particular products the falling off occurred, and the fact can only be “unsatisfactory” in case it should be proven to be that the deficiency was in the products of the farm, the mines, or the fisheries. But there was nothing developed during the year indicating that there were any serious deficiencies occurring in these industries; and the reasonable conclusion is that the home consumption increased a million dollars during the year. As far as this feature of the returns goes the question of Protection or Free Trade does not apply.

The *Mail* thinks the increased consumption of foreign merchandise “a peculiar phenomenon,” but in our opinion there is nothing remarkable about it. With a population of five million souls in a prosperous year, the additional absorption of a million dollars' worth of home products would be only about one dollar's worth to each family of five persons in the country; and the additional absorption of nearly seven millions of foreign merchandise, distributed per capita, amounts to only about one and one-third dollars.

It does not imply, as the *Mail* intimates, that this increased consumption of foreign merchandise is “in displacement of that quantity of goods of Canadian manufacture,” but it really means that the country, being that much better off last year than the year before, indulged to that additional extent in buying the more expensive lines of merchandise not manufactured in Canada. There is no evidence to show that there was any reduction in Canadian manufactures last year; but there is every reason to believe that the production of Canadian manufacturing industries last year was greater than ever before in the history of the country. “The nation that manufactures for itself, prospers.”

### THE TARIFF.

THE *Monetary Times*, discussing the coming session of the Dominion Parliament, and the action or non-action that may be taken there regarding the tariff, says :

"Unless the resolution not to grant an increase of the tariff as a concession to importunity be announced at an early date, the Government will be assailed with endless applications by interested parties. The best way would be to let it be understood at the outset that no increase of the tariff can be sanctioned."

It is strange that intelligent people do not comprehend that the tariff laws of the Dominion are not like the laws of the Medes and Persians, that cannot be altered, nor that they are made with the inflexibility of cast iron, that may be shattered but can never be made to conform to any other than the original shape. Other laws are not thus made, and even the Divine Law has recently been subjected to some modifications, as shown in the revised edition of the Holy Bible. Why, then, should the tariff laws of the Dominion be considered of such peculiar character as to forbid any corrections changes or alterations of them? What are the "concessions to importunity" that the *Monetary Times* deprecates? Suppose the Government should be "assailed with applications by interested parties" for modifications or changes of the tariff, what is the Government for if not to respectfully listen to all such applications; to weigh the arguments presented, and to do substantial justice in the premises? It is not expected that disinterested parties will annoy the Government about the matter; and the "interested" ones are those who should carry the matter to the Government, and to insist that it should receive that careful attention and consideration that business men should give to matters of business. This is no time for the Government to ignore the claims of manufacturers, the very existence of whose business may depend upon there being made some modifications of the tariff. In asking for modifications of the tariff, the manufacturers do not approach the Government as suppliants for favors; and the *Monetary Times*, nor any of those who oppose tariff revision, need suffer heart-sickness in advising the Government to turn deaf ears to whatever suggestions they may have to make. On the other hand, the manufacturers do not anticipate any such treatment, but they will go to Ottawa, and they will show to the Government wherein there should be some modifications of the tariff, and they feel dead sure that their representations will receive the consideration they deserve.

The *Monetary Times* imagines that whatever changes there may be demanded in the tariff will all be in the direction of increasing the present duties. In this it shows its ignorance of the situation, for, as we have heretofore shown, there are some levies that are obviously too high, and that ought to be reduced or removed. There are also levies that are not high enough, and these will most assuredly be increased. There are also features of the tariff that should be made more plain and unambiguous, and this matter will certainly be attended to.

The friends of the National Policy are not on the defensive—not a bit of it. They know who their friends are, and they also know who their enemies are; and they do not count among their friends those timid and half-hearted ones who are afraid of shadows. The masses of the voting population of Canada are friends of the National Policy. They demanded it

in the first place, and it sprung into existence in obedience to that demand. Time and again the Government have been sustained by the people in maintaining this system, and the people will sustain the Government now, and whenever they are appealed to for that purpose. The fact that for several years past there has been decline in the prices of farm produce cannot be charged against the National Policy; and the farmers of Canada have more sense than to do so, notwithstanding the suggestions of the Grit papers. It is the veriest nonsense to charge the decline in value of agricultural products to the tariff, and the doing so exhibits exceeding weakness on the part of the Free Traders. There will be no cry raised among the farmers against the tariff; there will be no revolution against it at the polls, and the National Policy is in no danger of sudden reversal.

### STRIKES AND THE STRIKERS.

THE recent dock laborers' strike in London, and its results, impressed the labor unions in that city that they could win in any strike they might inaugurate, and that they had only to demand in order to obtain higher wages and shorter hours, or any other terms they might demand. Growing out of this was the strike of the gas stokers in London South; but the firmness and determination of the manager of the gas works, Mr. Livesey, defeated the strikers at all points. Finally, when the hopelessness of obtaining their demands induced the men to give it up, a delegation from their union waited upon the manager, but these he absolutely refused to see, saying that if his old employees had anything to say to him they could see him as individuals representing no organization, and no persons but themselves. The gas works in the meantime had been fully supplied with new hands, and, as a final effort, the old employees waited upon Mr. Livesey and proposed that they would all return to work on the manager's terms if the new men were discharged. "Never," answered Mr. Livesey, "we are bound in honor to stand by the men who have stood by us." The weather is now very cold for these strikers. The strike of the railway porters in London has also proved a miserable failure, and these men are out in the cold. The attempt at a fresh strike at the Victoria Dock, to prevent the delivery of goods to any but union cartmen, broke down completely; and the miners in South Wales, and the workers in the shoe factories in Bristol, who recently attempted to use their unions to force certain concessions from their employers, are now trying to obtain their old situations in terms not of their dictating.

Recently, at the Liverpool Assizes, Mr. Justice Grantham decided that boycotting is an offence at common law. In the case before him boycotted Irish cattle had been taken to England for sale. Emissaries followed the cattle and warned and threatened dealers against buying them. These men were indicted for conspiracy, tried, convicted and sentenced to imprisonment. His Lordship held that when a combination becomes a conspiracy to prevent a man from carrying on his business, it is unlawful, and is punishable at common law.

In the case of the London workmen, there is no doubt but that the pay they were receiving was most meagre and insufficient, and it is greatly to be regretted that these men should not have received better wages for their services. That they



should attempt to force the employers to discharge the new hands who took service at a time when a failure, through the strikes, to carry on business would have entailed a great deal of inconvenience and misery upon innocent parties, was an outrage for which they encountered even-handed justice in finding themselves entirely shut out from their old employment.

The situation there is entirely analogous to that at Galt, where the iron moulders went out on strike several months ago because the foundrymen declined to allow them to run their business for them. All of the Galt foundries are in full operation, having all the moulders they want, all of whom are good and competent men. The strikers are out in the cold, and many of them are being supported in their idleness by the misplaced and mistaken charity of labor unions and laboring men, who think it an act of heroism to fight in a losing struggle against the inevitable.

In this connection the statistics relating to strikes and boycotts in the State of New York are suggestive. The Commissioner of Labor of that State in his report shows that in the years 1886, 1887 and 1888 there were 5,226 strikes, in which 203,177 persons were engaged. The total amount of wages gained thereby is given at \$2,725,068, and the loss of wages at \$5,649,436. The cost of the strikes to the labor organizations was \$981,506, and the loss to employers \$3,211,618. It is to be noted that there has been a decrease of more than one-half in the number of strikes since 1886, and of more than four-fifths in the number of individuals engaged in them. Strikes and boycotts are evidently not the correct nor most effectual methods of adjusting labor troubles. They should be abandoned.

#### EDITORIAL NOTES.

HAPPY NEW YEAR.

1890 has come to stay—for a year.

THEY now call it "Continental Free Trade."

BLACKGUARDISM is no part of respectable journalism.

VULGARITY and abuse are the arguments of blackguards.

THIS issue begins the eighteenth volume of THE CANADIAN MANUFACTURER.

To the *Toronto Globe*: Vulgarities, blackguardism and abuse are not arguments.

WHICH shall it be: Canadian autonomy or annexation to the United States? Advocates of Reciprocity please answer.

IF we only had "Continental Free Trade" we might send our products to Patagonia and Terra del Fuego. But C. F. T. has not yet eventuated.

CANADA'S prosperity and Canada's National Policy go hand in-hand. God bless Canada; we wish her the compliments of the season. May she live long and prosper.

THE *Globe*, speaking of Canadian manufacturers, calls them "an insolent ring of tax-fed Tories." This, the *Globe* thinks is an unanswerable argument against tariff protection.

THERE are but two ways by which Unrestricted Reciprocity may be had with the United States: by Annexation, pure and simple, and by forcing it from the United States against the will of that country.

THE mephitic vapors that emanate from *Globe* editorials when advocating annexation are more nauseating than any that are diffused in the atmosphere by any polecat that ever offended the olfactory organs of mankind.

THE *Toronto Telegram* says that the public debt in Canada amounts to \$47 per capita, while in the United States it is only \$28. In 1880, according to the census returns of that year, the per capita debt of the United States was \$38.27, and the average per capita debt of the several States of the Union was \$21.07, a total per capita debt of \$59.34.

WILL Canadian manufacturers tamely submit to the opprobrious epithets applied to them by the *Toronto Globe*? The grossest blackguardism and billingsgate that can be couched in the English language are bestowed upon them because they are the advocates and supporters of a National Policy that has raised Canada to the proud position she now occupies among the nations of the world.

THE *Mail*, speaking of "tariff-stricken industries," and calling the duty a tax, says: "It is really impossible to lay a tax that the people cannot feel." This is one of the most astounding discoveries of the nineteenth century. It is equivalent to saying that a young man really feels his heart throb and jump when he gets his first kiss from his best girl; or that a dog knows when his tail is stepped on.

THREE dollars a ton profit on a million tons of iron ore should be an inducement to engage vigorously in the business. It is claimed by the owner of a Canadian iron mine that he has a million tons of ore within a hundred feet of the surface, and that it can be laid down in Cleveland, Ohio, duty paid, for \$3.90 a ton. Similar ore in Cleveland is worth \$7 a ton. Can it be that the great richness and value of this Canadian mine exists only in imagination?

THE cannon that was used in firing the salute when South Carolina seceded from the Union, in 1861, was used a few days ago in the City of Columbia to fire a salute in the Jefferson Davis memorial ceremonies. In this latter event the cannon exploded, badly injuring several men. This indicates the irony of events. In the first place the cannon heralded what was then believed to be the successful disruption of the American Union by Jeff Davis and his associates; in the second place it heralded the death of that great disruptionist, and in doing this it itself became disastrously disrupted.

"THE children of a family can get a cheap and practical schooling by regularly reading a good daily newspaper."—*Toronto Globe*. No doubt, but if the "cheap and practical schooling" is to be got by reading such a daily newspaper as the *Globe*, the education will produce graduates in blackguardism

only equalled by the editorial writer on that paper who hurls such epithets as "ruffianly misrepresentation," "insolent organ," "insolent ring," "tax-fed Tories," "palpable lying," "controversial polecat," etc., against his adversary as arguments in the discussion of an important question. If, on the other hand, parents desire to keep their children from the contaminating influences of blackguardism, they should see that the *Toronto Globe* never falls into their hands.

CANADIAN manufacturers would do well to observe the way in which the *Toronto Globe* sneers at them, and insults them by calling them lazy and shiftless. In gloating over what it thinks would be the situation should Reciprocity be brought about, when American manufactures would be brought into fierce competition with the products of Canadian workshops and factories, the *Globe* says: "It is likely that some of the ring (meaning Canadian manufacturers) who supply Sir John with election funds, might be compelled to bestir themselves in fair competition; but are the Canadian people to put up with huge losses forever in order that a handful of Tory pets may live at the public expense on the product of obsolete machinery and without the exertions proper to business men?"

"We can make iron in Alabama, send it to Pennsylvania, and sell it there \$5 a ton cheaper than they can make it," was the deliberate utterance this week of one of the most eminent southern engineers. When asked further whether iron could be made anywhere in the world cheaper than in northern Alabama, the gentleman said without hesitation that only one other region anywhere had the advantage of the south, and it was doubtful whether even that could do better. Possibly the Cleveland district in England can produce a shade cheaper than Alabama, but he was not sure of it. Other things go to indicate that this enthusiastic conclusion has some warrant. One is the constant and increasing sale of southern iron in the northern and eastern States. Another is the removal of much Pennsylvania and other northern iron-making capital to the south. A third is the rapid growth of Birmingham and similarly situated places, and the steady flow of fresh capital southward for the building up of manufacturing cities in Tennessee, Alabama and Georgia.—*Bradstreets.*

This is what Protection is doing for the South. With similar protection, Canada would be able to manufacture iron as cheaply as Alabama.

THE *Cleveland Iron Trade Review*, discussing in its last issue the condition of the American iron ore market, says:

The rush, for the time being, seems fairly over, and with the sale of the 1890 Bessemer output, the sharp demand that has hitherto characterized the ore market has largely fallen off. Whether this result is due to the natural course of the trade or to the shrinkage of business peculiar to the holiday season, remains to be seen. The Eastern syndicate, represented by Mr. Ferdinand Schlesinger, of Milwaukee, has, through the Florence-Iron River Co.—one of its properties—obtained a lease of what is known as the Fowle property, in the Michigamme district. The mines, known as Nos. 1, 2 and 3, are said to contain immense deposits of low grade ores, assaying .56 in iron and .03 in phosphorous. A nominal sum passed as the purchase price, the new owners paying a royalty of twenty cents. It is expected to take some three hundred thousand tons of ore from these mines during the coming season, with either Marquette or St. Ignace as the shipping port.

From this it will be seen that all of the American Bessemer

ores available during 1890 are sold; that the demand is not satisfied; that furnacemen are willing to pay a royalty of twenty cents a ton above the cost of mining to obtain low grade ores, and that 300,000 tons of these low grade ores are to be taken from one certain property the coming season.

THE *Cleveland Iron Trade Review* tells the *Australasian Trade Review* some straight facts regarding the beneficial results that will inevitably follow the adoption of Protection in Australia, and of the dependence that colony will ever experience upon outside sources for its material supplies under Free Trade. It quotes an article recently published in these pages in which it was shown that if the failure to establish iron blast furnaces in Canada is due to the National Policy, as the Free Trade papers here say it is, the way to correct the evil is by increasing the tariff, not reducing it. Our Cleveland contemporary says some flattering things regarding the work this journal is doing in behalf of Protection, and, quoting our article here alluded to, says: "We commend this broad and statesman-like view to our Australian contemporary, and the important interests which it represents." It remarks by way of illustration, "Had any such policy (as advocated by the Australian journal) prevailed when the struggling United States began their industrial existence," that country "would never have risen above the condition of poor and dependent consumers, always in debt"; and it points to Canada as "another powerful British colony that does not regard this great economic question through the narrow vision" of Free Trade. "Canada has established a system of protection to home industries, which she is gradually broadening and strengthening, and if let alone, she will soon be ready to declare industrial, if not political, independence."

THE condition of the work-people employed in the manufacture of such wares as needles and pins in Great Britain, Germany and the United States, furnishes us with contrasts which are as remarkable as they are startling, and as showing how foreign competition has kept down the wages of employees in the former countries. Redditch and neighborhood has, for a hundred years and more, been the chief mart for needles, but the invention of the sewing machine and the sewing machine needle, by an American, has revolutionized the business. American ingenuity also supplied the machinery to perfect the needle and cheapen its manufacture, but Redditch has relied upon cheap labor to hold its trade. Its methods are old-fashioned, and the handling of such small articles as needles has necessitated wages so low as to be a marvel to the world how human beings can manage to eke out an existence at all. The explanation is, long hours. Whole families, consisting of father, mother and children, down almost to the babe in the cradle, spend the weary hours in the effort to earn the merest pittance, and by this means Redditch hopes to undersell the world. In needle making establishments in the United States expert tool makers earn from \$15.00 to \$18.00—equal to £3 to £3 12s. per week; swedgers, from \$10.00 to \$15.00; wire-drawers, \$12.00; temperers, \$15.00 to \$18.00, and their assistants from \$5.00 to \$7.50 per week. Groovers and pointers receive 30 cents per thousand; straighteners, 50 cents per thousand, and boys and girls can earn from \$3.00 to \$4.50

per week, according to expertness. Besides this, the laws there insist upon proper factory regulations as regards age, hours of work, and other restrictions, which affect the health and comfort of employees. But in Redditch the work is largely performed in private houses, by women and children, who earn the merest pittance, and who, so far as the comforts of life are concerned, are not nearly so well-to-do as the slaves of the South in all that goes to make up the sum of human happiness.

WE have received the following inquiries from a Canadian correspondent:

*Question:* What was the consumption of iron ore in the United States during last year and during any number of recent years? What quantities thereof were imported foreign ore?

*Answer:* The consumption of iron ore in the United States in 1888 was 12,650,000 gross tons, against 12,500,000 tons in 1887, and 11,300,000 tons in 1886. Of the above aggregates, we imported, in 1888, 587,470 gross tons, against 1,194,301 tons in 1887, 1,039,433 tons in 1886, and 437,680 tons in 1885. For the ten months ending October 31, 1889, our imports were 716,859 tons, against 516,623 tons for the corresponding period of last year.

*Question:* What was the duty on iron ore under the Morrill tariff, in 1865, and what changes have been made since then?

*Answer:* Iron ore was not specifically mentioned in the Morrill Act, but it was subject to a duty of 20 per cent. *ad valorem* under the section which read, "all mineral or bituminous substances not otherwise provided for." This was equivalent to from 45 to 55 per cent. specific duty; but the imports of iron ore prior to 1879 were inconsiderable, and hence there was no special call for a protective duty. It was in view of the rapid increase in importations subsequent to 1880 that the present specific duty of 75 cents per ton was imposed.

*Question:* What was the duty on pig iron at similar dates?

*Answer:* The present duty on pig iron is \$6.72 per ton. Prior to 1883 it was \$7 per ton. The importations of pig iron in 1885 were 164,349 net tons; in 1886, 405,180 tons; in 1887, 523,625 tons, and in 1888, 220,905 tons. For the ten months ending October 31, 1889, they were 123,853 net tons, against 157,542 tons for the corresponding period of 1888.—*Cleveland Iron Trade Review.*

If it could only obtain Reciprocity, the *Toronto Globe* and its subsidizers, the Americanized owners of Canadian iron mines, say they could export to the United States 2,000,000 tons of iron ore annually. This is what the *Globe* says:

The export of only 2,000,000 tons of iron ore annually would give subsistence to 63,000 people, besides the 9,000 men engaged in mining \* \* Reciprocity would not only give Ontario an iron mining industry employing 9,000 men, and supporting altogether 72,000 people, but would also give Toronto immense blast furnaces, rolling mills, and other manufactures of iron.

The *Globe* had quoted the estimate made by statisticians that about seven people are wholly supported by each able-bodied workman in the country. As cheap as labor now is, the *Globe* says it would be cheaper under Reciprocity, in the min-

ing of iron ore. Mr. Ledyard says that the ore in his Peterborough mine can be taken out at a cost of one dollar a ton. Mr. Carnegie, an authority introduced by Mr. Ledyard, says that the mining of Cuban ores costs one dollar a ton, and that the workers in the Cuban mines receive from sixty to seventy cents a day for their services. This means that the Canadian workers in Mr. Ledyard's mines would receive from sixty to seventy cents a day for their services. The *Globe* says that each of these workers would support on an average seven other persons. In other words, that 72,000 people would be supported by 9,000 working miners, who would receive from sixty to seventy cents a day each for their services. These 9,000 workmen who would produce 2,000,000 tons of ore for the Americanized subsidizers of the *Globe*, would, under the competition of Cuba, probably receive from \$5,400 to \$6,300 for so doing; but when this 2,000,000 tons of ore reached the American market the owners of it would be paid \$7 a ton for it, of \$14,000,000. Of course the Americanized owners of these Canadian iron mines could well afford to give the *Globe* a very liberal subsidy for its services in working up a Reciprocity that would put so many millions of dollars in their pockets at so small an expense to them for miners' wages.

In a recent issue of this journal allusion was made to the very cordial reception in Britain accorded to Mr. C. C. Taylor, of Her Majesty's customs, this city, while there last summer. Mr. Taylor delivered addresses in a number of English cities showing that the people and the industries of that country would be benefited by the adoption of tariff protection. The *Toronto Mail*, alluding to the incident, inquired if Mr. Taylor was anxious that the British Parliament should place a duty on Canadian wheat; in answer to which Mr. Taylor, in a letter in the *Mail*, speaking of his discussions of the subject in England, says that the argument was advanced, sustained by the figures, that the exports to the United States had not fallen off for many years; but, Mr. Taylor remarks, the speaker "forgot that in the great bulk of staple Manchester goods the trade had entirely ceased." Mr. Taylor lived in Lancashire for several years as a buyer and exporter to the Toronto market, and also for six years represented in Canada and the United States that large Manchester house of which Mr. Thomas Bailey Potter, the president of the British Free Trade League, was the head. During those six years Mr. Taylor saw line after line of British made goods shut out from the United States, and their places supplied by domestic manufactures, fostered by a protective tariff averaging sixty per cent. Mr. Taylor would rather have some reciprocal arrangement with Britain than with the United States; and if the mother country would discriminate in favor of Canada by admitting all her products free, and placing a duty on American products, the *Mail's* question would be answered. A letter recently received by Mr. Taylor from Mr. H. F. Hibbert, Mayor of the important manufacturing town of Chorley, England, alluding to the "Fair Trade" party in that country and the efforts that are being made in that direction, says "We are still fighting, and I am beginning to feel that the day of our deliverance from this vast mass of foreign manufactures which invades our shores daily, and which takes the bread from the mouths of British workmen, is approaching."

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Shepherd Street,  
Toronto, Nov. 16, 1888.

Messrs. F. E. DIXON & CO.  
Gentlemen,

The eighteen-inch Driving Belt we had from you in July, 1879, has given us thorough satisfaction. It has done all the work in our factory ever since, and looks as if it were good for the next ten years.

Yours truly,

WM. BURKE  
For Langley & Burke.

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for Hard Places.

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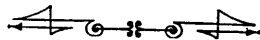
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**THE Australian Ironmonger**, published at Melbourne, like its prototype and founder, the London *Ironmonger*, is a Free Trade journal, but in giving the news as it occurs in the antipodean colony, it throws considerable light on the National Policy of Protection in Victoria. From it we learn that there are in that colony 3,154 manufacturing and industrial establishments, in which 56,271 hands are employed, the power to drive the works being the equivalent of 25,486 horse-power, and the value of the machinery and plant £5,565,325. Included in these are sixty-three agricultural implement works giving employment to 955 hands; and 194 establishments for the manufacture of engines, and machinery, and iron and brass foundries, employing 7,300 hands. The duty on metal goods and machinery has been advanced from 25 per cent. *ad valorem* to 35 per cent. The *Ironmonger* says that it was thought by some that this high rate of duty would cause a reaction in favor of Free Trade, but cites the fact that the United States have had a duty of 45 per cent. on such goods since 1866, which is still in force. Telling how Protection has lowered the cost of wire nails in Victoria, our contemporary says that when the duty was imposed on that article and colonial makers commenced operations, "the importers who had combined to keep up prices reduced their demands at once," also that "on account of the increased duty on nails, one of the two Victorian makers has cabled home for machinery for the manufacture, and will start operations at once." We are also told that the increased duty will not have much effect on prices, but that "the chief effect will be to prevent the consignment of large quantities to the Melbourne market for sale by auction." It is pleasant for Protectionists to read the following industrial item which appears in the current number of the *Ironmonger*:

"Sheet steel is now taking the place of the ordinary wrought iron piping, the saving in freight alone reducing the price of a 30 in. diameter pipe by a shilling a foot, while there is no sacrifice of strength. The Dispatch Foundry Co., Grey-mouth, N.Z., have secured an order for the Government water-race for 3200 ft. of such pipes, 30 in. diameter, telescoped in the usual way, without flanges, the one end merely forced 2 in or 3 in into the wide end. This is found to be quite tight for a pressure of 300 ft. vertical."

## 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, Cattanaich & Symons, Toronto; or Bruce, Burton & Bruce, Hamilton.

SIXTY HORSE-POWER BOILER FOR SALE.—Size, 60 x 144 inches, containing 76 3-inch tubes. Fitted with a No. 2 Curtis return trap, valves, condenser and steam gauge, water gauge and cocks, cast iron soot door, cast iron independent front, grates and bearers complete; all in perfect condition. Apply to SAMUEL MAY & Co., 111 Adelaide St. West, Toronto.

MESSRS. GEORGE GALE & SONS, proprietors of the Dominion Wire Mattress Works, at Waterville, Que., and at Leeds, England, have sent us an 1890 calendar in which is embodied a beautiful view of Niagara Falls. Messrs. Gale & Sons are perhaps the largest manufacturers of their special lines in Canada.

MESSRS. J. L. GOODHUE & Co., Danville, Que., tanners and manufacturers of leather belting, have sent us an adjustable calendar for 1890. It is one of those indispensable adjuncts to a business office, and the uniqueness and convenience of it will ensure a conspicuous place for it in whatever counting-rooms it may reach.

We are in receipt of the Christmas number of *The Ladies' Home Journal*, an illustrated magazine for women published by Messrs. T. Eaton & Co., Toronto. It is neatly printed, ably edited, and in every way a creditable addition to the magazine literature of the country. Send for a specimen copy. Issued monthly. Price 5 cents a copy.

THE Pillow & Hersey Manufacturing Company, Montreal, have sent us an office calendar for the current year, a valuable feature of it being the different phases of the moon in all of the months. Another useful feature is a condensed calendar which includes the last six months of 1889, all of 1890, and the first six months of 1891.

This firm—one of the largest concerns in Canada—are manufacturers of cut nails, horse shoes, railway spikes, tacks, small nails, bolts, nuts, rivets, etc.

*Our Little Ones*, the juvenile magazine heretofore praised in this journal, continues to make us its regular monthly visits, and each visit is more interesting than the preceding ones. The January number is filled with the very best and most entertaining Christmas and New Year stories, and the pictures illustrative of them are just too pretty. It is just the thing for the nursery and fireside, and the price—\$1.50 a year—places it within reach of all who have children and desire to contribute to their pleasure. Russell Publishing Company, Boston, Mass.

The Polson Iron Works Company have under construction at their ship yards at Owen Sound, Ont., a large steel barge to be called the *Seguin*, the contract for which has been given by the Parry Sound Lumber Company. This vessel is to be completed by the opening of navigation, and the steel ribs of the frame are already in position, and the work will be rapidly advanced on the hull. This barge is 215 feet long over all, with 34 feet beam. She will be driven by triple expansion engines of 17, 28 and 46-inch cylinders and 30-inch stroke. There will be two 10½ by 10 feet boilers, which will be worked by 160 pounds steam working pressure. It is believed that this will be one of the finest barges on the upper lakes.

*The National Magazine* for January announces two new and valuable departments—"Biblical Literature" and "Pedagogy"—with Rev. J. C. Quinn, Ph.D., and J. S. Mills, A.M., President of Western College, as editors. Agricultural readers will be especially interested in the new "Institute of Agriculture" described in this number—a part of the University Extension System of the National University of Chicago, whose non-resident or correspondence undergraduate and post-graduate courses have met with such favor. Other articles are by Prof. E. A. Birge, of the University of Wisconsin, and eminent specialists. Published at 147 Throop street, Chicago, Ill. Subscription, \$1.00 per year. Sample copy, 10 cents. Three cash prizes of \$50 each for the best essays on "Our Common Schools," "Study of the Bible," "How to Keep Young Men on the Farm," are announced.

*Outing* for January, 1890, is a most excellent number. The illustrations are superb, and the reading matter very good. We note "Wabun Anung," a tale of hunting in the Great Lake region, illustrated by Henry Sandham. "The Merits and Defects of the National Guard," illustrated, by Lieut. W. R. Hamilton, is an important contribution to the literature of the American militia. "Brant Shooting on Smith's Island," by Alexander Hunter, tells sportsmen where good shooting may be had at this season of the year. "Alligator Shooting in Florida," by J. M. Murphy, graphically describes a different kind of sport. A most readable and instructive paper is that by W. I. Lincoln Adams, on "Instantaneous Photography." This article is richly illustrated. One of the most interesting papers in the number is C. H. Shinn's "Wintering in California," with numerous illustrations. We notice further "Haak Fishing off Ireland's Eye," "Catching Frost Fish with a Shot Gun," "Ice Yachting," "Gymnastics for Ladies," and a most excellent paper on "Skating." The Editorial Department and Records are, as usual, replete with information on sporting events. Now is the time to subscribe for this excellent periodical. All newsdealers and postmasters act as agents.

The Christmas number of the *Dominion Illustrated* cannot, of course, be expected to differ so materially from its other issues, as the special holiday numbers of ordinary papers. Every week it comes out in a form which, with slight modification, might be called by the name of Christmas, or Easter, or Carnival, summer or winter. The handsome and appropriate illustrations of the Christmas issue show, nevertheless, that the publishers have not been oblivious of the hallowed and ever-welcome season. A fine double-page reproduction of Le Rolle's "Gloria in Excelcis"; an engraving of Raphael's "Sistine Madonna," and a pretty little holiday cartoon, "Family Cares," are among its timely specialties. Of portraits there are three—those of the Deputy Minister of Finance, Mr. Courtney; of the newly appointed Judge O'Brian, of L'Orignal, and of the late Nathaniel Pettes, ex-M.P. A beautiful scene, St. Mark's church and cemetery, Niagara; a group comprising the instructor and officers of the Montreal High School Cadets, and an engraving of a fine painting, by Mr. J. C. Pinhey, of Montreal, entitled "The Early Christian Martyr," complete the number. This excellent periodical is just now closing the third half year of its existence. All Canadians should have it, and now is the time to subscribe.

The Polson Iron Works Company, of Toronto, who recently established an extensive ship yard at Owen Sound, Ont., for building iron and steam sailing vessels, successfully launched their

second steamer on December 19th. She was called the *Canadian*, and was built for the Canadian Pacific Railway Company, the previous vessel built in these works being the steamer *Manitoba*, for the same Company. She is to be employed in ferrying Canadian Pacific railroad trains between Windsor, Ont., and Detroit, Mich., *The Canadian* is 295 feet long, that is 5 feet shorter than the *Manitoba*, and she is 73 feet in width over the guards. She will be built with double tracks on her decks, and will carry 14 cars each trip. She will be driven by two single acting independent condensing engines, with cylinders 50 inches in diameter, and 114 inch stroke. These will be worked from four boilers, 13 feet three inches in diameter by 14 feet in length, carrying a pressure of 94 pounds. The engines will develop 3000 horse power, by long odds the most powerful piece of marine mechanism on the lakes. She is a side wheeler. The wheels will be constructed of heavy oak cased in steel, and strong enough to crush any ice that may be encountered in the Detroit river. The vessel has been constructed under the superintendence of Mr. E. Trist, one of the best known shipbuilders on the Clyde, who also built the *Manitoba*, and each of these vessels attest to his manifest fitness for the position he occupies. The plans were drawn by Mr. R. Logan, naval architect. The engine and boilers were built at the works in Toronto. The Polson Company will immediately begin the construction of a sister ship to the *Canadian*, and like her in all respects.

#### RAILWAY PROGRESS.

*The Chicago Railway Age* has secured an interesting relic of the infancy of the railroad in the shape of "A Practical Treatise on Railroads and Carriages," published in New York in 1825. In it is given a description of the engines, cars, track and roadway of the few experimental lines then in operation. The Hetton Railway, which boasted the extreme length of 7½ miles, is the subject of the writer's first description, and we learn that on this line a train of 17 wagons "impelled by a locomotive high-pressure engine, called by the people there an 'iron horse' was said to attain 'the velocity of 3½ to 4 miles per hour.'" This engine it seems weighed no less than eight tons; it had a boiler 4 feet in diameter, with a chimney 12 feet high. The diameter of the pistons was nine inches, and the stroke two feet; the steam pressure was 40 to 50 pounds. The wheels of the "engine carriage" were two feet three inches in diameter, and their axles were connected by an endless chain working into a wheel on each axle. The boiler was supported on a carriage "by four floating pistons, which answered the purpose of springs, equalizing the pressure on the wheels and softening the jerks of the carriage." The train of 17 wagons weighed, when loaded, 64 tons, and when empty, 18½ tons. The rails were no less than 3 feet 11 inches long by 2½ wide, and weighed at first 61 pounds, though it was subsequently found advisable to increase them to 72 pounds. A startling innovation, however, had already begun, for it seems that some malleable iron rails 15 feet long, 3½ inches deep, 2½ inches in breadth at top, and weighing 28 pounds per yard, had already been proposed.

The author then describes the Blenkinsop engine of 1811, which had wheels "working into the teeth of the railway by a toothed wheel on the same axle," this engine being able to handle 30 coal wagons "each weighing more than three tons and moved at the rate of about 3½ miles per hour." The "extensive railway from Stockton to Darlington by the collieries," comprising with track completed and in operation, no less than 32 miles, is described as giving an encouraging example of what the steam railway can do, but the author, bold as was his advocacy of this almost untried means of propulsion, feels obliged to declare that "an engine running at a greater rate than about six miles per hour would need to be raised, so as to remove the possibility of overrunning people, or of dashing against other articles."

#### NICKEL STEEL.

In the proceedings of the Iron and Steel Institute at the meeting held in London, in May last, a paper was read by Mr. James Riley, of Glasgow, on alloys of nickel and steel. Mr. Riley is one of the practical men in one of the largest steel works in Great Britain, and he undertook certain experiments with various alloys of nickel and iron, at the request of the party in France who had taken out a patent for the process. It is to this same Mr. Riley that the people of Great Britain owe their thanks for being able to produce mild steel in the construction of mercantile ships, and no doubt it was the reputation so gained that led to his being selected above all other metallurgists in Great Britain by Mons. Marbeau, the patentee, to conduct the tests. The contents of nickel in the steel varied in proportions of one to nearly 50 per cent., and the results obtained

by him would seem to have astonished the savans of the Institute, including such well-known men as Sir Lowthian Bell, W. H. White, of the Admiralty, and Sir James Kitson, the President of the Institute. One of the experiments, made with an alloy composed of 95.3 per cent. steel and 4.7 per cent. nickel, showed that the breaking strain of the steel was raised from 30 to 40.6 tons, and the elastic limit from 16 to 28 tons. The quality of hardness obtains as the nickel is increased until about 20 per cent. is reached, and at this point a change takes place—the successive additions of nickel tending to neutralise the influence of carbon, so that the ductility shown by the extension before fracture is marvellous. A sample of wire produced by Mr. Riley was said by one gentleman to be available, instead of cotton, to sew buttons on with, it was so very fine and strong. The whole series of nickel steels up to 50 per cent. were stated by Mr. Riley to take on a good polish and finish with a good surface, the color being lighter with the increased additions of nickel. "In the very important matter of corrodibility," he said, "it is with the greatest satisfaction I can state that the steels rich in nickel are practically non-corrodible, and that those poor in nickel are not much better than other steels in this respect. Compared with mild steel of say 0.18 per cent. carbon, five per cent. nickel steel corrodes in the ratio of 10 to 12; while in the case of 25 per cent. nickel the corrosion is in the proportion of 10 to 870. In indicating some of the possible uses to which these alloys may be applied, Mr. Riley said he felt some difficulty in not becoming enthusiastic on the point, for in the wide range of properties or qualities possessed by them it really seems as if any conceivable demand could be met and satisfied. The fact that some of the tests gave breaking strains as high as 87 and even 95½ tons, is conclusive as to the enormous strength of the alloy; and in the making of guns, the plating of war vessels, the construction of the hulls of torpedo and similar vessels, etc., its value must be inestimable. Wherever lightness and strength, with non-corrodibility, are of vital importance, nickel steel is sure to commend itself; and especially is this sure to be the case in any provision which is required to be made for the national defence.

According to information coming from Ottawa, and published in the *Globe* recently, some copies of Mr. Riley's paper reached the United States, and very soon one got into the hands of those very enterprising men who compose the Canadian Copper Company. The importance of the tests was immediately recognized by them, for as fortunately it happens, they are the owners of what no doubt is the richest nickel property in the world—the mines in the vicinity of Sudbury.

One of the leading members of the Company, Mr. Ritchie, of Akron, Ohio, who is also President of the Ontario Central Railway, made immediate arrangements to go to Europe and get all the information obtainable there on the properties and uses of the new alloy. But about the same time Mr. Riley's paper was seen by the Secretary of the United States Navy, and hearing of Mr. Ritchie's movements, he appears to have suspected that the Canadian Copper Company had in view a business stroke with the British or some other European government. He knew that, excepting the mines of New Caledonia, which are owned by a French syndicate, there are no other mines in the world to compare with those of the Canadian Copper Company for the production of nickel, and he seems to have fully appreciated their value for purposes of naval armament. Mr. Ritchie was summoned to Washington, and although the exact nature of the interview in all its details is not known, there is reason to believe that the Secretary's fears were quieted. It is also known that he made arrangements for a metallurgical expert of the United States, now attached to the American Embassy at London, to accompany Mr. Ritchie throughout Great Britain and the Continent and aid him in his investigations. Mr. Ritchie was joined by the expert at London, visits were made to Mr. Riley in Glasgow and to certain works in London, where tests are being made with the new alloy, with the result that they were more than satisfied with what they saw. It was at this stage that Sir Charles Tupper became interested in the subject, and he spent several days with the Americans witnessing and examining experiments at the London works, when the visit to mining and metallurgical works in France, Spain, Germany, Belgium and other countries was talked of, Sir Charles felt that, as the representative of the country having the greatest supply of nickel ore, he ought to be one of the party. They visited some mines in Northern Africa; the Rio Tinto copper pyrites mines in Spain; the works of Le Nickel Company in France, where the New Caledonia ores are treated; the Krupp works in Germany, besides many other mines and establishments where information of a special character was to be obtained.

It is thought that the ores of the Canadian Copper Company can be used in the manufacture of nickel steel, and it is said that the Company's capital is to be increased to \$8,000,000 for that purpose.

## 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.*

THE Canada Atlantic Railway Company will erect new workshops near Valleyfield, Que.

MR. E. L. DREWRY, Winnipeg, Man., will double the capacity of his brewery, plant for this purpose having been ordered.

THE Canada Iron Furnace Company, with headquarters at Montreal, have been incorporated with a capital stock of \$200,000.

THE Truro Condensed Milk and Canning Company, Truro, N.S., put up 1,250,000 pounds of condensed milk during the past year.

A VEIN of Galena ore has been discovered near Lake Memphremagog, Que., which, it is said, assays 15 ounces of silver to the ton, and 70 per cent. lead.

THE Ball Electric Light Company, of Toronto, are erecting an electric light station in Whitby, which, they say, will be the best lighted town in Canada.

THE Massey and Company, a branch of the Massey Manufacturing Company, of Toronto, has been organized and incorporated with a capital stock of \$500,000.

FIRE in the Watties Woolen Mill, at Valleyfield, Que., operated by the Montreal Cotton Company, on December 20th, did damage to the extent of about \$10,000.

MESSRS. HOWSON BROS, Teeswater, Ont., are enquiring as to what inducements Sault Ste. Marie, Ont., will offer them for the removal of their flour mills to that place.

MR. ROBERT PRATT will establish a factory in London, Ont., for the manufacture of tents, flags, awnings, etc.; and the city will exempt his industry from taxation for five years.

THE Milton Manufacturing Company, of Yarmouth, N.S., has been organized with a capital of \$20,000, and are building a factory for the manufacture of all kinds of woodenware.

THE Alpha Iron Works, of Montreal, have been incorporated with \$50,000 capital stock, for the purpose of manufacturing latches, bolts, axles, screws and other lines of hardware.

MESSRS. KELLER & BURNS, who recently started a sewer-pipe factory at Victoria, B.C., are now turning out lines of very superior goods, the products being first-class in every respect.

THE Canadian Bridge and Iron Co., of Montreal, has been incorporated with \$75,000 capital stock, for the construction of iron bridges, and the manufacture of iron work in general.

MESSRS. PEUCHEN, VAUGHAN & Co., Toronto, manufacturers of paints, etc., will engage extensively in the manufacture of paris green, an article which it is claimed is not now made in Canada.

MESSRS. J. C. STEEN and D. ROBINSON, of Donald, B.C., have bought out Messrs. Valentine & Co.'s shingle mill at Revelstoke, B.C., and will add \$25,000 worth of saw and planing machinery.

THE Brooks' Manufacturing Company, recently established in Peterborough, Ont., will make a specialty of manufacturing electric light carbons, besides which they will also make lamps, clocks, etc.

MR. W. SUTTON, of Cowichan, B.C., has transferred his large saw mills at that place to a company of Michigan lumbermen, who will enlarge the capacity of the mills to 100,000 feet of lumber a day.

THE Canadian Switch Manufacturing Company have been incorporated with a capital stock of \$50,000. The headquarters of the concern will be at Montreal, and they will manufacture railway switches, etc.

COUNT DE ROFFIGNAC has erected works at Whitewood, a town on the Canadian Pacific Railway 250 miles west of Winnipeg, Man., for the manufacture of marketable chicory, of which large quantities are grown in that vicinity.

THE Kingsville Woolen Mills, at Kingsville, Ont., of which Messrs Brown, Bird & Co., are proprietors, are being operated to their fullest capacity, manufacturing white and grey blankets, flannels, tweeds, yarns, etc.



THE Hess Manufacturing Company, of West Toronto Junction, have been incorporated with a capital of \$40,000 for the manufacture of furniture, etc. This company are now building an extensive factory at West Toronto Junction, which they expect to occupy within a few weeks.

MR. E. C. COLE, Moncton, N.B., has begun the manufacture of the Greely adjustable pantaloons for gentlemen's wear. These articles have no buttons or buttonholes, and the size may be instantly varied five inches. It is a Yankee invention, patented in that country and Canada.

THE Victoria Rice Mills Company, who have extensive rice mills at Victoria, B.C., contemplate removing the same to Vancouver, B.C., and in connection with which they will erect a 100-barrel flour mill, and a sugar refinery with a capacity to refine 50 to 100 barrels of sugar a day.

MESSRS. GEO. F. HAWORTH & CO., manufacturers of leather belting, whose factory is at 11 Jordan street, Toronto, inform us that they are also dealers in rubber and cotton belting for all purposes, and that they are agents for Hoyt's American pure oak-tanned leather belting.

THE J. B. Armstrong Manufacturing Co., of Guelph, Ont., call attention to the Portland cutter manufactured by them. Regarding it, they say that this is a light, stylish and roomy cutter for business men, for families, or for any purpose; and that it is warranted satisfactory in every respect.

"THE British Columbia Mills, Timber and Trading Co.," is the name of a lumber firm which will seek a charter at the coming session of the British Columbia Legislature. The present Royal City Planing Mills Co. and the Hastings Saw Mills Co., of Westminster, B.C., will be merged therein.

THE refitting of the Wardlaw Knitting Works at Galt, Ont., recently purchased by Messrs. Forbes, of Hespeler, Ont., and C. Turnbull, of Galt, will include a new outfit of knitting machinery, which will be imported from England. It is expected that the mill will be in full running order by May 1.

THE City of London, Ont., will grant a bonus of \$25,000 to Messrs. Doherty & Co., of Clinton, Ont., who have recently established an organ and piano factory in that city. The Doherty Company guarantee that they will give employment in their works to 100 hands for 15 years, the property being mortgaged to the city to ensure the fulfilment of the contract.

THE steamer *Lakme* has arrived from Tacoma, having as cargo three carloads of machinery, including three immense boilers and a 500 horse-power engine, for the Victoria Lumber and Manufacturing Company, and intended for use at the new Chemainus mills. The machinery is of Eastern Canadian manufacture and came through in bond by the Northern.—Victoria, B. C., *Colonist*.

MESSRS. GOLDIE & McCULLOCH have received an order from the Dominion Government to build a large vault to be placed in the savings bank branch of the post office department at Ottawa. The contract price is over \$30,000, and the vault will be the largest and most complete structure of the kind ever manufactured in the Dominion. It will weigh in the neighborhood of 150 tons.—Galt, Ont., *Reformer*.

MESSRS. A. HARRIS, SONS & Co., Brantford, Ont., manufacturers of agricultural implements, are very busy. Over four hundred hands are employed, and the output for 1890 will be six thousand binders, four thousand five hundred mowers and one thousand reapers. Two engines, aggregating 375 h.p. furnish power, and a 75 h.p. Waterous engine generates electricity for 450 incandescent lights of 16 candle power each.

THE Albion Iron Works Company, Victoria, B.C., have contracted to build \$18,000 worth of machinery for the Brunette Saw Mill Company, of New Westminster, B.C., for their extensive saw mills they are about erecting at the latter place. This is only a part of the machinery required for the mill, which, when completed, will be one of the most complete in the province, and will have a capacity of 150,000 feet per day.

THE Dominion Safety Boiler Company, Montreal, claim for the Sterling patent water tube boilers manufactured by them. that they are the safest, most economical, compact and durable boilers made. Their construction embodies a large mud-drum, and perfect circulation is ensured. These boilers are built for any required pressure; all parts are readily accessible for close inspection; and the company guarantee dry steam and the greatest economy of fuel in them.

It was recently stated in these pages that the Albion Iron Works, Victoria, B.C., had been awarded the contract for repairing the British iron war ship *Amphion*, now in dock at Esquimalt, B.C., at \$150,000. The Union Iron Works, of San Francisco, Cal., was a

competitor for the contract, and the awarding of it to the Victoria company is very gratifying. The repairs to the *Amphion* are being done under the superintendence of Mr. W. F. Bullen, the manager of the Albion Works.

THE Midnapore woolen mill is fast approaching completion. The manager, W. H. Dyson, has now returned from the east, bringing with him all the necessary machinery for finishing all classes of woolen goods. The first lot of blankets will probably be ready in a week's time, followed by flannels, shirtings and tweeds in quick succession. It will now be possible to obtain in the district, woolen goods free from any admixture, made from wool of a very high class.—Calgary, Alberta, *Tribune*.

INCLUDED in the company recently formed in Montreal for the manufacture on an extensive scale of water and gas pipe, etc., at Three Rivers, Que., are Messrs. M. Schwab, French Vice-Consul at Montreal, president, and E. Samuel, of Toronto, vice-president. The new works are approaching completion, the expectation being that they will be in full operation early next spring. This company is associated with the Compagnie Generale des Conduites d'Eau, of Liege, Belgium, one of the largest in their line in Europe.

MESSRS. MIDDLETON & MEREDITH, Montreal, whose business card appears on the outside of our front cover, inform us that they are direct importers of aniline dyes, including benzo colors; also dyewoods, extracts, chemicals, etc., for dyeing purposes. They also inform us that they are sole agents in Canada for:—Actiengesellschaft für Anilin-Fabrikation, Berlin—aniline dyes; the Stamford Manufacturing Company, New York—dyewoods, dyewood extracts, etc.; James Muspratt & Sons, Liverpool—soda ash, sal soda, bleaching powder, caustic soda, chlorate of potash, etc.

FAIRVILLE, St. John, is to have an immense brewery, which Messrs. Mconey & Sons are now building for Mr. James Ready. The plans have been made by a New York architect, and provide for a structure of five stories, 150 x 59, besides boiler room and engine house. Two of the stories are to be built of granite and to be below the level of the street; the work for this is already well under way. Three stories will be furnished with iron girders. It is expected that 1,000 tons of granite will be used in construction. Operations are to be pushed on with all possible speed to have the building completed by Christmas.—*St. John Telegraph*.

THE Dominion Dyewood and Chemical Company, of Toronto, of which Messrs. John Taylor & Co. are proprietors, are placing some new and valuable dye-stuffs and colors on the market, for which, they inform us, they are the sole agents for Canada, and which they thus describe:—

*Leather Yellow, H.*—This new color is a product of Read, Halliday & Sons, Huddersfield, England. It dyes leather a full tan shade, good O lines being produced by combining with a little Indigotine. *Acid Phloxine*—A beautiful pink on wool, which withstands the action of sulphur, fulling and light, making it a very valuable color for blanket headings. *Indigo Extract Powder*—A pure extract of indigo only in powder form, much more convenient and satisfactory to use than paste. *Anthracene Brown*—Gives dark shades of brown on wool, with chrome mordant, which stand fulling and light, replacing madder, hypernic, etc.

WE are prone at times to boast of our sardine-packing industry in this country, but it should be borne in mind for the sake of accurate knowledge, that as a matter of fact, we have no sardine-packing industry in this country. We pack a great many boxes of a little fish which is a species of shrimp, and pour cottonseed oil over it, and people buy and eat them under the delusion that they are eating sardines dressed in olive oil. The only genuine sardines are taken on a few sections off the coast of Europe, and the French canners have nearly monopolized the market by establishing a reputation for the absolute genuineness of their fish and their oil, and by their careful, thorough method of packing, which preserves the exquisite flavor.—*Good Housekeeping*.

IN point of dimensions, amount and value of annual product and capital represented, the Nova Scotia Steel and Forge Company, of New Glasgow, N. S., ranks amongst the largest and most important industrial interests of the Dominion. The works cover fifteen acres along the East River, about a mile distant from New Glasgow. They were established in 1882, with a then paid up capital of \$280,000, now amounting to \$400,000 paid up, two-thirds of which stock is represented by the citizens of New Glasgow. On Jan. 1st, 1889, the Nova Scotia Steel Works absorbed the Nova Scotia Forge Company, with all its franchises, lands, buildings and equipment, when the *nom de commerce* of the enlarged and new arrangement became the Nova Scotia Steel & Forge Company. Since July, 1888, they have expended \$50,000 in improvements, enlargements, and for the obtaining of other facilities whereby they have increased their product and perfected their methods and systems. The bulk of the output passes over the I. C. R. for consumption in the Upper Pro-

vinces. In 1884 the shipments from the establishment were only 2,270 tons; in 1887 they amounted to about 6,000 tons; in 1888, 12,000 tons. At present there are 375 men on the pay list, and the monthly pay roll amounts to \$15,000.—Yarmouth, N. S., *Times*.

THE United Asbestos Company (limited), of London, who own all the asbestos mines in Italy, have recently purchased the Fréchette-Douville asbestos mining property at Black Lake, Que. This property is well known for its excellent quality of asbestos, and has very greatly improved during the last season, at least two-thirds of the asbestos mined having been of No. 1 grade, of a quality not inferior to the best obtained from the Thetford mines. We understand that the United Asbestos Company's manufactures principally consist of the Italian fibre, which they claim to be superior to that found in Canada for many purposes, but they use also a certain quantity of Canadian asbestos, and the recent advance in the price has induced them to purchase a mine of their own. Seeing that they are the oldest manufacturers in Europe, this policy will place them in a very strong position to meet the demand for all classes of material. We understand that, although the company has given some extensive orders for machinery to enable them to vigorously work their property, they will not have very much asbestos from their Black Lake mine for disposal to other manufacturers, and those, therefore, who require supplies should make early application. Mr. John J. Penhale, of Black Lake, has been appointed the manager. The chief offices of the company are at 161 Queen Victoria street, London, E. C.—*Mining Review*.

THE terms upon which new leases have been issued to the Chaudiere lumbermen by the Dominion Government, under which the mill-owners become entitled to sufficient water to run their mills, are as follows: There is reserved for the use of the city of Ottawa all the water now necessary, or that may be necessary, for the water-works. The Government reserves all the surplus water beyond this, and also sufficient water for the timber slides. The Government will maintain supervision over all existing works, as well as over all works to be erected hereafter, and no works, improvements or repairs are to be undertaken without the consent and supervision of the Department of Public Works. That department is to see that due economy is exercised in the use of water, and to prevent waste, and for that reason the Chief Engineer of Public Works is to have complete supervision of any machinery that may be placed in the mills, in order that the most improved and economical may be used. The Government reserves the right at any time to make such improvements or changes as may be necessary, and to regulate the height of water as it thinks proper. The lessees bind themselves to make all necessary repairs to existing works at their own expense, and also to construct, at their own expense, any new works that may be necessary in controlling the water. In no case will the Government be liable for any works constructed by the lessees. In case of default by the lessees in any of the conditions imposed upon them, the lots in default revert to the Government.

THE Chatham Manufacturing Company, manufacturers of the celebrated Standard wagons, Chatham, Ont., recently issued a private circular to their agents, in which they say: "Our financial year closed on December 15th, and reckoning you as among our host of friends, we take this liberty to let you know what we have done in the past and what our prospects are for the coming year. You will, no doubt, feel like congratulating us upon the fact that we made and sold a little over 2,000 wagons during the past year—600 MORE THAN THE PREVIOUS YEAR—and have greatly enlarged our premises to meet the expected demand for 3,000 wagons this coming year. To show you our expectations are well grounded, it is only necessary for us to tell you we now have orders booked for about 1,100 wagons for delivery by March 1st, and that our wagon works are now, and for some time past have been, turning out twelve complete wagons per day. The demand for the 'Chatham Wagon,' increasing as it does by leaps and bounds annually, sustains our assertion that it is the best, the greatest carrier and the easiest running wagon made in Canada; and assures us that the farmers of the Dominion have come to realize the fact that no wagonmaker, however skilled and experienced he may be, can make as good and perfect a wagon as the 'Chatham Wagon' without the choicest material in wood, iron and paint; without all the latest improved machinery for making wagons; without our peculiar and vastly superior patent arm (made and used only by ourselves), and last and most important of all, so far as carrying capacity goes, without our own patent Climax Truss Rod."

DURING the year 745,000 tons of coal have been mined in Cape Breton, against 240,000 in 1879. North Sydney and Sydney shipped 460,000 in 1889, as compared with 140,000 tons in 1879. The growth of this important industry, feeding all other branches of commerce, illustrates the great benefit of the National Policy,

which has made a home market for such a large output of coal, giving employment to our people and making them virtually independent of the New England market and adverse American tariff, which crippled our coal industry so long. Comparing the yearly coal exports since 1878, the result of the present tariff is most satisfactory. In 1879 the coal shipments from all the Cape Breton mines only aggregated 243,200 tons; in 1884, 598,150 tons, and in 1889 this was increased to 749,367 tons. The shipments from North Sydney were 140,000 in 1879, 299,000 in 1884, and 400,148 tons to December 15 of this year. The shipping season is not over yet, and your correspondent can only give the shipments from the several mines to date, which are as follows: Sydney, 120,000 tons; International, 123,000; Bridgeport, 25,000; Reserve, 10,325; Little Glace Bay, 73,000; Port Caledonia, 13,000; Gowrie mines, 184,000. At the present time there are nine coal mines in operation in Cape Breton, and two more are opening in connection with these mines. Indirectly there is an army of about 4,600 to 5,000 persons employed, and a gross population of about 18,000 has settled in and about the various mining localities. About 2,550 vessels, with an aggregate tonnage of 450,000, handle our coal shipments this year, with an employment of 24,000 hands. Considering the employment, the commerce and the number of industries affected through the development of the coal trade, the importance of the industry can hardly be over estimated.—Halifax, N.S., *Herald*.

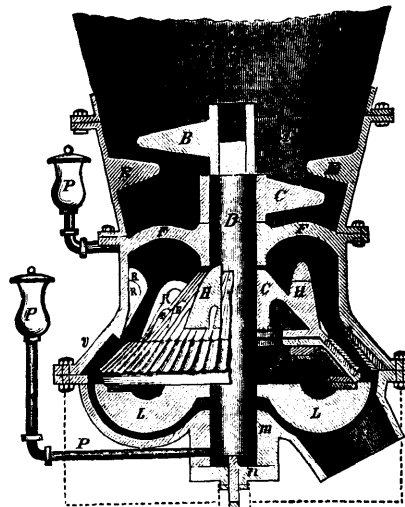
IN the Copper Cliff Mine near Sudbury, Ont., it is said more nickel is being produced than the entire market of the world calls for at current prices. A little branch railway off the main line of the Canadian Pacific Railway, four miles in length, leads out to the mine, which opens into the face of a crag of the brown, oxidized Laurentian rock characteristic of this region. The miners are now at work at a depth of about 300 feet below the surface. As fast as the nickel and copper bearing rock is hoisted out it is broken up and piled upon long beds or ricks of pine wood to be calcined, or roasted, for the purpose of driving out the sulphur which it contains. The roasting process is of the nature of lime-kilning or charcoal burning. Each great bed of ore requires from one to two

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months to roast. When roasted the rock goes to the principal smelter, a powerful blast furnace, "jacketed"—in mining phrase—with running water to enable it to sustain the great heat requisite to reduce the crude, obdurate mineral to fluidity. The dross of the molten mass is first allowed to flow off and afterwards the nearly pure nickel and copper, blended together in an alloy called the "mat," or matte, is drawn off at the base of the furnace vat into barrow-pots and wheeled away, still liquid and fiery hot, to cool in the yard of the smelter. The mat contains about 70 per cent. of nickel, the remaining 30 per cent. being mainly copper. When cool the conical pot loaves of mat can easily be cracked in pieces by means of heavy hammers. The fragments are then packed in barrels and shipped to Swansea in Wales and to Germany, where the two constituent metals are separated and refined by secret processes which are jealously guarded by the manufacturers. So jealously is the secret kept that no one in America has yet been able to learn the process, although one young metallurgist spent three years at Swansea, working as a common laborer in the factories, in order to obtain it. At present there are produced daily at the Copper Cliff Mine about ninety pot loaves of mat each weighing nearly 450 pounds, an output which yields an aggregate of more than 4,000 tons of nickel a year.

#### THE CHIGNECTO SHIP RAILWAY.

Work has been pushed very vigorously during the past season on the Chignecto Ship Railway. This important work is described as follows by Mr. Ketchum, the engineer under whose direction it is being constructed:

The line runs 17 miles in a straight line from where we stand to Tidnish Head—so straight and so nearly level that, standing at either end, one will be able to see the masts of vessels at the other end. The greatest gradient will be 10 feet to the mile. Here there will be a dock 530 feet long and 300 feet wide, with a gate 60 feet wide and 30 high, to enclose the water when the tide is out. At the inner end of this there is to be a lifting dock, 230x60 feet, of first-class masonry. The whole basin will be 40 feet deep, or 50 feet below the grade of the railway. The lifting dock will contain 20 hydraulic presses, for lifting vessels with their cargoes, sails, and passengers, a height of 40 feet.

The vessel will be brought up when the tide permits and admitted

to the dock. It will then be floated over the gridiron, which will then be raised to the bottom of the vessel. This is furnished with cradle blocks which form a support to the hull at distances of 7 to 8 feet apart. The process of raising the vessel by hydraulic power is continued until it is brought up to the level of the rails, when it is locked securely to the gridiron, which is made a solid bridge, supported on each side by steel blocks. The vessel is then hauled off by a hydraulic capstan and placed upon the track, the rails of which coincide with those of the gridiron. The extreme weight proposed to be raised is 3,500 tons, including the gridiron, and the estimated dead weight in vessel and cargo which may be carried is 2,000 tons.

The railway will be a double track, measuring 18 feet from centre to centre. The rails will be about double the size and weight of any used in this country, and will weigh 110 lbs. to the yard. The cradle will be carried on these rails by a large number of wheels—probably 240—so that the weight of the load will be well distributed and each will have to sustain but a small portion of the burden.

The locomotives will be very heavy and will be calculated to move with great ease at the rate of ten miles an hour for the largest vessels carried.

After a vessel is moved across, the locomotives will be shunted out of the way by a traversing shunt, and it will then only be necessary to lower the cradle to a sufficient depth when the vessel will simply float off from it. In the case of a steamer, it immediately steams away, or if a sail vessel it may be towed out.

In the construction of the docks the mode of operation at Tidnish is directly opposite to that at this end. Here we excavate; there we have to build out to the sea; build a coffer dam and enclose it in the form of a horse-shoe, so as to permit of the masonry being put up to dry.

We expect the traffic here to be principally in steamers. The *Monticello*, which plies between St. John and Annapolis, can be as easily transported as a schooner. The cradle will be 235 feet in length, and will accommodate two schooners at once.

In eighteen months or so we hope to have a line of steamers running regularly between St. John and Charlottetown. We expect a large number of excursionists, and many will take the trip for the novelty of the thing from the station at Fort Lawrence to Northumberland Strait. The capacity of the Fort Lawrence dock will be to accommodate six vessels of 1,000 tons capacity each.

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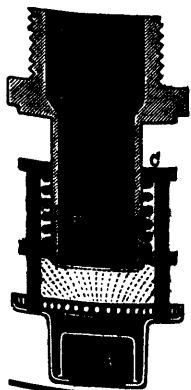
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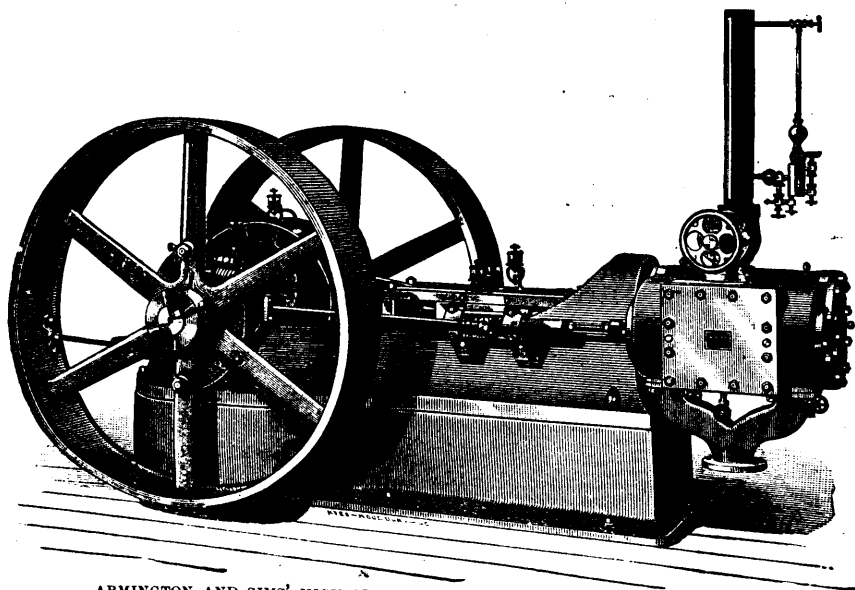
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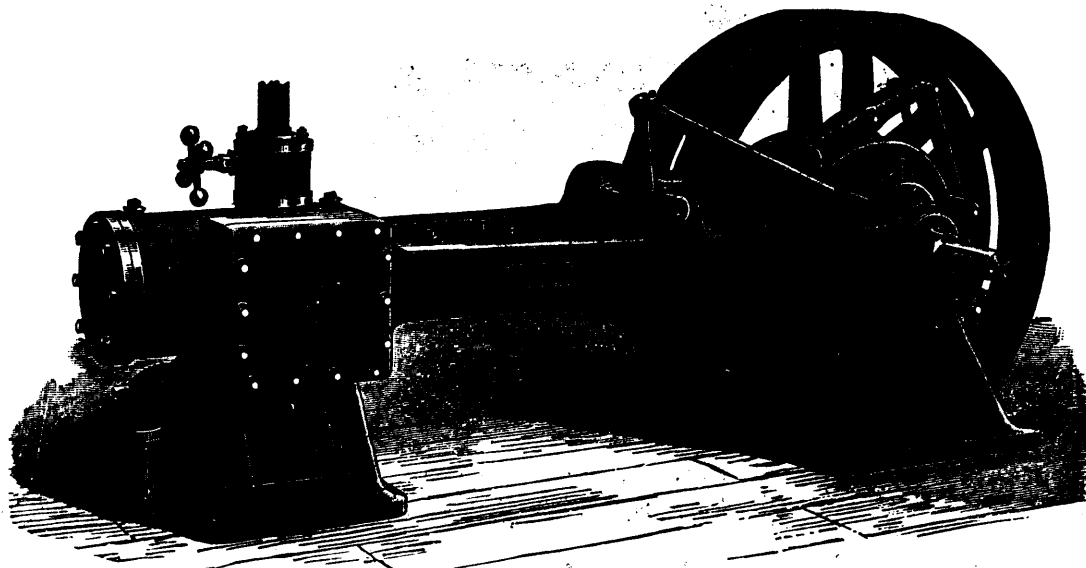
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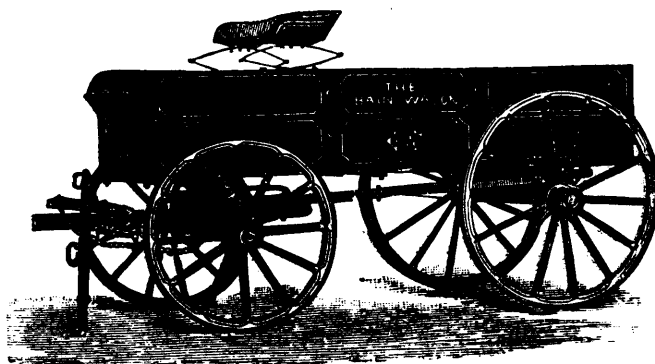
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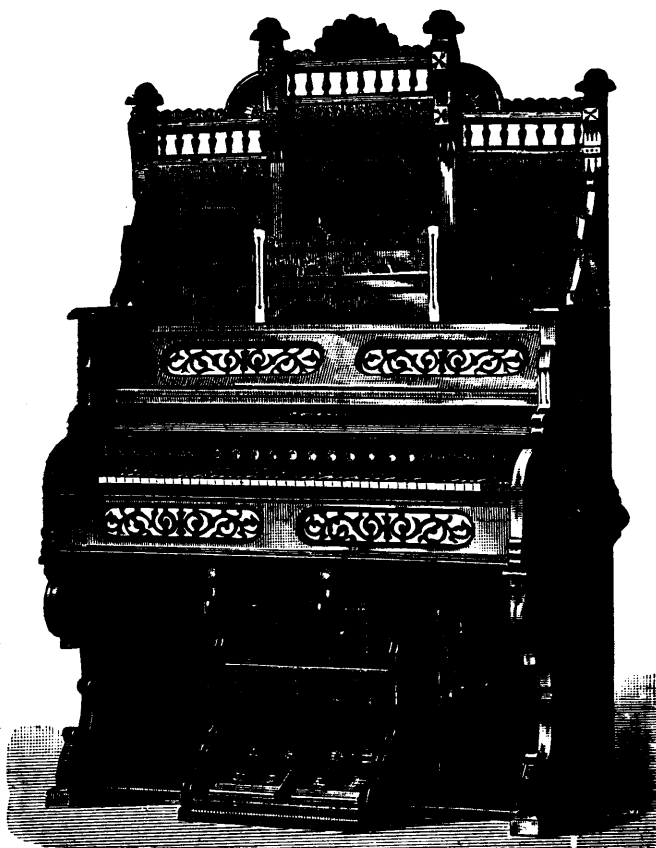
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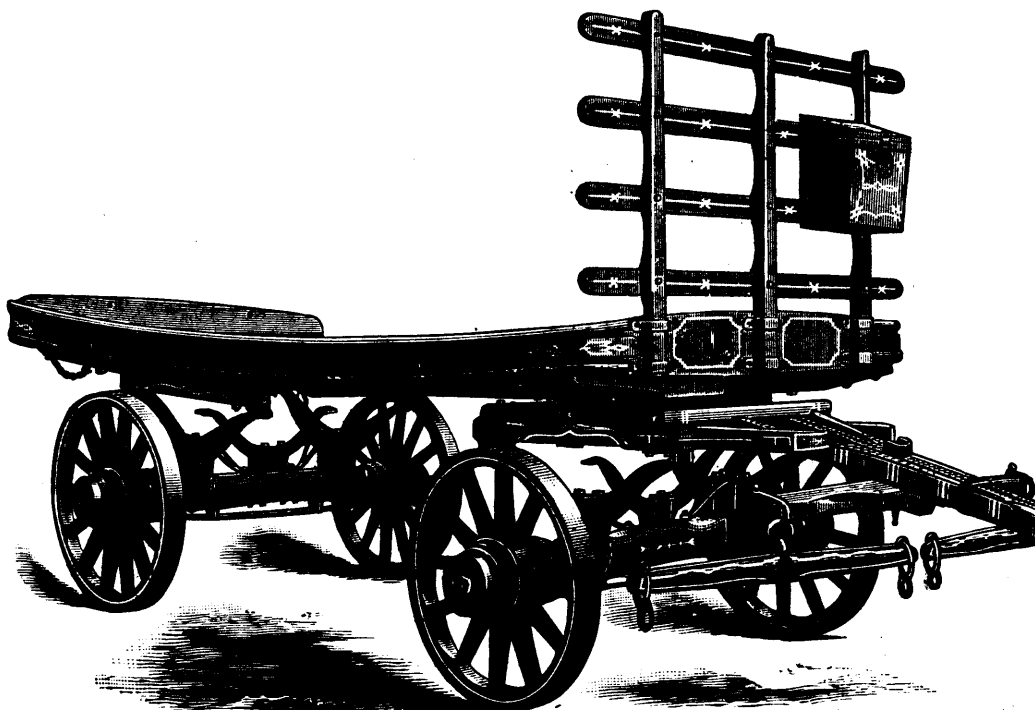
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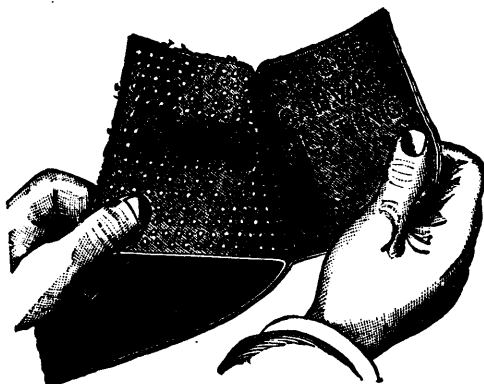
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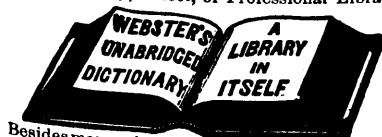
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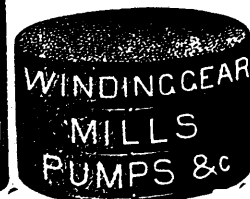
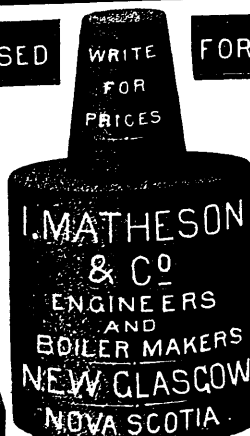
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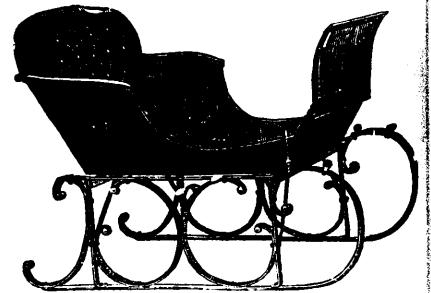
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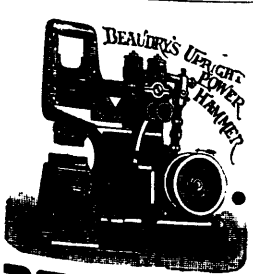
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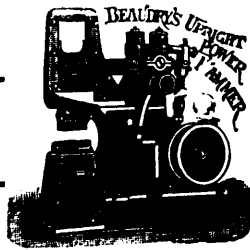
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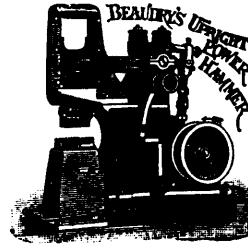
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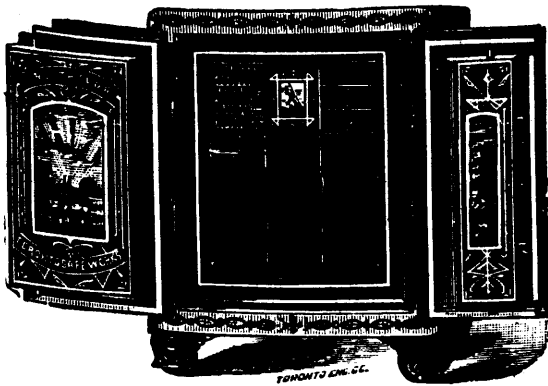


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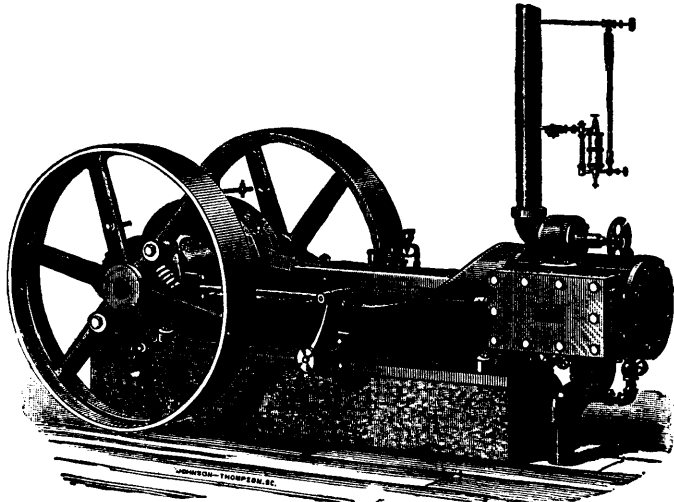
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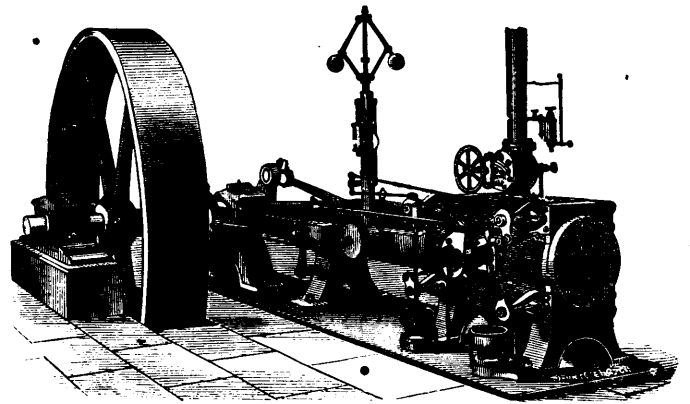
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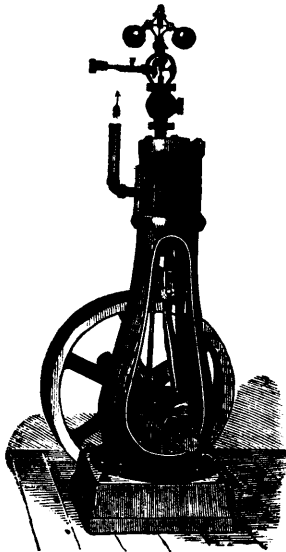
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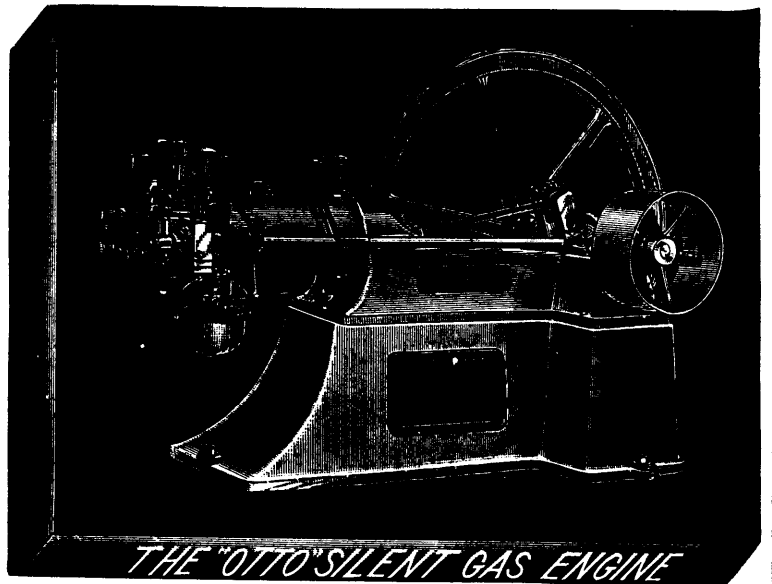
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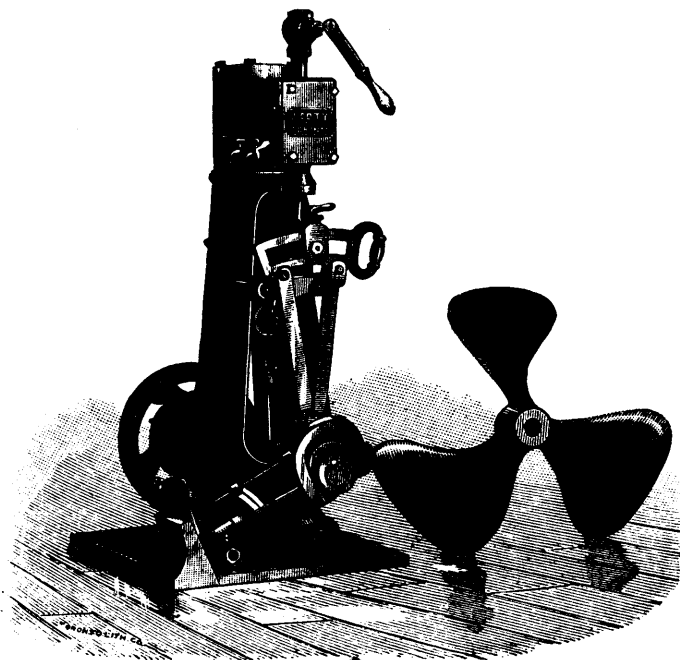
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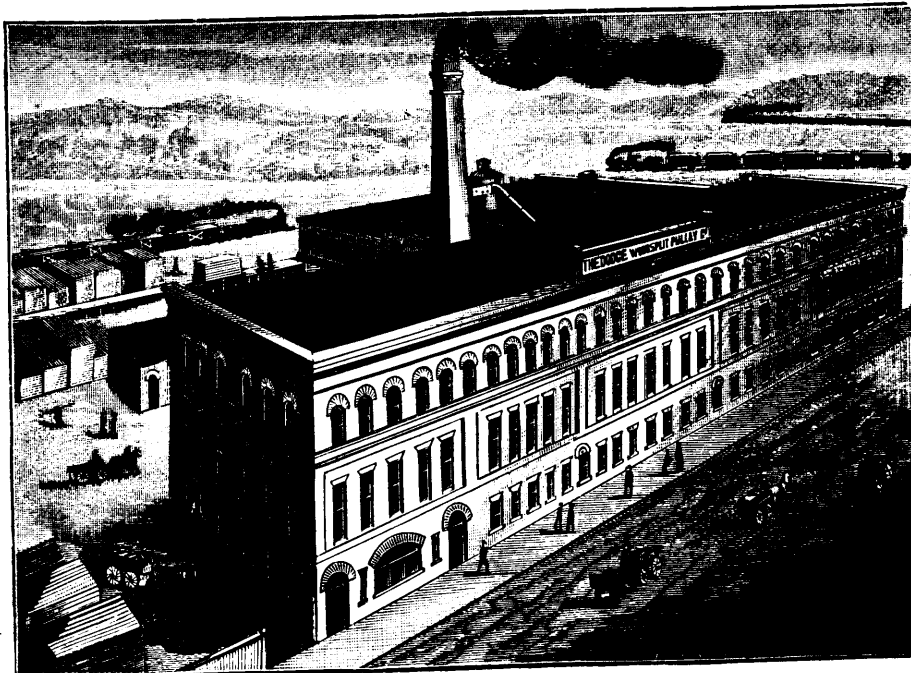
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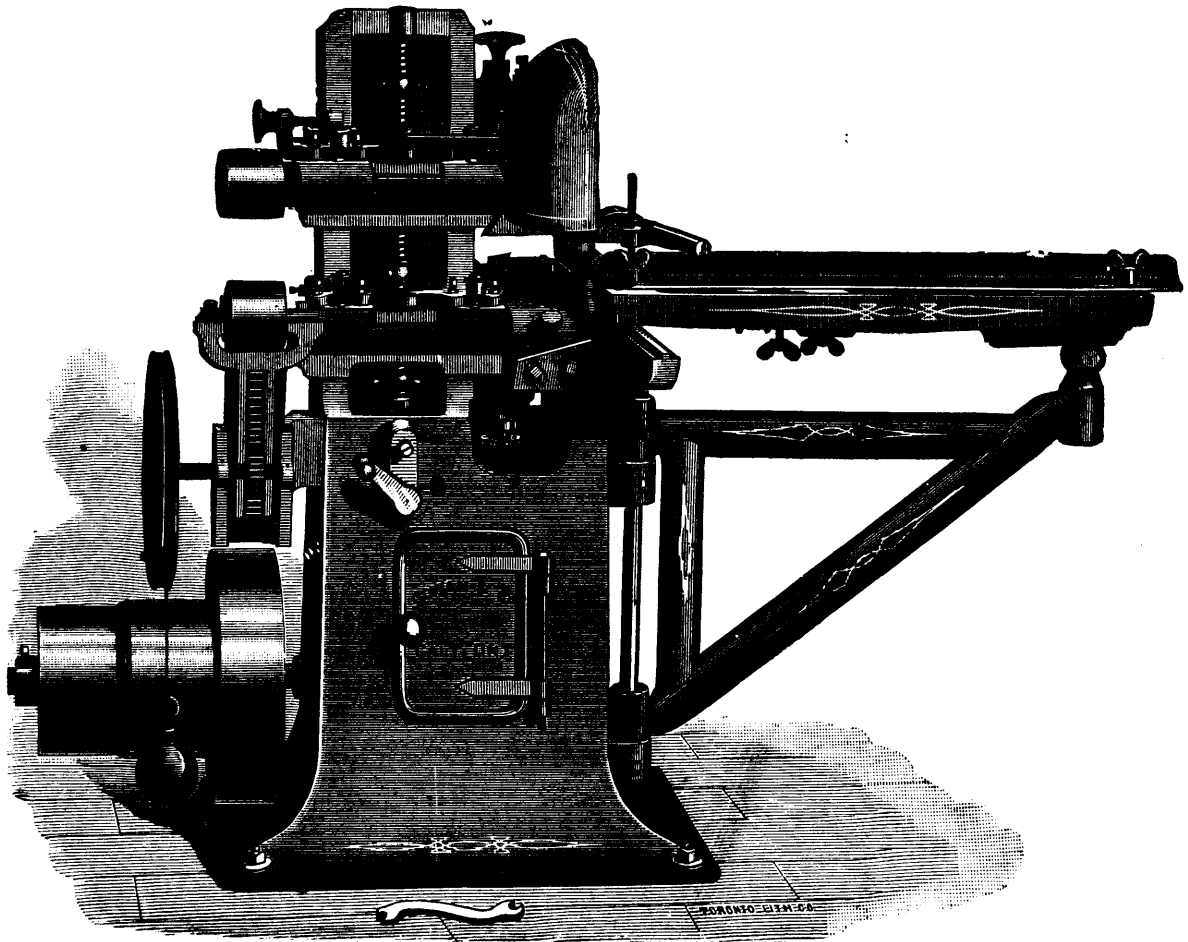
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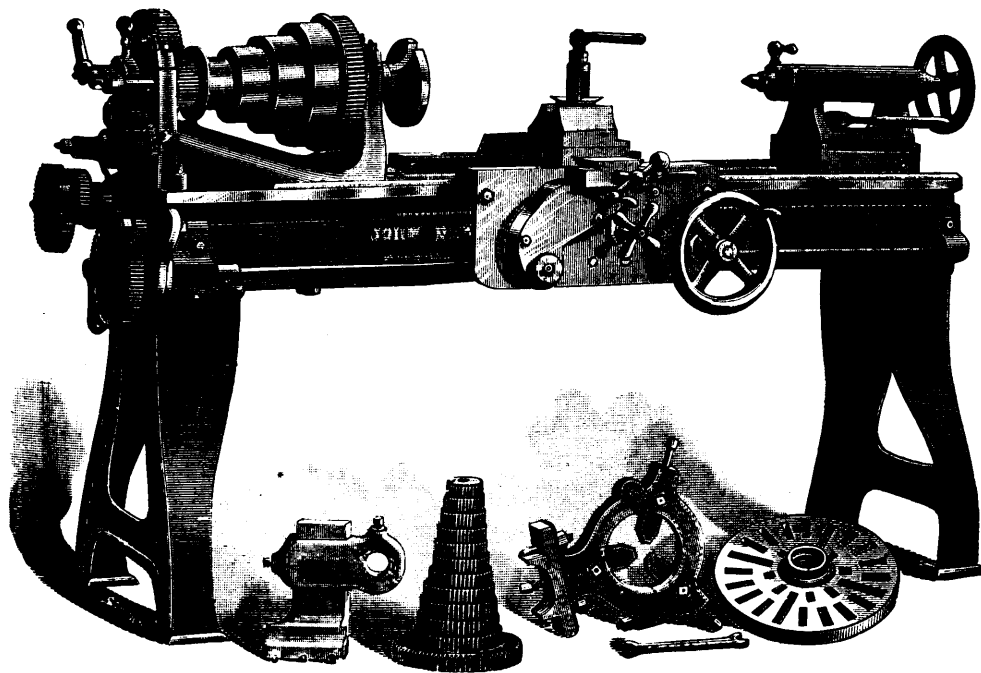
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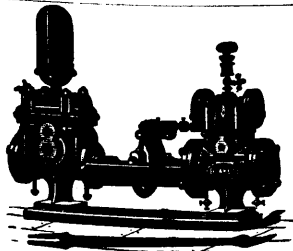
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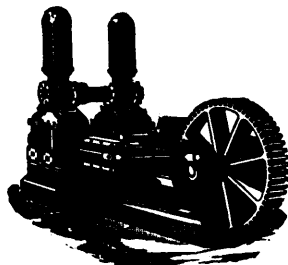
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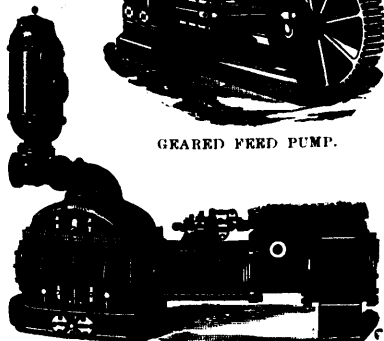
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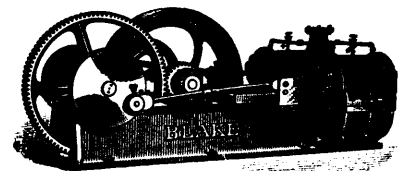


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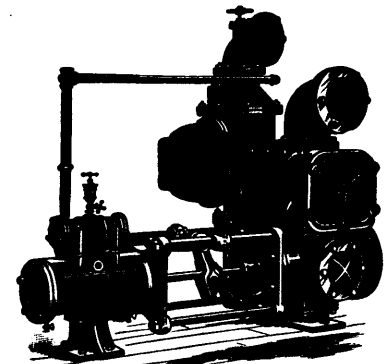
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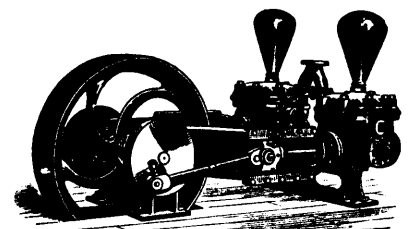
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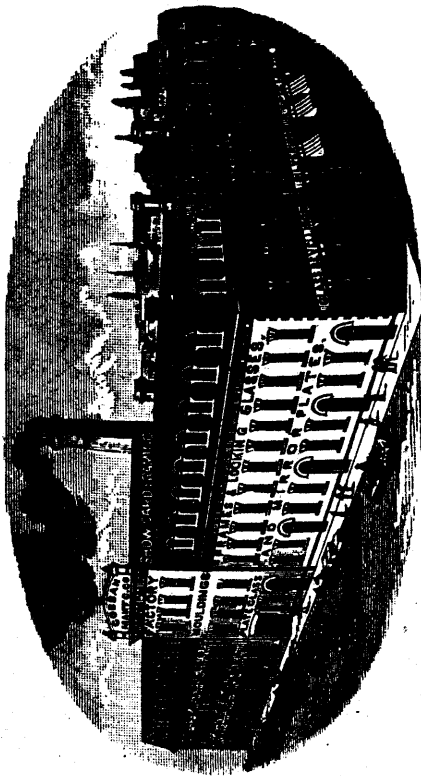
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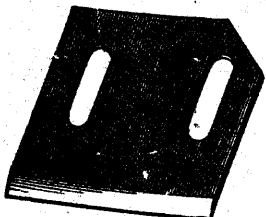
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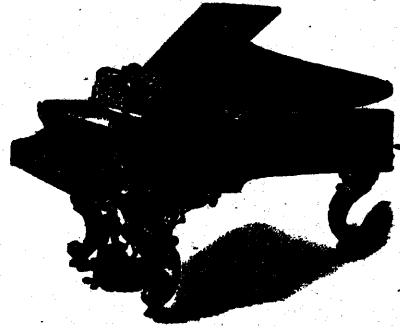
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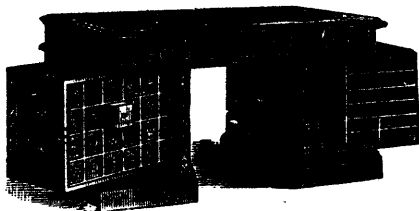
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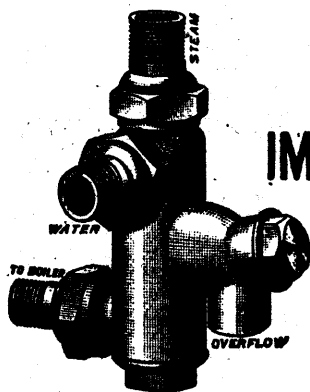
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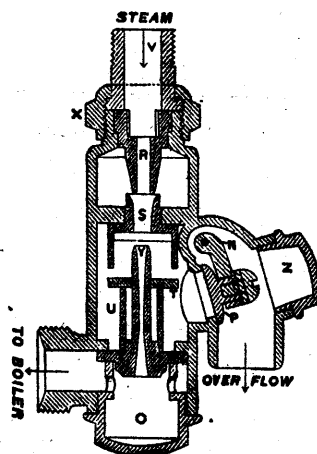
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