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Vol. 18.

TORONTO, MARCH 21, 1890.

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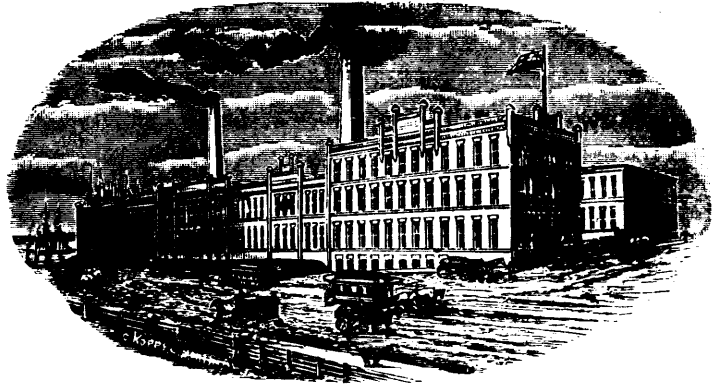
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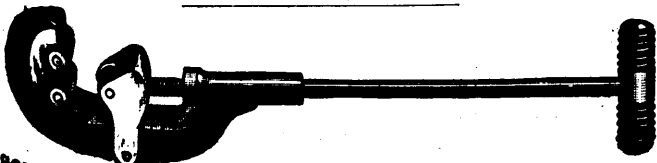
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CANADIAN SHIP-BUILDING.

In the last issue of this journal allusion was made to the fact that the Marine Section of the Toronto Board of Trade had discussed the question of admission duty free into Canada of materials used in ship-building, and had adopted a resolution to the effect that all metal or steel material entering into the construction and equipment of ships built in Canada should be admitted duty free; the fact being cited that under existing laws, vessels wholly constructed in Great Britain are admitted to the Canadian coasting trade without Canadian registration and without the payment of any Customs duties. This resolution was submitted to the Council of the Board of Trade, who appointed a committee to present the matter to the Dominion Government, and to urge action in the direction indicated. This committee duly discharged the duty entrusted to them, and the petition is now receiving the consideration of the Government.

The CANADIAN MANUFACTURER promptly protested against this effort to annul and set aside the life and spirit of Canada's National Policy in the interest of a few selfish persons; but it is painfully observable that none of the newspapers or journals professing allegiance to the dominant party, or to support the N.P. have yet found it convenient to discuss the question. It is to be hoped, however, and to be expected that the Dominion Government will not be led to sacrifice that glorious policy that has done and is doing so much in the way of making Canada a self-sustaining manufacturing nation for the sake of

enabling the putting together—we will not say building—of a few vessels in Canada, however much it may be desired to have Canadian shipping done in Canadian vessels. The National Policy has done much for Canada, and the way to have it do much more is not by destroying it in whole or in part.

The coastwise trade of Canada should be done entirely in Canadian-built vessels; and to secure and build up a ship-building industry here there should be safe-guards thrown around it through an extension of the provisions of our National Policy. Of course there can be no desire to hamper or restrict the carrying on of our foreign trade in foreign ships; but our coastwise and inter-lake commerce should be confined exclusively to ships built in Canada. As we have heretofore shown, although the anti-Protectionists sneer at the merchant marine of the United States, there has not been a year during the past hundred years when the coastwise shipping tonnage of that country has not been larger and more important than in any preceding year, which fact cannot apply to the shipping tonnage engaged in its foreign trade. Thus in 1809, long before the era of iron vessels, and when the foreign trade of that country done in American vessels was in a fairly prosperous condition, the tonnage engaged in that trade aggregated 906,855 tons, against only 405,163 tons engaged in the coastwise trade. In 1829 the tonnage in these two branches of trade was nearly equal; and when, in 1859, when the foreign trade of that country was at its zenith, with 2,321,674 tons of shipping afloat on the ocean, the aggregate tonnage of the coastwise lakes and river trade exceeded that amount considerably, there then being engaged in that trade 2,488,929 tons. This latter tonnage has never been lessened, and in 1888 it amounted to 3,172,120 tons against only 919,302 tons engaged in foreign commerce. It must be remembered that this immense amount of tonnage of American vessels was all built in American ship-yards and of domestic materials; and no sane person could suppose that if the coastwise trade of the United States had been open to the vessels of all nations, such a vast quantity of tonnage as we have shown was engaged in it would have been built in that country. Under the effects of high prices for labor and for all sorts of materials entering into the construction of such vessels as have prevailed in the United States ever since the war, and under that country's high tariffs, all such craft would have been built and equipped and owned elsewhere. The United States Government have made some unfortunate blunders regarding their foreign shipping interests but they have shown peculiar wisdom in excluding all foreign shipping from their coastwise trade. As a result of this wisdom vast ship-yards have been established in American lake and river cities, from which are being turned out some of the finest specimens of marine architecture that ever floated. But a few days ago it was announced that one order from a ship building yard at Duluth included 5,000 tons of structural steel, to enter into the construction of vessels to be built at that place the coming season. Do the Marine Section of the Toronto Board of Trade comprehend the meaning of this? Not one pound of this 5,000 tons of steel will be manufactured elsewhere than in the United States. The ores from which the steel will be made will be taken from American iron mines; hauled to the blast furnaces on American railroads or on American built vessels, all the

labor being done by American miners, train-hands and seamen. The furnaces are on American soil, erected with American capital and employing American workmen. So, too, regarding the steel works, manufacturing the steel, and the rolling mills and machine shops engaged in reducing it to proper shapes; and this one order alone will require in railroad service the equivalent of 600 freight carloads traveling a distance of about a thousand miles.

If the vessels to be constructed with this 5,000 tons of steel had been ordered to be built in Canadian ship-yards, according to the prayer of the Marine Section of the Toronto Board of Trade, all the investment of capital in mining, smelting, conversion, rolling, shaping, transportation, etc., would be in some other country than Canada: and all the benefit Canada would receive from it would be the assembling and fastening together the parts of vessels that had been to all intents constructed on the otherside of the ocean. The so-called Canadian ship builders would be recompensed for superintending this almost inconsequential part of the work; and probably a few score imported workmen would find temporary employment; but only a strained interpretation of the term could be made to denominate the transaction an exhibition of Canadian ship building enterprise.

It is indeed anomalous that our tariff imposes a duty upon much of the materials now imported entering into the construction and equipment of steel vessels in Canada, while vessels wholly constructed in Great Britain are admitted into full and equal competition with Canadian built vessels without Canadian registration and without payment of Canadian customs dues. This is all wrong, and the wrong should be righted, but the way to right it is not in the way proposed by the Marine Section of the Toronto Board of Trade. Canadian coastwise trade should be restricted to Canadian built tonnage. The other scheme is a delusion and a snare.

CANADIAN IRON MINES.

THE owners of Canadian iron mines and their newspaper friends who are so anxious for Reciprocity with the United States so that Canadian ores can be admitted duty free to that country, owe to Canadian miners an explanation regarding what they have said concerning the cost of mining. Mr. T. D. Ledyard, who is largely interested in an iron mine near Peterborough, Ont., states that the ores from that mine can be taken out at a cost not exceeding one dollar per ton.—The *Toronto Globe*, Mr. Ledyard's mouthpiece, says that mining these ores at one dollar per ton is, to able-bodied miners, "high wages." Mr. Ledyard says that these ores are the equal of any from Lake Superior mines, and that they can be laid down in Cleveland, Ohio, duty paid, at \$3.90 per ton. The *Cleveland Iron Trade Review* recently stated the market value at that city of certain Lake Superior ores, to be \$7 per ton. Hon. George H. Ely, of Cleveland, President of the Western Iron Ore Association, in a letter to Major McKinley, Chairman of Committee on Ways and Means of the United States House of Representatives, speaking of the cost of mining the Lake Superior ores states that the average daily wages per man paid to miners during the past eight years was \$2.10;

that the average total cost per ton of ore mined in that time was \$2.32 and that the labor cost per ton was \$1.60, the explanation being made that the difference between the "labor cost" and the "total cost" per ton was the expense for tools, explosives, timber, etc.; the figures not including cost of general administration of the business, but only the cost of production at the mines; the mining operations being carried on all the year round.

The process of mining is substantially the same at Mr. Ely's Lake Superior mines and at Mr. Ledyard's Peterborough mines; and what we desire to call special attention to is the difference in cost of mining—pay of miners, etc., as reported by these two gentlemen. Mr. Ledyard says he can mine his Canadian ores at a cost of one dollar per ton, while Mr. Ely says it cost him \$2.32 a ton to mine his American ores—that he pays his miners \$1.60 a ton for mining, the cost of tools, explosives, timber, etc., averaging seventy-two cents per ton. Certainly Mr. Ledyard cannot supply tools, explosives, timber, etc., for his Canadian mine any cheaper than Mr. Ely can for his American mine; and it is fair to suppose that this being the fact, and that seventy-two cents per ton must be counted in the cost of mining, it is evident that Mr. Ledyard, to mine his ore at a cost of one dollar per ton, as he says he can do, cannot possibly pay his miners more than twenty eight cents per ton for mining. And this is what the *Toronto Globe* calls "high wages to able-bodied Ontario miners!"

Mr. Ely a couple of years ago—in April, 1888—in an article in the *North American Review* stated certain facts regarding the cost of mining iron ore; and in his letter to Major McKinley, he asserts that the figures hereinbefore quoted entirely confirmed the statements he had previously made. These were to the effect that the wages of miners in Lake Superior mines are more than three and three-quarter times what they are at Bilbao, and more than double those paid in the Cleveland District, England; and that the labor cost of a ton of iron ore in the Lake Superior region would be at least eight or nine times that at Bilbao. The Pennsylvania Steel Company, who, like Mr. Ledyard, are clamoring for "free ore," say that the cost of mining their Cuban ores and delivering it on board ship in that Island is only one dollar per ton. No doubt the cost of tools, explosives, timber, etc., in these Cuban mines is quite as much as in the United States and Canada—seventy-two cents per ton; and it is evident that the cost of general administration of the business there, as in Canada also, must be duly considered; and in considering the matter the question arises: What pay do the miners get? The measure of that pay to slave labor in Cuban iron mines with ore mined at a cost of one dollar per ton, is certainly the measure of the wages Mr. Ledyard expects to pay to able-bodied Ontario miners working in his Peterborough mines, from which he says he can deliver ore at a cost of only one dollar per ton. And this pay is what the *Toronto Globe* calls "high wages!"

Mr. Ledyard is an intelligent gentleman who probably knows or thinks he knows what he talks about; but able-bodied Ontario miners will hesitate in taking employment in his mines at the rate of wages paid to slave labor in Cuba. He must not be too avaricious. He must offer as much as Mr. Ely, whose miners average \$2.10 a day wages the year round.

FIRST USES OF ELECTRICITY IN CANADA.

THE CANADIAN MANUFACTURER is no admirer of the political opinions usually expressed by the *Toronto Globe*, but as an exhibitor of that push, vim and energy in business matters that always guarantees an arrival at destination with both pedal extremities, that paper deserves both admiration and unbounded success. Aside from other features of business enterprise, some of the *Globe's* exploits in the direction of availing itself of many of the uses of electricity are noticeable and worthy of record. We do not refer to the telegraphic and telephonic conveniences it possesses, for these electric appliances are common in all well-regulated newspaper offices; but we allude to the fact that the *Globe* was the first establishment of any description in Ontario to install for its own use an incandescent electric light plant. This was in 1884, and the dynamos then introduced into its building on King Street East, this city, are there now in good order and in operation every day. These dynamos were made by the Edison Machine Works, Hamilton, Ont., and are used for illuminating by incandescent lamps the entire establishment—business offices, editorial sanctums, composing-rooms, press-rooms, engine and boiler rooms, etc.

The utility of the electric power as generated in the *Globe* establishment was apparent to all who investigated it; and the Great Northwestern Telegraph Company, of which Mr. H. P. Dwight is the manager, was quick to be availed of it. The telegraph office is on Wellington Street, in a direct line about 800 feet from the *Globe* office; and although overhead wires were in use transmitting electrical energy of high tension systems, no effort had ever before been made in Canada for thus transmitting low tension energy for incandescent lighting. But aerial wires were extended and electricity transmitted between these two points, and ever since then (and this was in 1885) electricity generated on the dynamos in the *Globe* establishment was constantly employed in the Great Northwestern Telegraph Company's offices in Toronto, until the completion of the Edison central generating station and underground system of electrical conduits of the Toronto Incandescent Electric Light Company a few weeks ago, when the current was taken from the latter company's wires. This circuit between the *Globe* dynamos and the telegraph company's offices was, at the time of its installation, the longest low tension circuit in Canada.

The Toronto Incandescent Electric Light Company had their underground conduits laid and ready to receive the electric current for lighting purposes several weeks before their central station on Terauley Street was in condition to supply the energy. Many of the stores on Yonge and King Streets had been wired and equipped ready to be lighted, and great anxiety was manifested to have the electric illumination; and it was to gratify this desire that connections were made from the *Globe* dynamos with the underground conduits in the streets, and in this manner and from this source the first incandescent electric lighting in Canada from an underground system was had.

The advantages to be derived from the use of electric motors in driving printing presses commended themselves to the *Globe*; and with the enterprise that characterized it in intro-

ducing the other electrical appliances here alluded to, certain presses of that establishment are now driven by Eddy motors receiving their energy from the dynamos already alluded to. This, we believe, is the first adaptation in Canada of the use of electric motors to drive newspaper printing presses.

Another electrical appliance now in operation in the *Globe* office is an electric heater, the heating of which is accomplished by passing a current of electricity through a series of coils of German silver encased in an ornamental cast-iron tablet. This system is capable of enlargement so as to satisfactorily warm residences, offices, etc., and that in the *Globe* office is the first appearance of the principle in Canada.

A large six-story building is now being arranged as a new home for the *Globe*. It is on Yonge Street, and extends along the south side of Melinda to Jordan Street; which, when completed, will be probably the largest and best equipped newspaper office in the Dominion. Of course there will be steam engines there, but they will be principally used for driving dynamos, for most of the power to be used throughout the establishment will be generated in these dynamos, and distributed by electric motors to printing presses and wherever else it may be required. From all of which it will be seen that the *Toronto Globe* is a pioneer in Canada in the application of electricity to the requirements of business, and as such deserves the mention here given it.

TAX EXEMPTION.

THE "National Society for the Exemption of Machinery from Rating, and for the Protection of Manufacturers" is a society recently formed in Great Britain for the purpose indicated by the name. It was brought into existence because of the inclusion in the valuation of a building of the machinery therein employed in the manufacture of lace. The manufacturing firm had been rated for their buildings, which contained the machinery, to the net value of £290, and this sum included the value of engine, boiler, shafting etc; and to this was added an additional amount of £800 for the value of the lace machinery. On appeal to the Sessions Court the total assessment was reduced to £895, but the principle of rating machinery was maintained; and an appeal was taken from the judgment of the court on the ground of the illegality of the assessment of the lace machinery. The matter is now pending in the Court of Queen's Bench, the denouement of which is awaited with considerable interest by all manufacturers in the country.

In interesting manufacturers in this Society it is pointed out that the taxation of such machinery increases the cost of production; and that if the policy is allowed both the workman operating it, and the purchaser of the goods will be suffering:—that the great source of British commercial supremacy on machinery must directly enhance the prime cost of manufactured goods, with the consequence that the British manufacturer so rated has to compete at a disadvantage with such foreign manufacturers who have no such imposts to pay, and whose trade is protected by tariff laws. It is further pointed out that such rates are in the nature of export duties, which, it is claimed, is the most unsound and pernicious of all forms of taxation.

In Great Britain while taxes are levied upon lands and buildings, and upon fixtures attached to buildings, such as boilers, engines, shafting, etc., there are no taxes upon personal property, i.e., such property as lace making machinery which is not of necessity attached to the buildings containing it; and it is because of this attempt to thus levy taxes upon such machinery that the society here alluded to was organized. But trade profits arising out of the employment of machinery are liable to income tax which is now sixpence in the pound. All freehold property is liable to "property tax," collected from the occupier, and which is also sixpence in the pound on the gross annual value. All machinery so fixed or built as to be part of the freehold is liable to this tax as part thereof; and further than this there is no Imperial taxation in Great Britain affecting machinery. The occupiers of all freehold or real property are also liable to local taxation; and this is also based on the estimate of its annual value. Anything in the nature of machinery or plant so built or attached as to be part of the realty is included in the estimate; but there is a considerable dispute there now as to what "machinery" is or is not to be so included.

This matter of tax exemptions is creating quite as much interest in this country as in Great Britain, though perhaps not along precisely the same lines. As has frequently been shown in these pages, very widespread dissatisfaction prevails at the system in Canada that shows special favoritism to certain classes of persons and certain kinds of real property, to the prejudice of the whole community except those who are thus favored. Thus, in the city of Toronto, the exempted real estate, chiefly church and college property, is valued at about eighteen million dollars; and in the city of Montreal such exempted property is valued at even a much higher figure. In other words, the burden of taxation is not borne ratably by the whole body of the community. It is argued by some that all church property used for church purposes; all school and college property used to promote and encourage education; all hospital and asylum property, and all public buildings and grounds should be exempt from taxation because of their public or semi-public character. But the answer to this is that in fairness to all land should bear its fair share of the public burden; and this argument goes so far as to demand that the land should be assessed for all the taxation levied for the support of Government; and that no tax should be levied upon any thing but the land. Churches are built for the accommodation of those who own and frequent them; and those who do not own them, and who have no special interest in them should not be taxed for their support. They are a luxury that their owners should pay for. Colleges and college property, in like manner, should pay their just contribution to the public coffer, inasmuch as they are for the exclusive use of the rich, the poor being unable to avail themselves of their advantages. All public buildings should be assessed for taxation. Under the present system of exemption, while such property receives the same benefits as taxed property from the police, fire and water services of the city, it contributes nothing to the support of these services; and as regards some municipal advantages, the contiguity of untaxed public property involves onerous, unjust and unequal taxation upon neighboring property liable to taxation. As to local improvements the non-assessment of any property

involves unjust burdens upon neighboring taxpayers. The exemption from taxation of incomes of clergymen and certain other favored classes is obviously unjust; and the taxation of personal property cannot possibly be ever made to bear *pro rata* upon all the owners of such property, and therefore ought not to be levied.

There is no class of taxpayers upon whom the existing system bears as heavily as it does upon manufacturers. It is true that some towns endeavor to lighten this burden by remitting their municipal taxes upon factories and similar industrial establishments, but this system is also wrong; for it is an attempt to remedy an effect rather than to cure a cause. All that the manufacturer has lies plainly open to the inspection of the tax assessor; and there is no way by which he can avert the inevitable assessment. His money is invested in land, buildings, machinery, etc., and this investment gives employment to many men, the presence and labor of whom adds to the wealth of the State. And while this may be true of some of those who deal in merchandise, it is not true of many other classes who, not being employers of labor, accumulate wealth and invest it in lands, or in stocks and bonds, which the owners conveniently forget to remember when the tax assessor asks for returns. It is evidently unjust that any speculator should be made rich by investing his wealth in real estate, and waiting for the prosperity of the community to enhance its value for him. Such enhancement in value should belong to the community; and the way for the community to obtain that benefit is by exempting all but the land itself from taxation.

REVIVAL OF IRISH MANUFACTURING INDUSTRIES.

THE Irish League in the United States call upon all Irishmen throughout the world to join in a boycott of all British made goods; and this is done in the hope that it may in some undescribed manner have some sort of influence upon the British Government in inducing it to accede to the demands of the Irish Leaguers regarding the political condition of Ireland. What effect this call will have upon Irishmen throughout the world remains to be seen; but if hoped for "reforms" in the Government of that Island can only be expected after the vigorous, universal and successful boycott of British manufactures, then that millenium must be postponed indefinitely. The boycott will not work.

What is perhaps a more feasible scheme as a step towards the disenfranchisement of Ireland, is not the boycott suggested by the Irish League in the United States, but that of the Irish Industrial League in Ireland; which is to bring about a revival of those manufacturing industries in Ireland that in past days made her famous and gave her great wealth and prosperity. Some of the largest and most important industrial enterprises in the world are now and for many long years have been in successful operation in Ireland, and without which that unhappy country would be even more wretched than what it now is.

The natural advantages of Ireland are such as to enable her to take front rank with any other country on the globe if these advantages were properly utilized. The soil is good, the

climate is delightful, the people are frugal and industrious, and, thanks to St. Patrick, there are no snakes there. At one time the products of Irish manufacturing industries were celebrated throughout the world; and, to-day, no household is properly equipped without liberal supplies of napery made in Ireland.

"The nation that manufactures for itself, prospers." The ambitions and restlessness of the Irish people have ever impelled them to accomplish and maintain their industrial independence; and if this independence has not been accomplished it is due to no fault of theirs. Circumstances which they could not control ordained differently. In the seventeenth century the raising of cattle for the English market was a lucrative business in Ireland, and a source of great wealth. This industry was destroyed through no fault of Ireland. Then Ireland built ships and established a vast and profitable marine trading with foreign countries; but laws in the formation of which she had no voice cut off and destroyed this trade. Then Ireland turned her attention to sheep husbandry and the manufacture of woolen goods, and, according to Froude, "Irish wool was the finest in Europe, and Irish cloth was eagerly sought after;" and then prohibitory laws destroyed these industries. At the time of the destruction of Ireland's woolen industry fifty thousand families were employed in it: when it occurred the exodus to America began. The coasts of Ireland teemed with fish and Ireland's fishing interest began to grow in magnitude and importance; but the adverse laws that compelled Irish fishermen to carry on their business in vessels that were not owned in Ireland, manned by crews who were not Irishmen wrought the destruction of the industry. The cycles of time brought to Ireland Grattan, Flood and others, and an enfranchisement that established a policy of Tariff Protection to Irish manufacturing industries; and then the wonderful spirit of Irish enterprise placed these industries in a higher and more remunerative condition than that country had ever known. The beautiful Island became a hive of humming industry; her harbors were filled with shipping; her commerce extended over every sea to every land, and her people were prosperous, contented and happy. "Protection to home industries" was the magic "sesame" that opened to a now happy people this entrancing vista of prosperity. Then came a political condition the important feature of which was Free Trade as between Ireland and England; and the glow and sunshine of Ireland's prosperity faded into the darkness and gloom of the following years. Five millions of operatives in workshops and factories were thrown into idleness, and the almost countless establishments that gave profitable employment to these people were closed. According to the official reports, in 1822, the first year under Free Trade with England under the Act of Union, the population of Ireland numbered 8,000,000 souls; and of these the reports show that only 2,000,000 were employed. Those who had been employed in the industrial establishments of the country, finding no other occupation open to them, went upon the land to earn their living. Land rents went up and the price of farm products went down; and then came the famine and its attendant gloom and horror, when over 2,000,000 of the Irish people perished from want and starvation, and another 2,000,000 found refuge from the disaster by emigration.

Regarding the condition of Irish manufacturing industries at the time of the famine—in 1847—Thomas Francis Meagher said:

"The cotton manufacture of Dublin, which employed 14,000 operatives, has been destroyed. The stuff and serge manufacturers which employed 1,500 operatives, have been destroyed. The callico looms of Balbriggan have been destroyed. The flannel manufacture of Rathdrum has been destroyed. The camlet trade of Bandon, which produced goods valued at £100,000 a year, has been destroyed. The blanket manufacture of Kilkenny has been destroyed. The worsted and stuff manufactures of Waterford have been destroyed. The sateen and frieze manufacturers in Carrick-on-Suir have been destroyed. One business alone thrives and flourishes and dreads no bankruptcy—that of the Irish coffin-makers."

This is a brief picture of the variegated fortunes of Ireland in comparatively recent years; and perhaps the view will be subjected to similar kaleidoscopic changes for years to come. Perhaps not. It is to be hoped not; and the action of the Irish Industrial League in Ireland gives ground for that hope. "Heaven helps those who help themselves;" and when it is seen that the Irish people have determined to build their political hopes upon the sure foundation of industrial independence, they will receive greater sympathy and moral support from all the world than what they could ever hope for from any system of boycotting.

The scheme of this Industrial League is to promote and extend home industries. Meetings are being held throughout Ireland; councils formed, committees chosen and information asked for as to all particulars where there is the remotest possibility of reviving depressed industries or establishing new ones. Reports are requested as to all unused buildings suitable for factory purposes; the names of owners and the rent demanded; the character of the premises and water and other power available; the nearest railway stations, etc. Particulars are also requested as to the number and qualifications of skilled and other workmen available; and the probable farm and dairy supplies. The League want to know also where fishing stations are possible; what minerals are available, and all about them. It desires to have introduced into Ireland the latest best and most economical system of flax collection and treatment; and to stir up the people to interest themselves in all that concerns the industrial progress of their country.

A new Industrial Ireland would be a national endowment of world-wide importance, not only in making the people too busy to be discontented, but because all the world would share in Ireland's joy at her renewed prosperity and happiness.

ETHERIC FORCE.

HE is a rash man who would undertake to show that a limit had been reached in human researches into the mysteries of nature regarding the undeveloped forces, that she contains. We have ideas regarding the force of the wind. We have high authority for the statement that "the wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh or whither it goeth." Since those words were spoken, scientific investigation has discovered much regarding the wind, and scientists think they have some knowledge both of the origin and the destination of it. We know

that as a force of nature, the wind can be used for many mechanical purposes; and that for many purposes the wind is the cheapest power available. It will drive vessels through the water, and it will drive machinery. The tides of the ocean are a force of nature that for centuries past has been harnessed, like the wind, for the use and benefit of man. Heat, and cold, which is but the absence of heat, are forces of nature with some of the properties of which we are all more or less familiar; and we know that without heat there could be no life. The action of heat upon water produces effects, some of which are also familiar. Some of these are the clouds in the sky and the fog that covers the earth under certain conditions.

When Watt discovered that the vapor or steam generated from boiling water could be made to do service for man, he became a benefactor of the human race. He observed that steam was expansive; and his ingenuity invented an engine that could convert that expansive power into motion that could be made useful to man: and although there is a long distance between the steam engine invented by James Watt and the ponderous machinery that drives a floating palace into the very face of ocean storms, at a speed of twenty-five miles an hour, the expansive power of steam is the secret now as then. The force of nature as developed in the steam engine, like that captured from the wind, has been harnessed down for the use of man. Time was when that other force of nature, electricity, was as wild and unknown as the winds that swept over the chaotic face of the world before it assumed shape. The thunders and lightning that encircled Mount Sinai were believed by the awe-stricken beholders to denote the actual personal presence of the Almighty, threatening vengeance against any who might violate His divine law: but scientists now tell us that the thick darkness that encompassed the Mount was caused by an accumulation of vaporous clouds, and that the thunders that reverberated and echoed from mountain top to valley—the loud artillery of heaven; and the lightning that pierced the clouds and held high carnival there, were but demonstrations of electrical energy that only indicated a peculiar but natural phenomena that any student of philosophy can account for. One understands now that there is more danger in being an electrical conductor in an exposed place during a passing storm than in being struck by lightning for some violation of other than a law of nature.

For many years scientists have explained some of the mysteries of that great force of nature—electricity; but when Franklin brought the subtle fluid from the skies, he demonstrated that electricity could be made the friend and servant of man; and since then the great thinkers of the world have been busy developing methods by which electricity could be thus used. Morse discovered that the incredible swiftness of the current could be controlled—that it could be arrested and released at pleasure; and that these pulsations could be converted into signs and demonstrations by which the lightning could be made to carry the messages of men. This gave us the electric telegraph. Noah sailing on the ark discovered that the wind, a force of nature, could be utilized for the benefit of man; and Saint Paul, a captive sailing on a ship towards Rome, observed that this force was capable of taking the place of human labor, although his ship was buffeted about for many days; yet neither of these ancient mariners invented the wind.

Watt did not invent or discover steam, but he taught the world how to harness and control this valuable force of nature. Franklin nor Morse invented electricity, but they showed how it could be utilized; and since then the world is alive to the fact that electrical science is in its infancy, and its wise men are busy working out the problem of its thousand uses.

Are there other forces of nature that are as undeveloped to-day as was the uses of electricity a thousand years ago? Mr. Keely says yes—or rather that sound is one of these forces; and it is in this field of science that he has been working for many years; a result of his study being the discovery in the high realm of applied acoustics which he calls sympathetic vibration or etheric force. Of course in the earlier of his experimental investigations he met with many baffling failures; but he claims that he has certainly discovered how to utilize this force of nature. One feature of his discovery is the disintegration of water by vibration, this being accomplished by sonorous vibration alone; not by heat, electricity, chemical combustion or any other known force. He maintains that in the operation of his motor he takes only water and the surrounding atmosphere, and by the concussion produced by certain musical sounds, or vibrations, disintegrates these elements. The cohesion previously existing between their particles is destroyed, and they are dissolved into ether, thus setting free a force which he says resides in the infinitesimal spaces that separate the ultimate atoms. Mr. Keely is not alone in the assertion that the forces of nature are due to vibrations propagated like waves of motion of the ultimate particles of matter such as is known to exist in light, heat, sound and electricity. As an instance of the close analogy between some observed phenomena of Mr. Keely's experiments, attention is called to the fact of unisonant tuning-forks responding to each other, when one or the other is vibrated, although they may be a wide distance apart. This is sympathetic vibration; and it is upon this that Mr. Keely depends for his force.

Some of the experiments made in developing the power sought by Mr. Keely were exceedingly interesting. The first was in the realm of sympathetic vibration, when he by vibrations alone of a sonorous structure effected the disintegration of water, not decomposing it into its component gases, but separating it molecularly or atomically, which resulted in the evolution of a gas of enormous expansive energy of about 20,000 pounds per square inch. The change from the liquid to the gaseous condition was unaccompanied by any appreciable thermal change.

During the second experiment Mr. Keely caused the rotation of an insulated copper globe by sound waves emanating from an ordinary mouth organ sounded at some distance from the globe, the link of connection being the atmosphere alone, and it was observed that the velocity of the globe was in proportion to the duration and the volume of the particular keynote sounded, with which the globe was in sympathy.

The third experiment was the very antithesis of the first one. During this two cast iron discs were held together by molecular attraction originating in a structure separate and apart from them, but connected to them by a small wire, the force of attraction being very great.

The fourth experiment illustrated the conversion by sympathetic attraction of the vibrations of one structure into rotary

motion, accompanied by power of another body or structure, the two terminals of the combined system being connected with each other by a wire. The instruments employed in this experiment are termed the "sympathetic attractor" and the "provisional engine" respectively. The latter was kept continuously in motion after the vibrations had been established in the "attractor," and the engine was stopped at the will of the operator by merely pressing upon the button on the top of the attractor at the other end of the wire. Another experiment was the causing of a brass weight resting in the bottom of a glass jar to rise and float upon the surface of the water by the application of the end of a wire to the cap or cover of the jar, the other end of the wire being connected to the attractor, and the attractive force being transmitted through the wire and through the superimposed body of water at the bottom of which the weight referred to rested. Recently some demonstrations of the workings of his motor has been made by Mr. Keely before a number of well-known scientific and practical men, one of whom in a communication to a scientific journal, declares that he saw the motor put into operation, and regarding which he says :

"Although Mr. Keely has not finished his commercial engine, he thinks he will be able, by and through his "provisional engine," to operate a dynamo machine and light a series of incandescent lamps. If Mr. Keely succeeds in this, and affords the necessary proofs of his success to investigators, the practical application of his power to one of the greatest industries of the world will be established. From a description of his "provisional engine" we find that a small wire projects from the end of the cylinder, which is on an extension of the shaft of the engine, this cylinder, together with a perforated disc at its outer end, constituting the governor of the engine; the wire referred to being connected to the "disintegrator," and the vibrations being set up in the latter, the main body of the engine is put in motion at a very slow speed, say one revolution in two minutes, while the disc at the outer end of the governor revolves at very high speed, say 2,000 revolutions per minute. The power exerted by the engine—from whatever cause—is, however, considerable. Many of Mr. Keely's visitors have in vain tried to retard its motion by bracing against the periphery. Mr. Keely is now in theory running his engine continuously, that is to say, that he has demonstrated that, sitting in the middle room of his house and tapping a button, which is on the top of the cylindrical portion of the telephone, as already described, he can put his engine in motion (the latter being connected by a wire to the disintegrator and the disintegrator by a wire to the telephone), and the motion of the engine will continue for a week or a month, in other words, indefinitely. That it is not, in fact, doing so now is solely attributable, he says, to mechanical imperfections, which Mr. Keely feels sure he can remove."

Mr. Keely may fail finally in his endeavor to discover the secret that he has sought so long and so patiently. If he does fail, his name may become in this age a by-word and reproach, but probably in the sweet by-and-bye some more fortunate investigator may discover it; and if this should be so, then the galaxy of stars of great men who have benefited mankind may be enriched by the inscription of that of Mr. Keely.

EDITORIAL NOTES.

It is said that a concern engaged in the manufacture of harvesting machinery at Hoosic Falls, N.Y., have perfected a binder in which the old-fashioned use of straw bands is reverted to, the new machine having a special device for twisting straw into a suitable rope for binding the sheaf. The firm have been engaged for some years past in perfecting the machine, the object being to save the enormous outlay for string at present incurred. If such a machine can be made to do its work as satisfactorily as binding is now done with twine the inventor has a soft snap.

THE consumption of raw cotton in manufactures is showing some noticeable changes. In Great Britain last year the total consumption was 3,825,000 bales of the average weight of 400 pounds, the increase over the previous year being only 3,000 bales. The consumption on the continent, however, was 4,121,000 bales, an increase of 273,000 bales over 1888. Since 1880 the consumption of raw cotton in Great Britain has increased only about 11.5 per cent., while the increase of continental consumption in the same time has been over 48 per cent. Since 1873 the increase of consumption in Great Britain has been only 21.5 per cent, while that of the continent has been doubled. The *Finance Chronicle* estimates that the imports of raw cotton into Europe during the season of 1889-90 will aggregate 3,250,800,000 pounds, of which more than two thirds—2,256,000,000 pounds—will be from the United States.

THE *Toronto Mail* reproduced a table published by the *New York Post* showing the rise and fall since 1875 of the cost of living in a business city at about two hours' journey from New York. The only items in which increases are shown are in taxes, 26.6 per cent. and servants' wages, 14.2 per cent. There were no changes in rents or in the cost of ham or poultry, but there were reductions in the cost of the following articles as follows: Coal, 35.3 per cent.; insurance, 14.3; gas, 50; beef, 8 to 12; mutton, 12; pork, 14.2; butter, 22.2; sugar, 33; coffee, 22.2; potatoes, 35; flour, 35.3; fresh fish, 13.3; oysters 20 per cent. The *Mail* says: "These figures have been drawn with the utmost care from actual book accounts. Clothing and furniture are omitted as not falling within the category of strictly household expenses, but there can be no doubt that the prices of those articles have greatly declined in the United States since 1875." The *Mail* neglects to remind its readers that this great reduction in the cost of living was made in the face of the high tariff prevailing in the United States.

THE shipments of hematite ore last year from the Spanish iron mines were the largest on record, the quantity exported having been 450,000 tons. Prices are firm, the product of the Rubio mine being quoted at 10s per ton and of the Campanil mine at 12s. The demand is good and the supply very short. According to the *Bilbao Marítimo y Comercial* recently there were no less than 120 steamers in that port waiting for cargoes of ore, and many of these were delayed at the loading stations owing to the scarcity of mineral. It is computed that at that date there were ships in the port capable of loading 185,000

tons of iron ore, if it could be found to load them with, and that never before had such a concourse of steamers been seen anchored in the Bilbao river. The exports of Spanish iron ore to Great Britain last year were close upon 3,620,000 tons, compared with 3,230,000 tons in 1888. Its market value was more than £2,607,000, and was paid chiefly to English companies owning Spanish iron mines. Besides this the cost of freight for bringing the ore to English ports amounted to probably £450,000 or £500,000, and was earned principally by English ship-owners trading to the Biscayan ports with coal, and taking iron ore as a return cargo.

THE action of the Marine Section of the Toronto Board of Trade in sending a deputation to Ottawa to petition the Government to remove the duties on metal materials entering into the construction and equipment of ships constructed in Canada is paralleled in its selfishness by the petition of 122 New England manufacturers who asked Congress to remove the duty on coal, coke and iron ore, and reduce it on pig iron. These New England manufacturers are consumers of the articles mentioned; and they seem to care nothing for the interests of the manufacturers and producers of these articles, whether they sink or swim. A close inspection of the New England petition fails to discover that the petitioners asked any reduction or removal of duties from any classes of manufactures produced by them—in fact, they would like to see such duties increased. How do Canadian ship-builders expect ever to see flourishing works in Canada producing boiler plates, boiler tubes, corrugated furnaces, steam steering gear, steam windlasses, etc., if all such articles are admitted duty free? Canada would probably be quite as well off without any so-called ship-building industry whatever as to be obliged to import all the different parts of ships from abroad, only the mere fastening together of them being left to be done in Canada. "Live and let live" is a good maxim.

THE Farmers' Institute of Canada met at Toronto last month, and passed a resolution to the effect that it would advocate a measure that would allow the free importation of corn from the United States, inasmuch as corn cannot be raised at a profit in the Dominion. This may be accepted as the beginning of a movement that will not stop until American machinery can be imported into Canada without the payment of import taxes.—*St. Louis Miller*.

This is where "Eli" makes a bad guess. In fact a very bad guess. We can confidently state for the benefit of manufacturers of American farm machinery that Canada's National Policy is in the enjoyment of strong and lusty health, and that Canadian farmers are numbered among its most staunch supporters. Therefore, if the aforesaid American manufacturers are anticipating any large returns from sales of their machinery in Canada "without the payment of import taxes" they are barking up the wrong tree. Furthermore, if Kansas farmers want to sell their ten cent a bushel corn in Canada they will have to pay duty on that also. Another bad error that "Eli" has fallen into is in supposing that "the Farmers' Institute of Canada" is composed of Canadian farmers. This is not the case. Those who passed the resolution alluded to were broken-down political hacks, consisting chiefly of lawyers, horse doctors, livery-stablemen and jawsmiths. The farmers were not there.

SPEAKING of the qualified approval of the views of the Australian Federationists as made in the Queen's speech, *Fair Trade*, of London, expresses the hope that the British Government will make a new departure in its treatment of the colonies. It says: "Up to now Free Trade has refused any further industrial recognition or Reciprocity to our colonies than it accords to all the rest of the world. This may be very fine cosmopolitanism, but it bids fair to run our Imperialism. Without her colonies where would England be? The United States, a one time English colony, stands to-day as a warning and also a portent. With nothing to draw us closer together, why should not Canada follow suit, and guard her own internal industry and prosperity by Protective Tariffs against the Mother Country? We make no effort to conciliate Canada and it were a pity to lose Canada." Under a judiciously arranged Confederation of Britain and her colonies, the Empire would be within itself somewhat as the United States is within itself—an intirety: a complete nation enjoying within itself all that could possibly be obtained from such a union invulnerable against the rest of the world: invincible in any conflict that might arise. If England wantssuch invincibility and invulnerability she can have it by such a union. But it will never come to her under her existing system of Free Trade.

THAT abject poverty in the Old World is by no means confined to the cities is illustrated by a letter written by the wife of a rural laborer in England to *The Essex County Chronicle*. This man supports a family of eight on wages ranging from seven to nine shillings a week. Nine shillings, the humble letter writer points out, "comes to a half-penny each a meal and barely two shillings over," leaving two shillings for coal and all the other things that are wanted even in the poorest man's home.—*Toronto Globe*.

What's this; What's this! The *Globe* telling about a farmer in Free Trade Britain supporting a family of eight souls on two dollars a week, when not a day passes when that inconsistent journal does not do all it can to induce Canadian farmers to become Free Traders. What difference does it make to this British farmer how cheap the necessaries of life may be in that country if he has not got but two dollars a week with which to buy his supplies. Two dollars a week to support eight persons! Think of it. Twenty-five cents a week each, and this to supply shelter, food, clothing and all the other comforts necessary in a family. The abject poverty prevalent in Britain among the laboring classes, both in cities and the country, does not speak encouragingly for the Free Trade system that prevails there. It may be a good thing for non-resident landlords, for merchant princes and wealthy manufacturers, but for the working classes it is a deadly upas tree.

WHY is it that ignorance resorts to strikes, and intelligence never does? The employes in woolen mills are rarely led to use force. The intelligent employes in the cotton mills never join strikes. Cotton operatives who have never had the advantages of an education always make this mistake and pay the penalty without learning the reason why failure followed their efforts. Strikes by cotton operatives originated in Lancashire, and there are many readers of *Fibre and Fabric* that could trace back to this cause. Woolen operatives were spread over the country until a later day, hence a different code governed

them. Hand wool combers never worked very steadily, they drank ale and passed out of existence with the advent of lager beer. Hand file cutters were closely related to the hand wool comber, and like crows and rooks, they were often found in the same flock until the last "picayune" was gone. The shoemakers for hundreds of years back have always struck; they used to get to work about Wednesday morning and work like beavers until the following Sunday noon then spend the money earned, and Monday morning at daylight saw "blue Monday" commenced, and the poor fellow borrowed an occasional drink until about Tuesday night, which was devoted to good resolutions. The "publicans" had got their money and they felt they were the "sinners." The shoemakers of to-day are a good deal like the proverbial Englishman, "never happy unless miserable."—*Wade's Fibre and Fabric.*

THE prospects of the British Government having a surplus revenue this year has led to the agitation for a revision of the duties on tea. In the year 1887 the number of pounds of tea imported into Great Britain was 183,635,885, while in the following year it had increased to 185,556,214, which produced a revenue of £4,638,905. It would not be surprising if in the current year the amount realized is not nearly five millions sterling, for the annual consumption is increasing steadily. In the year 1860 the consumption of tea per head of the population was 2.67 lbs., in 1870 it had increased to 3.81 lbs., while in the next decade in 1880 it reached 4.70 lbs. per head, and in the year 1888 it was 4.95 or close upon 5 lbs. per head. This would no doubt have been even more but for the large consumption of Indian and Ceylon tea, which goes so much further than that from China—for which latter tea the demand has rapidly declined of late years.—*Montreal Herald.*

The duty levied upon importations of tea into Great Britain is 6d. per pound; upon raw cocoa 1d. and upon manufactured cocoa 2d. per pound; upon raw coffee 14s. per hundredweight and upon roasted coffee 2d. per pound; upon chicory 2d. per pound; upon dried fruits 7s. per hundredweight, and upon tobacco from 3s. 2d. to 5s. per pound. These are all articles of prime necessity particularly with the laboring classes; and the amount collected upon imports of these articles into the Kingdom aggregated over £20,000,000 or \$100,000,000, the total income of the Kingdom that year being £88,472,812. This is so called "Free Trade" Britain. But this terrible taxation is necessary to support the Government and for the purposes of local expenditure, which in 1886-87 amounted to £66,441,199, much of it going to the relief of the poor and parochial expenditures payable out of the Poor Rates. And this is the condition the *Herald* and other Free Trade journals want to see prevail in Canada.

"If new buildings, enlargements, improvements and general reconstruction are signs of prosperity among the industries, then the facts which come to our table in exchanges from all over the country, and especially from New England, are good proofs that such conditions exist. No less than twenty instances have been recorded in the past week of industries in New England building new mills and additions, or starting up silent wheels, including six cotton plants, five paper mills, four foundry and machine buildings, two woolen mills, one brass rolling mill, a wire factory and the projection of a new linen mill at Lawrence or vicinity. Mills engaged in repair work on plant or alterations are quite numerous, some dozen

large plants in this city, Lowell, Fall River, Providence and other manufacturing centres being on the list. The New Plunkett Cotton Mill, at Adams, Mass., will soon be ready to start up, and those at Fall River and New Bedford are adding daily to the machinery already running. The Howland Mill, New Bedford, will have 25,000 spindles running on fine yarns before the present week is ended, and by January 1st the full equipment of 125,000 spindles will be in active operation. The cotton machinery at the new Bennett mill, in the same city, is all arranged for work, and the boilers have been fired for testing the running of gearing, shafting, etc., previous to starting the mill in full. New factories for shoe manufactories are springing up in every section of New England. No less than five companies are reported as either building or making additions, or anticipating such, in the past week. It is believed that never before were manufacturing industries of all kinds in so prosperous a condition in New England as at present."—*Augusta, Me., Journal.*

THE commercial intercourse of Canada with the United States steadily increases, in spite of tariffs and the absence of a reciprocity treaty. We are the best customers of the Dominion, and the Canadians are among the most liberal buyers of American products. Thus the recently published returns of the Canadian Government respecting the trade operations of the Dominion show that last year "the aggregate trade between Canada and the United States amounted to \$94,000,000, or forty-six per cent. of the total trade of the Dominion. Exports to Great Britain amounted to \$38,100,000, and to the United States, \$43,500,000. Imports from Great Britain amounted to \$42,300,000 and from the United States to \$50,500,000. As compared with 1878, trade with the United States has increased over \$20,000,000, while with Great Britain it remained about the same. As compared with 1888, exports to the United States increased about \$1,000,000, while exports to Great Britain decreased nearly \$2,000,000. Imports from the United States increased \$2,000,000, and from Great Britain, \$1,000,000. These results are due, of course, solely to the facts that the United States and Canada are close neighbors, and that near-by trade, if the parties are prosperous, is always the most profitable kind of commerce. The advocates of the reciprocity system use these facts and these figures as evidence that, practically, free trade between the two countries, by largely increasing the number of exchanges, would be profitable to both. But every American believes that manifest destiny points to the incorporation of Canada, by the voluntary action of her own people, into the United States, and many Canadians entertain the same opinion. The way to hasten that movement is not to give to Canada, while she remains a dependency of Great Britain, all the trade advantage of membership in the Union, but to withhold such advantage until she acquires membership. The greatest inducement she can have to join her fortunes with ours is just the gain she may make for her commerce by such a movement. The surest method of accelerating the movement will be to withhold the privilege."—*Textile Record.*

Our esteemed contemporary entirely misapprehends the situation. Canada does not entertain the idea that her manifest destiny is annexation to the United States. The "trade advantages" spoken of work both ways; and it is folly to suppose that under any sort of reciprocity Canada would be a greater gainer than the United States. Canada can not be allowed to become a dumping ground for the surplus of American manufactures. Canada is entirely able to paddle her own canoe. Whenever Canada changes her political connec-

tions it will be to establish an independent government, not to become the tail to an American kite.

Few people even in the United States have any adequate idea of the consumption in that country of tin and terne plate, taggers tin, and taggers iron, every pound of which is imported from Great Britain. The annual consumption of these articles aggregates about 350,000 tons; and Mr. W. C. Cronmeyer, secretary of the American Tinned Plate Association, has figured out some startling facts thereunto appertaining. These importations into the United States last year were valued at \$21,669,669; and the production thereof gave employment to 38,050 men and 1,750 women for one year. The materials necessary in the production of these imports were 2,000,000 tons of coke and coal; 1,000,000 tons iron ore, 45,000 tons pig iron, 15,000 tons pig tin, 3,000 tons lead, 6,500 tons tallow or palm oil, 20,000 tons sulphuric acid, and 30,000,000 feet box lumber. To turn the pig iron into fine sheet iron, 17,500 men; to turn fine sheet iron into tin plate, terne plate, etc., 1,750 women and 2,450 men; to keep machinery in repair and to produce packing, lubricating oils and mill supplies, 2,000 men and employes engaged on railroad transportation 1,000 men. This army of workers, numbering nearly 40,000 souls, would in turn give employment to about 300 preachers, 2,000 teachers, 300 lawyers; 1,000 farmers, 300 physicians, 300 butchers, 300 grocers, 300 shoemakers, 300 tailors and dress-makers, 300 carpenters, 300 masons and 2,000 county and municipal employes, etc., making a total of some 8,000 more souls. Mr. Cronmeyer in discussing the benefit to the United States if all the tin plate etc., consumed in that country was made at home instead of being made in a foreign country, says:

"The above 48,000 people thus employed will provide a livelihood, for about 240,000 people, and these 240,000 people thus employed, being 4-10 per cent of the present population of the United States, will increase the general consumption of all commodities by about 4-10 per cent. I have not at hand the statistics showing the total value of these, but estimate them at \$1,200,000,000, at least, and then this consumption would be increased by \$4,800,000, and in the production of these a large number of people will again find employment. Other diversified industries would be created as side issues of this one, and the industry once established would move along like an avalanche, or like compound interest, and in a few years it will have been the means of giving employment to a population which, brought together, would fill a very large city.

Of course the consumption of tin plate in Canada is not as large as it is in the United States, but it is very considerable; and it is an important question for consideration whether some efforts should not be put forth looking to the establishment of tin plate works in this country. There seems to be no doubt that the American Congress will considerably increase the duty on importations of tin plates, and this increase will probably be sufficiently high to ensure the establishment of works there. If this is done Mr. Cronmeyer's figures indicate the large numbers of American workman who would find employment in them and in connection with them.

CONGRATULATIONS are extended to the *Hamilton Spectator* upon the beautiful appearance it makes in its new suit and rejuvenated form. Discarding the inconvenient quarto, it now appears in octavo form, six columns to a page, the *toute ensemble* being city like in all particulars and first class throughout. Again we say, congratulations.

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.

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

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.

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.

FOR SALE.—In town east of Toronto, Two Set Woolen Mill, fully equipped and in good running order; never-failing water-power, main building stone, 50x150 feet, three stories; picker house, brick, 24x30, two stories; railway and water convenient for shipping, will sell with or without machinery. For further particulars, address this office.

FOR SALE in Kent County, Michigan, the Buchanan Mill property consisting of a first class lumbering mill the extensive water power in connection with it including the entire power furnished by the river with real estate on both sides of sixteen acres, situate one mile from Main Street of Lowell, a rich farming country surrounding an excellent location for paper mill, furniture factory, woolen mill and the many uses that require power. Also a splendid home and farm of 87½ acres with buildings, fruit, evergreens etc. For further information call at the premises of JAS. R. BUCHANAN, Lowell, Michigan.

THE Buckeye Portland Cement Company, of Bellfontaine, Ohio, have sent us a pamphlet descriptive of their works, the qualities and advantages of the cement product manufactured by them, and tables of analysis showing the strength of their cement as compared with other similar goods. To those who are not familiar with the quality and character of cements the entire book will be very interesting.

Good Housekeeping of March 15th, has a special paper regarding how to adapt the family table to the Lenten season; the descriptions of how to prepare the various dishes presenting a variety sufficient to tempt the palate of an epicure. Another readable and timely paper has reference to "practical flower gardening;" and the little folks will be specially interested in those parts of this most excellent magazine set apart for their pleasure and instruction. *Good Housekeeping* is issued fortnightly by Messrs. Clark W. Bryan & Co., publishers, Springfield, Mass.; subscription, \$2.50 a year.

The Traveler is a dainty little monthly magazine of adventure, discovery and observation, published by Mr. John B. Alden, 393 Pearl Street, New York. "Tropical Africa," by Prof. Henry Drummond, author of "Natural Law in the Spiritual World," begun in the January issue, will be completed in March. "Tropical Africa" is one of the most interesting and instructive books of travel and observation ever published, and its issue now is especially timely. The cheapest edition heretofore published in book form sold at \$1.50. In this magazine you get it and the equivalent of three other books, equal in size, all for twenty-five cents.

Wide Awake for April is before us. It would be a sad heart indeed that could not enjoy this delightful magazine at any time, but the current number opens with such a happy burst of Easter beauty and hope, and such a characteristic frontispiece wherein youth and innocence go hand in hand loaded with *fleur-de-lis* offerings, all suggestive of the life that is just now being expanded by nature into beautiful flowers, and of the other life that we all hope will be ours in the sweet by-and-bye, as to make glad hearts of the most care-worn. As is always the case, *Wide Awake* is filled to the brim and overflows with good things, each of which is as good and fragrant and entertaining as any other. There is no choice or preference where each possesses the acme of excellence. All Canadian children should subscribe to this excellent magazine. It is published monthly by the D. Lothrop Company, Boston, Mass., at \$2.40 a year.

THE Bradstreet Company, whose headquarters are at 279 Broadway, New York, have sent us a brochure which they call "A Record—not a Prospectus" of their business since their incorporation fourteen years ago; the book having reference to the company's methods of reporting the credits of firms, individuals and corporations engaged in mercantile or industrial pursuits. The labors involved in this undertaking extend over 3,800,000 square miles, and among more than 70,000,000 people. The task of gathering the information is performed by several thousand employes, aided by more than 10,000 correspondents; and an evidence of the painstaking nature of the company's efforts is shown in the fact developed that approximately there exists about one strictly commercial mercantile or industrial establishment in the United States and Canada to each seventy inhabitants. This company have agencies in all the principal cities of the United States and Canada, and also in Great Britain, Australia, Germany, Austria, Hungary and France.

THE publishers of the *Victoria Colonist*, Victoria, B. C., have in preparation a series of cuts of the public, business and residential buildings of that city, of scenery in an about Victoria and Esquimalt, near there, and numerous maps showing the extent of Victoria and its geographical and commercial position and advantages. These are intended for the illustration of a mammoth special number of the *Colonist* soon to be issued. The letter-press will consist of well written descriptive and statistical articles relating to Victoria's business, progress and prospects, together with all other matters tending to show to the outside world its importance and commanding position from a commercial standpoint, and also its many scenic beauties and its desirability as a place of residence and resort. The edition will be between forty and fifty thousand copies, which will have a world-wide circulation. It will be the finest number ever issued in the Province, and will prove of great benefit to the city and Province in making it known to capitalists and immigrants.

THERE is no more beautiful literary visitor to our editorial table than *The Illustrated American*. This is a new venture in the field of pictorial journalism, and the specimens now before us indicate that its publication is upon a high plane by which it is made the peer and equal of any similar publication in America or Europe, and this is saying much. And while it is the equal of any it is far ahead of many illustrated periodicals, however pretentious they may be. The illustrations are the chronicling of contemporary history, referring to events, not only of American history but having reference to things, places and persons of importance in all parts of the world. In the production of this beautiful magazine no expense is spared. The artistic work displayed in the illustrations is of the highest order of merit; the literary matter of the most entertaining character; the paper is the best and finest made and the presswork unsurpassable; an attractive feature being a colored supplement in every number, these alone being worth the price of the magazine. It consists of not less than twenty-four pages, 16x12 inches, and supplement, enclosed in colored cover. Published by the Illustrated American Publishing Company, Bible House, New York City. Price \$10 a year, and twenty-five cents per copy.

CANADIAN ASBESTUS.

THE February issue of the *Popular Science Monthly* contains an interesting paper by Prof. J. T. Donald, of Bishop's College, on "Canadian Asbestos": Its "Occurrence and Uses." Many Canadians will doubtless be surprised to learn that in the production of the strange mineral to which, on account of its fire-resisting properties, the ancients gave the name of "endless" or "ceaseless," this country possesses an industry which has already assumed large proportions, and which promises to become ere long one of great importance to it. It was only so recently as 1878 that the first

Canadian asbestos deposit was opened and the output for that year did not exceed fifty tons. In 1888, however, nine mines were in operation, and their total production was 4,404 tons, valued at the mines at \$255,000. The only other great source of supply is Italy, and Canadian asbestos is now being shipped even to that country. The United States, however, is our chief market, over three-fourths of the output of 1888 having been sent thither. Preparations are now being made by an English company which controls the Italian mines for the extension of operations in the Canadian field, and there is no reason why this should not become one of our most important industries.

The term "asbestos" properly denotes a peculiar form assumed by several minerals rather than any particular species. The mineralogist, however, originally applied it to the finer sorts of fibrous horn-blende, and it has now come to denote fibrous serpentine, which is the asbestos of commerce. This mineral occurs in fibers so fine and flexible that they may be woven into a fabric like cotton and flax, and this fabric is capable of resisting a very high temperature, some varieties being infusible even at 5,000 degrees Fahrenheit. Its chief components are silica and magnesia, and, as has already been said, it is chiefly found in Italy and Canada though extensive deposits have recently been discovered in Australia. Serpentine occupies large areas in Canada in the Laurentian formation, which extends from the coast of Labrador westward beyond the Great Lakes, and in the Quebec group, which lies between the St. Lawrence and the United States boundary. In the serpentine of both of these formations asbestos occurs, but it is only in that of the Quebec group that productive mining has as yet been carried on. Throughout a belt of this rock, extending with frequent breaks from the Vermont boundary to some distance beyond the Chaudiere river, which enters the St. Lawrence near Quebec, asbestos appears to exist, but mining operations have up to the present been confined to a small area on the line of the Quebec Central Railway about midway between Sherbrooke and Quebec. The country here is very rugged, the serpentine rising into bold peaks and ridges. The asbestos is formed in irregular veins varying from mere threads to four, six and sometimes more inches in width. The rock is blasted out and the mineral separated from it by hammering, a primitive process which occasions great waste, especially in the case of the lower grades, which do not readily separate from the rock. Where the veins are very thin, moreover, it does not pay to endeavor to separate them by the method at present in use. The finest quality of asbestos sells at from \$80 to \$110 a ton, and the third or lowest at from \$13 to \$15. In good mines the yield is from three to five per cent. of the rock quarried and the cost of mining is from \$25 to \$30 a ton. The value of asbestos has been recognized by man since the times when the ancient Greeks used it as a wrapping for the bodies that they burned on the funeral pyre, and probably from a still earlier date, but it is only within very recent years that the mineral has been utilized in the industrial arts. The sphere of its usefulness, however, is now being rapidly widened and before many years the demand for it will without doubt have very greatly increased. At the present time its most important use is in connection with the steam engine and boiler, its non-conducting power and ability to resist high temperatures rendering it most valuable as a packing for pistons, hot-air joints, cylinder-heads, etc., for which purposes it is spun into yarn or rope or made into mill-board. It is also much used in the form of felt as a covering for steampipes and wood-work that is exposed to heat. In Europe many theatre drop-curtains are made of it, and in Paris the members of the fire brigade have recently been supplied with suits of asbestos cloth. It makes admirable salvage blankets and gloves for stokers and furnace-men, and it is announced that mail-bags will soon be made from it. It is also used for the manufacture of indestructible writing and printing paper and of fire-proof paints and wall-papers. It is proof against the action of most chemicals, and in this respect is of great service to the scientist and to the manufacturer as well. Many other uses to which it is put might also be mentioned.

It will be seen, therefore, that man has begun to realize the value of this singular product of the earth, which seems to possess certain of the qualities of the vegetable as well as that of the mineral kingdom to which it belongs. That he will continue to adapt it to his purposes is beyond question, and it is safe to say that it will not be long before it becomes a most important article of commerce. It is gratifying to learn, therefore, in connection with the fact that the Canadian supply of the mineral is almost inexhaustible, that it has been conclusively proved that "mining for asbestos, when properly conducted, shows a more steady return for the money invested, with less elements of risk, than mining for any other known mineral." Here is evidently an opportunity for Canadian capitalists which they should not let slip.—*Toronto Mail*.

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11 JORDAN STREET TORONTO.

AN OVERDOSE OF PLENTY IN THE GREAT WEST.

THE Nebraska Governor's appeal to the railroads to lower their rates and haul out the corn crop at a profit to the farmer is about as remarkable a deliverance on the Granger question as has been seen in some time. In the lack of extraneous evidence one would say Governor Thayer did not correctly represent public sentiment in this matter, or the real attitude of the agricultural interests of the State toward the railroads. But as petitions signed by 100,000 Kansas farmers have been addressed to the roads in that State, praying for an "emergency rate" on corn for the reasons advanced by the Nebraska Executive, we must give it weight.

The cause of Governor Thayer's piteous appeal for help is a bountiful crop. "Millions of bushels of corn are lying upon the ground going to waste;" and the farmers, he says, are helpless to get it to market because of the high freight rates; there is so much corn and so little market for it at present rates that "farmers are unable to pay for provisions and coal;" "they can not meet their obligations;" "the merchants can not buy goods because they can not pay for them;" "there is an almost universal paralysis of business, and every department of human enterprise is blocked, and a most gloomy prospect for the opening of Spring is settling down upon the people."

Short crops may have their drawbacks to the agricultural community, but what could be much worse than a bountiful crop if this be its effect? In the midst of plenty, with grain cribs bursting and barns stuffed to repletion, the Kansas and Nebraska farmer is in want. Governor Thayer's remedy is a reduction of rates. "I know, and so do the people, that you can give the reduced rate asked for, and your roads will hardly feel it. The demand of the people for this reduction is universal; and the people and the Press are speaking out with one mighty voice; you must heed it."

It is hardly worth while to analyze this position, which is so common in the Granger States. It assumes that the railroad stockholder is always a person of large property, and able, and in duty bound, to forego income upon it whenever the gain might accrue to and be needed by those for whom Governor Thayer pretends to speak. But the point which is missed in this appeal is how a reduction of rates will help the situation. Why are there millions of bushels of corn lying on the ground going to waste? If the railroads have capacity to carry it, why is it not sent to market? Governor Thayer and the Kansas petitioners seem to assume that the railroads have this capacity and that there is room in the market for the corn. In that case they ought to be able to see that high rates do not stand in the way. High rates would increase the price of corn, and to that extent limit consumption and narrow demand, to be sure, but that is all; high rates do not otherwise affect them. They could yet market their corn without hindrance as long as there was demand for it. How, then, do high rates interfere? Why is the corn not moved out?

But rates are not unusually high, and Governor Thayer does not venture to say as much. They are lower than they have been in years under normal conditions. But suppose they are put lower or crowded down to nothing, as Governor Thayer apparently thinks it the duty of the roads to do in this emergency. If there is then transportation capacity enough these millions of bushels of corn on the ground would be rushed into the market free of cost. Would prices stand up under this additional supply? They are now lower than ever before because corn is so plentiful that consumers will pay no more for it. The markets are glutted with corn. But low as these prices are the cost of transportation enters into them. Remove this cost of freight and increase the supply. Will the farmer gain the transportation cost or will not prices fall so that the consumer will gain every cent of it? Even the excitable Governor Thayer ought to be able to comprehend so simple a problem. High as rates may be, and capacious as freight room may be on the Western roads, the market is yet glutted with corn and prices thereby forced down lower than ever before, with possibly a single exception. To lower rates, increase the supply, and aggravate the market glut will not benefit the farmer; it will only lower prices to the consumer. The further fact of the matter is that the roads are unable to move all the corn offered at any price, and this makes Governor Thayer's position even more senseless and groundless.

It is about time that the Western farmers began to cut loose from such hare-brained politicians as Governor Thayer and Governor Larrabee, and think for themselves. A wider view must convince them that the railroads are not in the first place under obligations to do their business at a loss; and in the second place that the railroads are not the cause of their troubles as to corn or anything else, and that the cure is not to be found in suppressing the railroads.—*Chicago Republican*.

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.

MR. A. E. HOWSE, Nicola, B.C., will build a fifty-barrel roller flour mill.

A COMPANY is being formed at Amherst, N.S., for manufacturing linen from home grown flax.

JACKSON'S flour mill at Bleinheim, Ont., was destroyed by fire March 13th, loss about \$8,500.

THE large planing mill of Messrs. James Jerrett & Son, Alliston, Ont., was destroyed by fire March 8th

THE Killey-Beckett Engine Company, Hamilton, Ont., has been merged into a stock company with \$40,000 capital stock.

MR. F. S. EVANS, of Cleveland, Ohio, is establishing a factory at Windsor, Ont., for the manufacture of his type-setting machine.

MR. W. P. SAYWARD, proprietor of the Rock Bay saw mill, Victoria, B.C., will increase the capacity of his plant to about 100,000 feet a day.

THE Walkerville Malleable Iron Company, Walkerville, Ont., heretofore alluded to in these pages, has been incorporated with a capital stock of \$100,000.

THE Brantford Furniture Company, Brantford, Ont., has been incorporated with a capital stock of \$25,000, for the manufacture of furniture, mantels, etc.

THE New Westminster Street Railway Company, New Westminster, B.C., will be incorporated with \$250,000 capital stock, to operate street cars in that city.

THE Eno Steam Generator Company, of Canada, withhead quarters at Toronto, will be organized with a capital stock of \$100,000 for the manufacture of steam appliances.

THE New Westminster Electric Light and Motor Power Company, New Westminster, B.C., will be incorporated with a capital stock of \$100,000 for purposes indicated by the name.

MESSRS. HIRAM WALKER & SONS, distillers, of Walkerville, Ont., a few days ago, while boring for gas near that place, struck a vein of oil, which is producing fourteen barrels a day.

MESSRS. JOHN McPHERSON & Co., shoe manufacturers, Hamilton, Ont., have been awarded a contract for furnishing 3,000 pairs of boots for the Dominion North-West Mounted Police.

THE Acton Boot and Shoe Manufacturing Company, whose headquarters are at Acton Vale, Que., will be incorporated with a capital stock of \$50,000 for the manufacture of boots and shoes.

MESSRS. WYETH & McCULLY, sled and wagon manufacturers, of Newark, Ohio, are in correspondence with the Board of Trade of St. Thomas, Ont., in regard to establishing a branch factory there.

THE Westminster and Vancouver Tramway Company will be incorporated by the British Columbia Legislature with a capital stock of \$500,000 to construct and operate a tramway between those two cities.

THE Vancouver Street Railway Company and the Vancouver Electric Illuminating Company, of Vancouver, B.C., will be incorporated as one company to carry on the business for which the two companies were formed.

MESSRS. LOSEE & MORRISON are erecting a saw mill at Shawnigan Lake, B.C., with capacity to cut 40 000 feet of lumber a day. They will also manufacture all kinds of dressed lumber; and will establish yards in Victoria, B.C.

TWO new barges will be added this year to the Kingston and Montreal Forwarding Company's equipment. One is being built at Garden Island, having a capacity for 30,000 bushels, and the other at Montreal of 35,000 bushels capacity.

MESSRS. PENDRAY & Co., who own extensive soap works at Victoria, B.C., have extended their business by including the manufacture of blueing, black-lead, etc. The machinery for these latter specialties has been received and put in operation.

THE British Columbia Mills, Timber and Trading Company with head office at Vancouver, B.C., will be incorporated with \$2,500,000 capital stock, its object being the acquirement of the properties of the Royal City Saw Mill Company and the Hastings Saw Mill Company of that Province.

MESSRS. J. W. PATERSON & Co., manufacturers of roofing felt, etc., Montreal, who recently purchased the paper mill at Portage la Prairie, Man., are overhauling the mill preparatory to commencing operations. They expect to begin work during this spring, and will manufacture straw-board, tarred felt, and wrapping paper.

THE works of the Bras d'Or Lime Company at Marble Mountain, Cape Breton, comprise one patent draw kiln with a capacity of 120 barrels per day, with a second draw kiln under construction, an extensive storehouse, a cooper shop, a barrel factory, tramways and wharves, a steam wood boat and dwelling houses for the Manager and employes.

A COMPANY has been started in Halifax, N.S., with \$200,000 capital stock, for the manufacture of steam compressed codfish. There are now twenty-five hands employed, and about two tons a day of compressed fish is being turned out. When in full operation forty hands will be employed, the works having a capacity of ten tons of fish a day.

THE British Columbia Fruit Canning and Coffee Company has been organized at Vancouver, B.C., for the purpose of preserving, canning and evaporating fruit; manufacturing extracts, cordials, vinegar, pickles and sauces, and the roasting and grinding of coffee and spices. The motive power is being supplied from New York, and the copper utensils and apparatus from English.

THE Dartmouth Ropework Company, Halifax, N.S., manufacturers of twine, rope, cordage, etc., announce that they are now engaged in the manufacture of 1,000 tons of their patent composite silver binder twine, for the harvest of the current year. This twine averages 530 feet to the pound. Over 2,000 tons of this composite twine were used in harvesting crops in the United States last year; and over 6,000 tons will be used there this year.

J. LINDENBERGER, of Berlin, Germany, a member of a large fish preserving house, and who closed a contract at Westminster for the shipment of salmon to Germany, has also visited the Sound cities with the same object. While in Port Townsend he stated that his house will pay eight cents per pound for all salmon weighing twenty pounds or over, salted in barrels, and will pay \$1.50 per barrel. His house will buy all the salmon caught on the coast of this size and would like to secure 500 car loads or more.—Victoria, B.C., *Colonist*.

THE large shoe factory of Messrs. Robt. Taylor & Co., is 140 feet long, forty feet wide and five storeys high, giving 28,000 feet of floor space, and extends from Brunswick to Albermale Street. The building has cost in the neighborhood of \$70,000, and the machinery about \$16,000, and over 180 hands will be in full employment in a few weeks. At present the output is from 3,000 to 4,000 pairs per week, and it is expected will soon be 4,500 pairs. The extensive machinery and labor-saving and multiplying appliances are well up to the latest standards, and ensure the performance of an immense amount of work by every individual employed.—Halifax, N.S. *Critic*.

SAWDUST is no longer considered a waste product anywhere, and it has already become an article of considerable commercial value. The latest form in which it has been utilized is in the manufacture of paper-pulps and sheathing paper. It has also been discovered that fine sawdust is unequalled for the dressing of wounds, and as a vehicle for medicaments or antiseptics. The sawdust when freed from splinters and sharp bits of wood, and used alone and dry, is a clean and pleasant dressing; it readily takes up and holds the discharges without packing or adhering, and is readily rendered antiseptic by any of the methods used in the preparation of antiseptic wool or cotton. It is suggested that the yellow pine sawdust, being rich in turpentine, would prove a valuable antiseptic application.

A NEW and very important use has been discovered for paper. The electric companies of New York city have recently adopted a new conduit system for supplying interior lights. By it electric wires in buildings instead of being strung with no other protection than the insulating material, are run through tubes made of sheathing paper that has been subjected to a process making it impervious to fire or water. The tests made were thorough and showed that wires within the tubes could be burned out without the slightest danger of setting a building on fire. Mayor Hart, of Boston, and a party of other New England officials visited New York city recently to inspect the new system, and they declared after the examination that the use of such conduits would have saved Boston from its last great fire.

THE Waterous Engine Works Company, Brantford, Ont., call

attention to the fact that "la grippe" is still spreading. The "la grippe" that they allude to is not that which makes the possessors of it ill and unhappy. Their reference is to the friction-clutch pulley and cut-off coupling manufactured by them, and which, they assure us, gives health and joy and happiness to all users of machinery who wisely avail themselves of the appliance. For the immediate stopping and starting of all kinds of machinery it is claimed to have no equal, in its operation it being simplicity itself, and the working of it being fully guaranteed. It is efficient and instant in its action and is applicable to the heaviest as well as lightest machinery and shafting. This company are the patentees of this clutch and coupling both in Canada and the United States.

A BY-LAW was introduced at a recent meeting of the town council of Galt, Ont., to exempt from taxation certain manufactories in that town, in whole or in part, for the period of ten years. The exempted parts consist of engines, boilers, machinery, plant, tools, implements and the stock, goods, chattels and effects in and about the said manufacturing establishments, and all improvements and extensions made during the said period. The establishments proposed to be exempted are Messrs. Goldie & McCulloch, McGregor, Gourlay & Co., Cowan & Co., Cant Bros. & Co., Galt Felt Company, Galt Milling Company, Crauston & Scrimger, John Cherry, James Warnock, Peter Hay A. Stroud & Son, George Hespeler, A. McAuslan, R. Gilholm, W. & F. A. Scott, Todd & Essig, F. Parkin, Shurly & Dietrich, Victoria Wheel Works, C. Turnbull, R. McDougall & Co., Galt Axle Works, J. & R. Elliott, Henry Dakin, O. Cooper, M. S. McKay, C. Turnbull Company and Stevens, Hamilton & Co. It is probable that before the passage of the by-law some additional business institutions will be included under its provisions.

MESSRS. H. H. VIVIAN & Co., of London, Swansea and Birmingham, England, a company incorporated under the English Limited Liabilities Act, are seeking incorporation from the Canadian Parliament. This firm, the president of which is Sir Henry Hussey Vivian, M.P., for Swansea, is one of the richest incorporated companies in England and produce everything from Swansea tin plates to steel armor plating for vessels. They have recently purchased a large number of mines near Sudbury, and ask incorporation for the purpose of acquiring, holding and working iron mines, dealing with iron and other ore, either by mining or otherwise, smelting, etc. Although they can mine and manufacture in Canada without, they desire a recognition of their incorporation in Canada in order to enable them to extend their operations with facility. Should their operations prove successful they will in the near future extend their operations to Nova Scotia and New Brunswick. The company is not a new one, and their advent in Canada means that the vast mineral resources of the Dominion are already attracting British capitalists. They are about erecting large blast furnaces at Sudbury.

MR. M. C. MULLARKY, manufacturer of boots and shoes, Montreal, is urging the Dominion Government to grant an arrangement by which he can form a joint stock company, for the purpose of employing convict labor to manufacture in bond boots and shoes and ready-made clothing for export only. To make the business a profitable one, the company, it is stated, would require to obtain from the Government the right of importing all raw material free, also the labor of the men, boys and women, free for a term of three years, so as to learn them the trade, after which the company would be ready to pay the Government so much per day for the convicts' labor, and, in addition to this, would from the commencement allow a small amount per day to each convict, according to what they were worth; this amount to be placed in the Government's Savings bank for her or him, until their term of imprisonment expires. By this time they would have a good trade learned and sufficient means to take them to some place where they were not known and become good citizens. As it is now, the convicts, when released, come out penniless, and go back to where they originally came from, where generally no employment can be obtained.

MESSRS. A. HARRIS, SON & Co., Brantford, Ont., manufacturers of agricultural implements and farm machinery, at the recent New Zealand and South Seas International Exhibition held at Dunedin, N.Z., displayed one of their low-level elevator twine binders, an official description of which is thus given: "It is constructed in such a light manner that a 7-ft. binder is well within power of three horses. The machine is constructed on a steel frame of simple design. The spur gearing, usual in reapers, is abolished, and a pitch chain used to drive direct from main wheel axle. A spring is introduced between main wheel and machine to take jar off when working in rough ground. An extra roll is introduced to take the grain from the top of the elevators to the packers. The Appelby binder is used, but this has been simplified in many important particulars; amongst others, the spring to close grip of knotter is replaced by a positive motion. A spring has been introduced into the trip bar to

prevent jar on binder. Two of these machines were introduced into New Zealand in 1887 and 200 have been imported since, so that, although a new introduction, they are making their way.

At the recent New Zealand and South Seas International Exhibition, held at Dunedin, N.Z., the Massey Manufacturing Company of Toronto exhibited one of their binders which, although but recently introduced into that country, has become a favorite. An official description of it states that the machine is well designed, and is, by judicious distribution of metal, kept light in draught and solid in construction. The steel frame supporting main wheel is extra strong, and is very securely nutted together; all through the frame at least two $\frac{1}{2}$ -in. bolts are used to secure joints. The main wheel is of steel throughout, and spokes can be tightened; the bearings, also, are made so that the gear wheels can be put closer in mesh if required, owing to wear of cog-wheels. Springs to tighten all the canvas aprons are used. The knife bar is made with the angle at the back; this brings the canvas much nearer the knife than usual. The knife has the bar on top of the sections, and the sections have a bearing on the fingers at back as well as front, which keeps the knife from twisting. A relief rake in corner turns the butts straight before being elevated; the pitman is adjustable. The spindles are all of cold rolled steel, and all brushes are replaceable. The binder is of the improved Appelby type, and does not require any special make of twine.

THE shipbuilding industry in Nova Scotia is very active. At Mahone Bay Mr. J. H. Zwicker is building a barquentine of 600 tons, and Mr. Titus Langille one of 300 tons; at Bridgewater Capt. Wilson a brigantine of 200 tons; at Liverpool Mr. J. Milliard a barquentine of 550 tons; at Shelburne Mr. Joseph Megill a barquentine of 400 tons, and several schooners are being built ranging from 70 to 120 tons each; at Tusket Messrs. Hatfield & Co., a ship of 1,800 tons; at Meteghan Messrs. Blackadar & Co. a barque of 900 tons; at Belliveau's Cove Mr. W. D. Lovitt a barque of 800 tons and a barquentine of 700 tons; at Everett's Bay Capt. Everett a barquentine of 350 tons; at Weymouth Messrs. Rice & Co., a tern of 300 tons, and Messrs. Charles Burnell & Co. a steamer of 230 tons; at Digby Neck, a barquentine of 400 tons, at Bear River, by Messrs. Marshall & Hardwick, a barquentine of 550 tons; at Granville, by Mr. S. W. Pickup, two barquentines of 400 tons each; at St. Mary's Bay, by Capt. Hall, a tern of 300 tons; at Bridgetown, a vessel of 300 tons; at Kingsport, by Mr. C. R. Burgess, a ship of 2,200 tons and another ship of 1,800 tons; at Hantsport, by Mr. J. B. Worth, a barquentine of 700 tons, a brigantine of 400 tons and another barquentine of 700 tons. Messrs. Churchill are building a steamer of 600 tons and a barquentine of 400 tons. At Mount Denson, Capt. McKinlay, a schooner of 70 tons; at Avondale, Mr. W. H. Mosher, a ship of 1,700 tons, Mr. T. A. Mosher a barquentine of 650 tons, a barque of 1,200 tons and another barquentine of 1,200 tons, and Mr. Thomas Aylward a barquentine of 600 tons; at Parrsboro, Mr. Thomas Aylward is also building a barquentine of 450 tons, and at Cheverie Mr. Roderick Rose is building a barquentine of 550 tons. A number of vessels of different sizes are being built at other places in Nova Scotia regarding which particulars are not now to hand. The aggregate number and tonnage of the vessels above alluded to amount to thirty-two vessels and nearly 25,000 tons.

USES OF PAPER.

PAPER is now made to serve for steel and iron. When strong fibre is used it can be made into a substance so hard that it can scarcely be scratched. Railroad car wheels are made of it more durable than iron. A store in Atlanta, Ga., has been built entirely of paper. The rafters, weather-boards, roof and flooring are all made of thick compressed paper boards, impervious to water. On account of the surface of the paper being smooth and hard it cannot catch on fire as easily as a wooden building. It is found warm in cold and cool in hot weather. The Breslau fireproof chimney has demonstrated that cooking and heating stoves, bathtubs and pots, when made of paper, and annealed by a process that renders them fireproof, become more lasting than iron, and will not burn out. Cracks in floors around the skirting board, or other parts of a room may be neatly filled by thoroughly soaking newspaper in paste made as thick as putty and forced into the cracks with a paste knife. It will soon harden, and can be painted.

Black walnut picture frames are made of paper and so colored that no one can tell them from the original wood. A paper piano has lately been exhibited in Paris. The entire case is made of compressed paper, to which is given a hard surface and a cream-white brilliant polish. The legs and sides are ornamented with arabesques and floral designs. The exterior, and as much of the interior as can

be seen when the instrument is open, are covered with wreaths and medallions painted in miniature. An Italian monk has succeeded in constructing an organ where the pipes are made of paper pulp. It has 1,400 pipes of various sizes. The American Cottonseed Oil Trust are now running a mill for making paper from the hulls remaining after all the oil has been squeezed out of the cottonseed. They are contemplating the erection of a 100-ton mill for the same purpose. These hulls have heretofore been considered worthless. It has so far proved so successful that the Trust propose erecting mills at different points in the cotton-raising country. Of course this will somewhat revolutionize the paper trade.

A new mill for the manufacture of paper from moss has been recently established in Sweden. Paper of different thicknesses, and pasteboard made of it have already been shown, the latter even in sheets three quarters of an inch thick. It is as hard as wood, and can be easily painted and polished. It has all the good qualities, but none of the defects of wood. The pasteboard can be used for door and window frames, architectural ornaments and all kinds of furniture. The ceiling of the Assembly Chamber at Albany, N.Y., is made of papier-mache. It is a model of its kind, and appears so like marble as to deceive the most expert eye. The latest idea is to use paper instead of wood for lead pencils, using a patent preparation by which it can be cut as easily as the softest wood.

HEAVY BONUSES UNADVISABLE.

In securing manufacturing establishments in a new location, of course, there must be some special or great natural advantages, and in most cases both must be combined.

Of these special advantages, of course, a large bonus is the most prominent, and also the most effective, but it has grave dangers and disadvantages if carried to the extent sometimes reached.

First, if a community places all its available resources in one establishment, they have nothing left to induce other and perhaps equally desirable enterprises to locate in their midst. Secondly, if the one line or one establishment meets adversity, there is a worse state of stagnation resulting than if the town had never had a mill. This, of course, applies with special force to small places.

In all cases a large bonus is a great temptation to establish industries not especially adapted to the location, and still more dangerous is the tendency to secure some worn out establishment. There have been, we fear, some mills built purposely to get the bonus, and without so much regard to a prosperous career after the bonus and stock manipulations had been used for all there was in them.

If capital subscribed for bonus was put into common stock of the enterprise, and the balance of the capital raised by the sale of good preferred stock, there would be direct value given to those subscribing, and reasonable inducement for the added or preferred stock.

In case this plan does not secure the desired result, there is another of some decided advantage which is as follows: Where local capital is willing to donate practically a large per cent. of the cost of the mill in bonus, they would quite likely be able to raise one half of the capital required, and then without any cash bonus whatever (free site and exemption from taxation would be sufficient in most cases) the enterprise could be bonded for the balance of the capital needed. There are several parties who stand ready to take mortgage bonds to the extent of the local capital raised, provided location and parties interested are satisfactory.

This plan has the safeguard of not being practical unless there is every prospect of successful permanence. The case is this: Any second-hand or even new mill sold at forced sale rarely brings one-fourth its cost and often less than ten per cent. The parties who invest in fifty per cent. of the cost of the mill or mortgage bonds would see to it that there was very little prospect of collapsing to their certain and great loss.

There is still another point of importance which this plan of having direct value for money paid possesses; the stock of the original local subscribers can be sold at an opportune time, and the proceeds invested in building up another industry, greatly to the glory and profit of all concerned.

On the whole, we believe that where a town is able to give a manufacturer about the whole establishment they are usually able to keep it themselves and induce manufacturers on either the common stock or mortgage bond plan. With good business management the practical departments could be run by moderate salaried men, and for the practical manager a generous share in the profits would reward energy and stimulate to successful methods.—*Textile Manufacturing World.*

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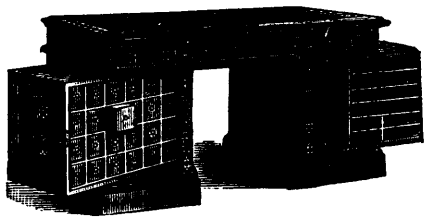
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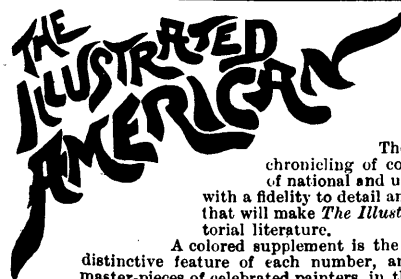
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MENASHA HARDWOOD PULLEYS.

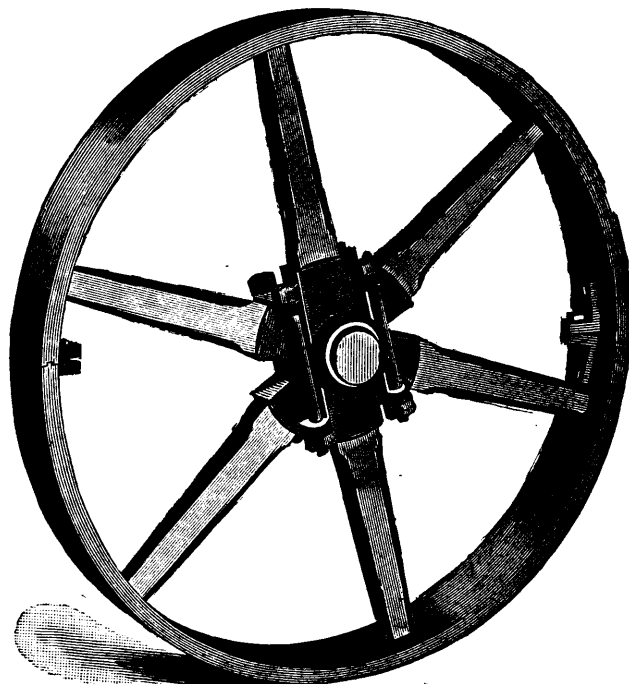
THE accompanying illustrations have reference to the hardwood pulleys manufactured by the Menasha Wood Split Pulley Company, Menasha, Wis.



hubs are either hardwood or iron according to the size of the

The notable features of these pulleys is that they have a hardwood bent rim, which the manufacturers claim makes the best belt surface of any pulley made, another valuable feature being that it is not affected by the action of the belt. As the bent rim is practically a solid piece of wood, and no glue or nails used in its construction, we are informed that it is very much stronger than a rim made of several hundred pieces of wood, as is the case with some other wooden pulleys. The

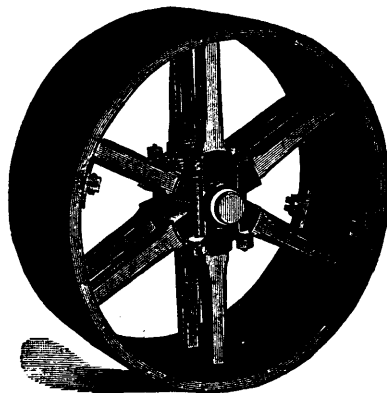
pulley, and are securely bolted to the rim so that every part of the pulley is positively put together, and its durability is not dependent upon the shrinkage or swelling of the wood. Another important and essential feature of the pulley is that it is fastened to the shaft by gripping between the hub and shaft friction-board paper made very hard by hydraulic pressure, to the exact thickness, so that it is a perfect fit, and when gripped to the shaft it is absolutely impossible for the pulley to turn upon the shaft because of the excellent friction qualities of friction paper, which is fully under-



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The company inform us that these pulleys are to be found in use in many of the largest and best equipped factories and mills of all kinds in every State and Territory in the United States; and they are for sale in all the machinery depots in all the larger cities and towns in the country.

For further information regarding this pulley, apply to the Menasha Wood Split Pulley Company, Menasha, Wis., who will take pleasure in sending their handsome new catalogue and price list.

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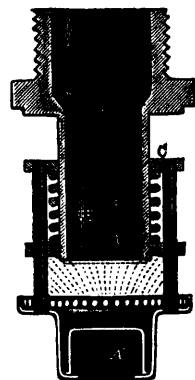
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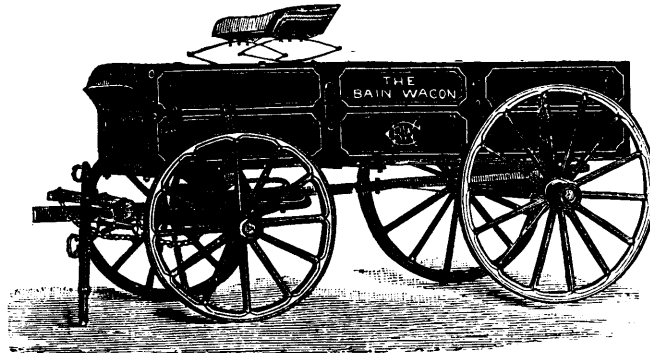
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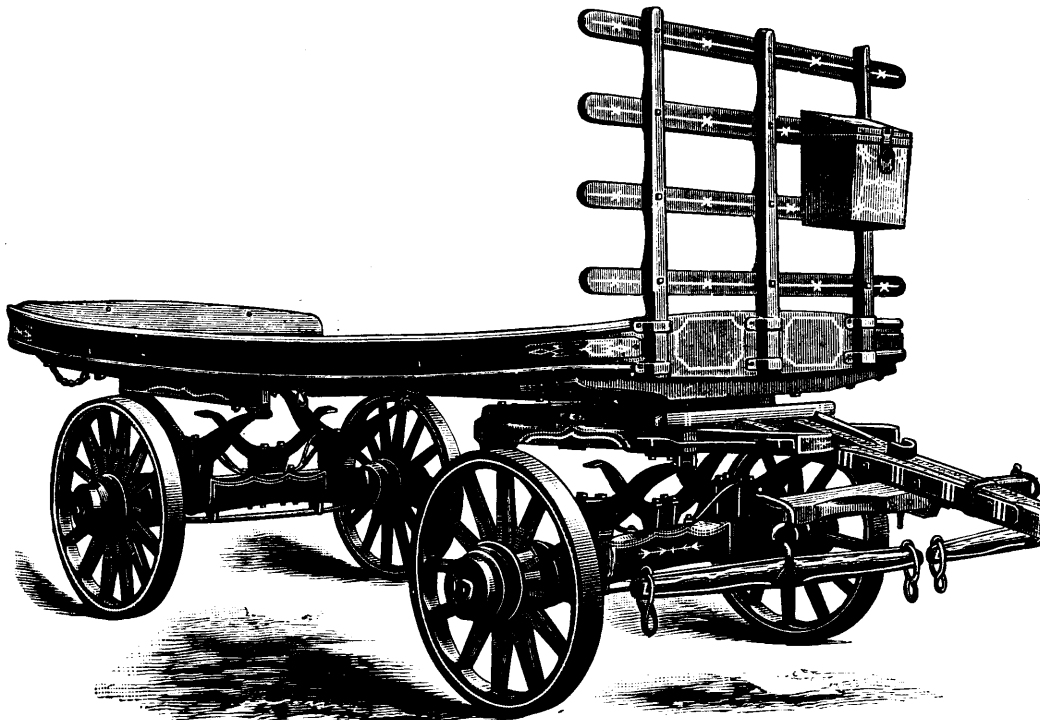
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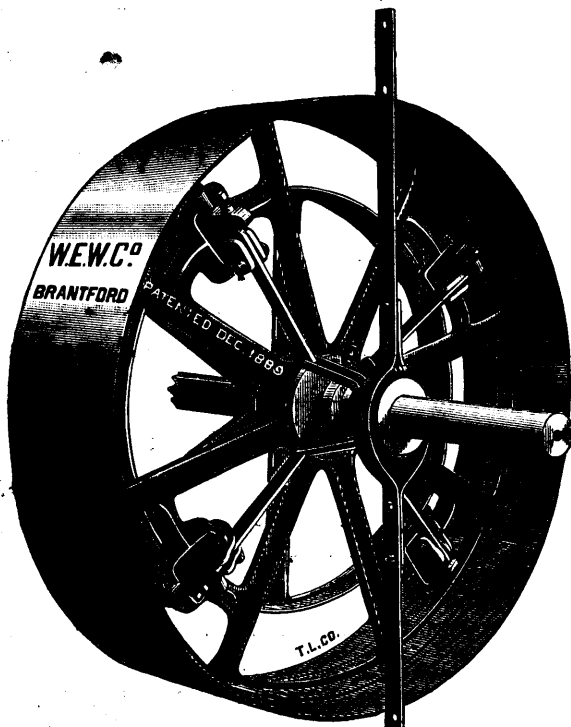
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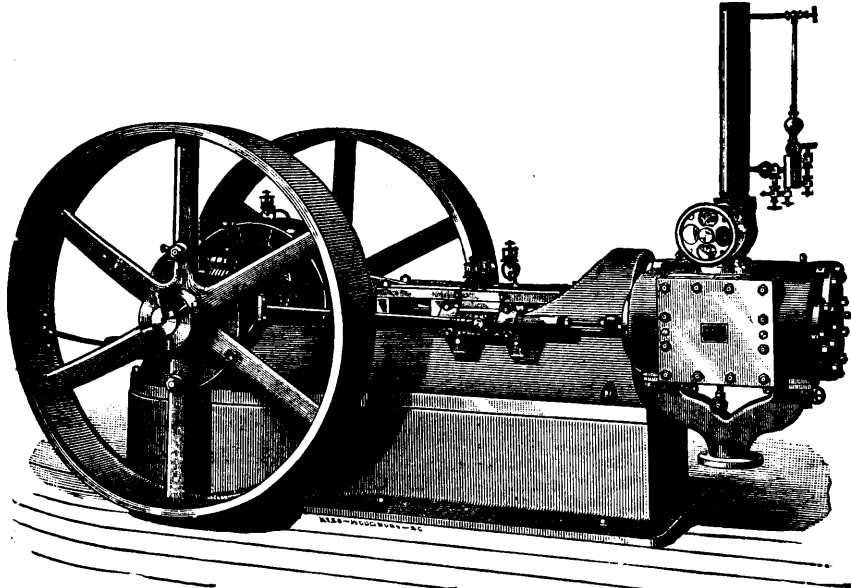
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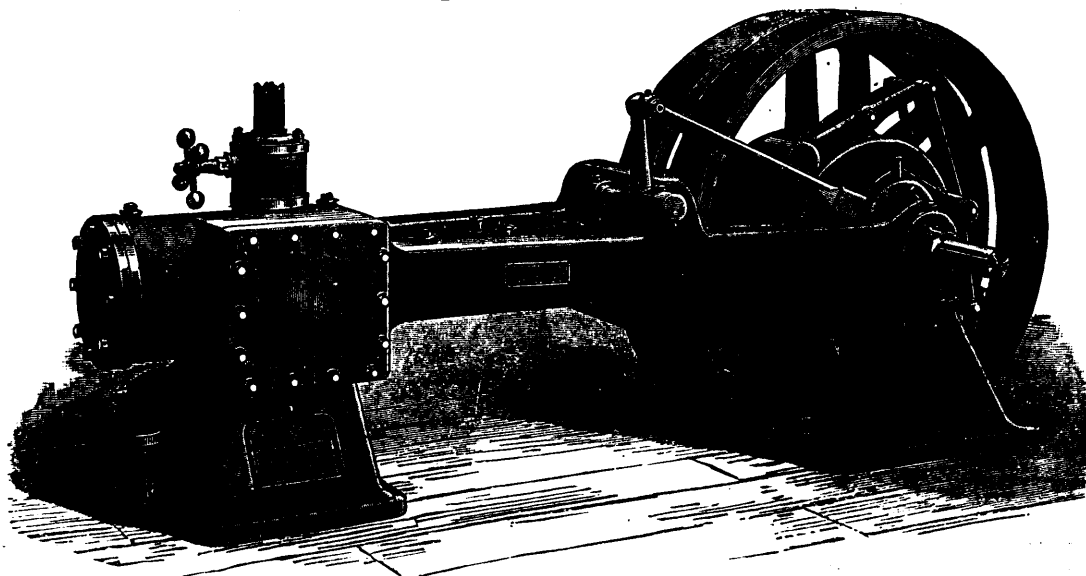
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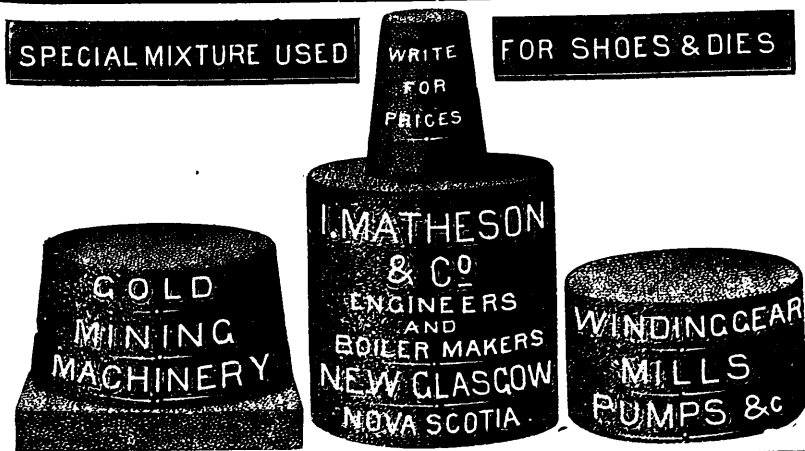
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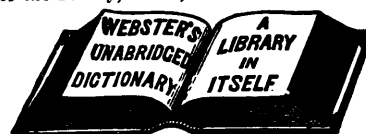
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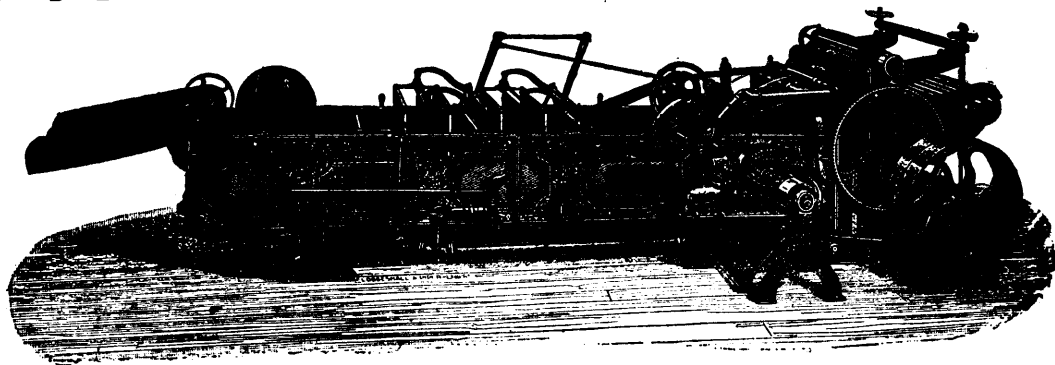
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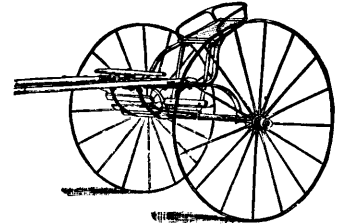
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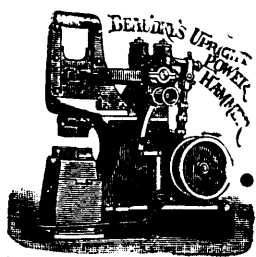
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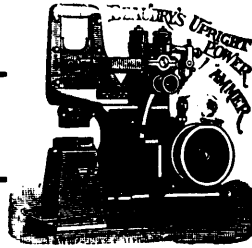
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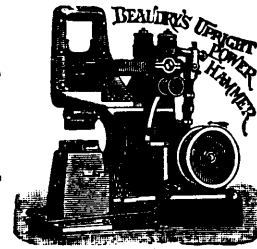
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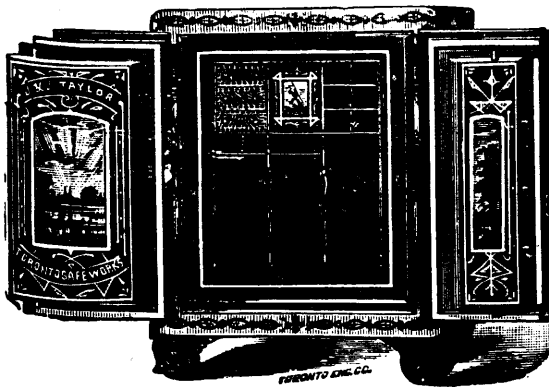


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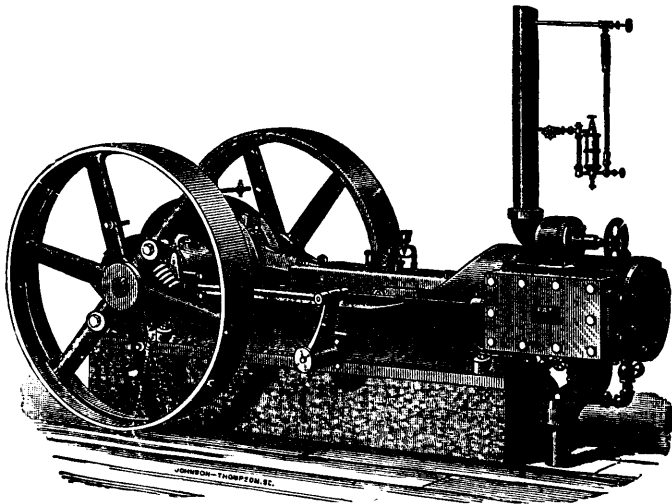
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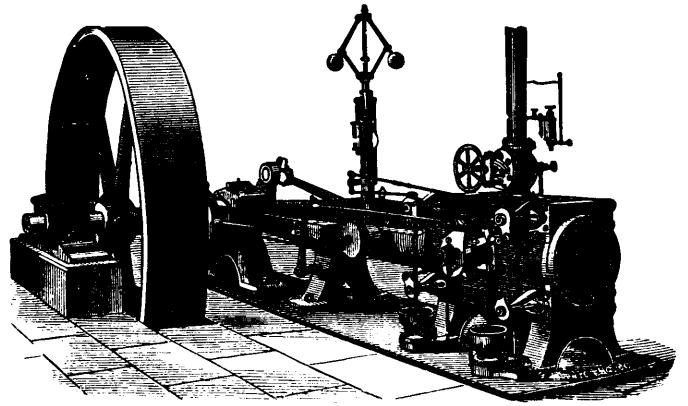
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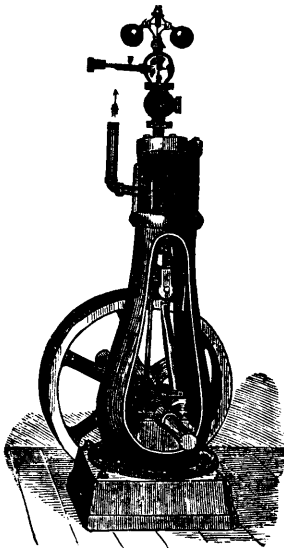
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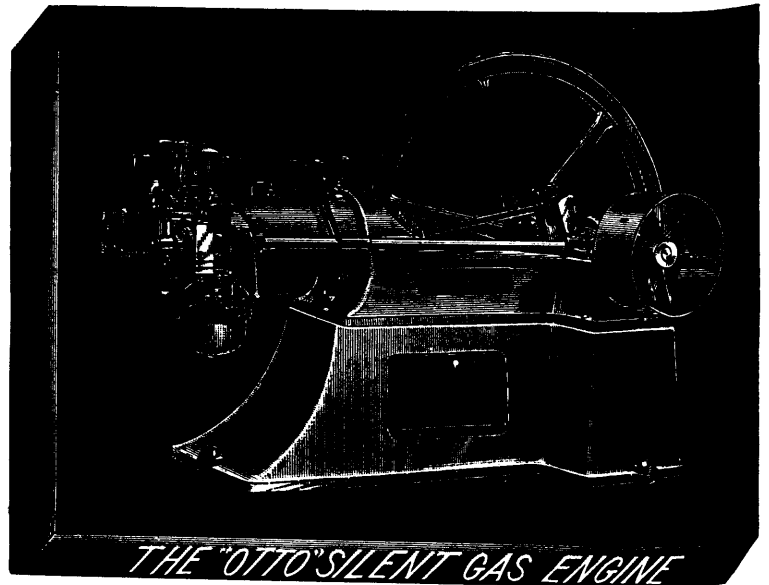
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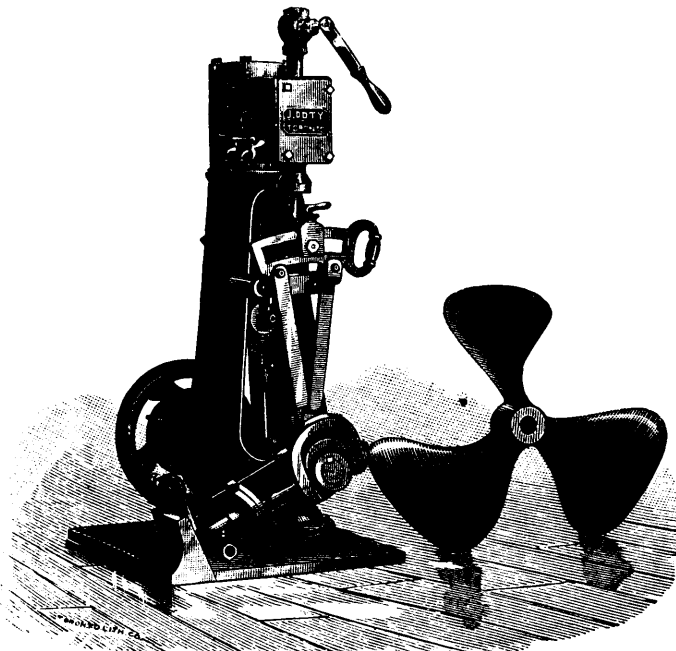
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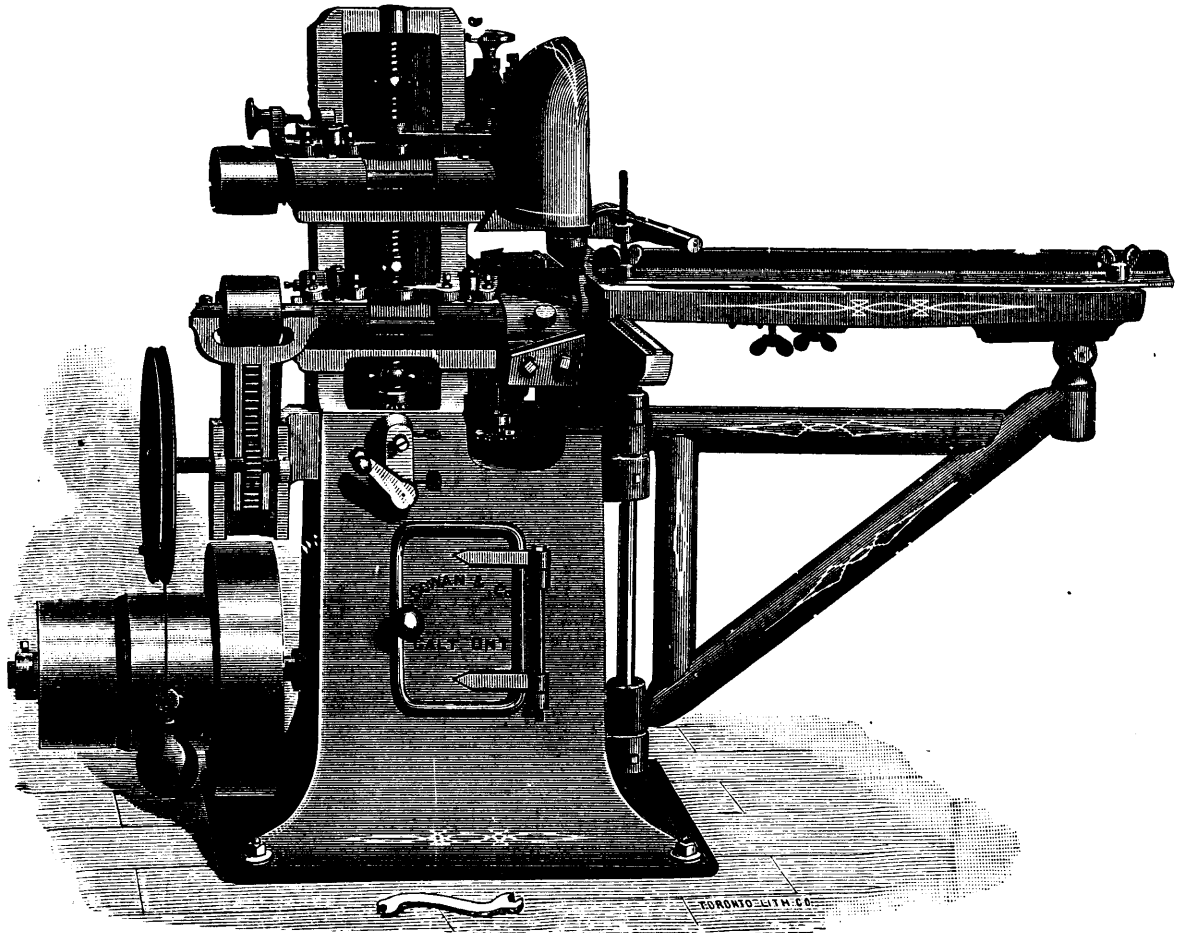
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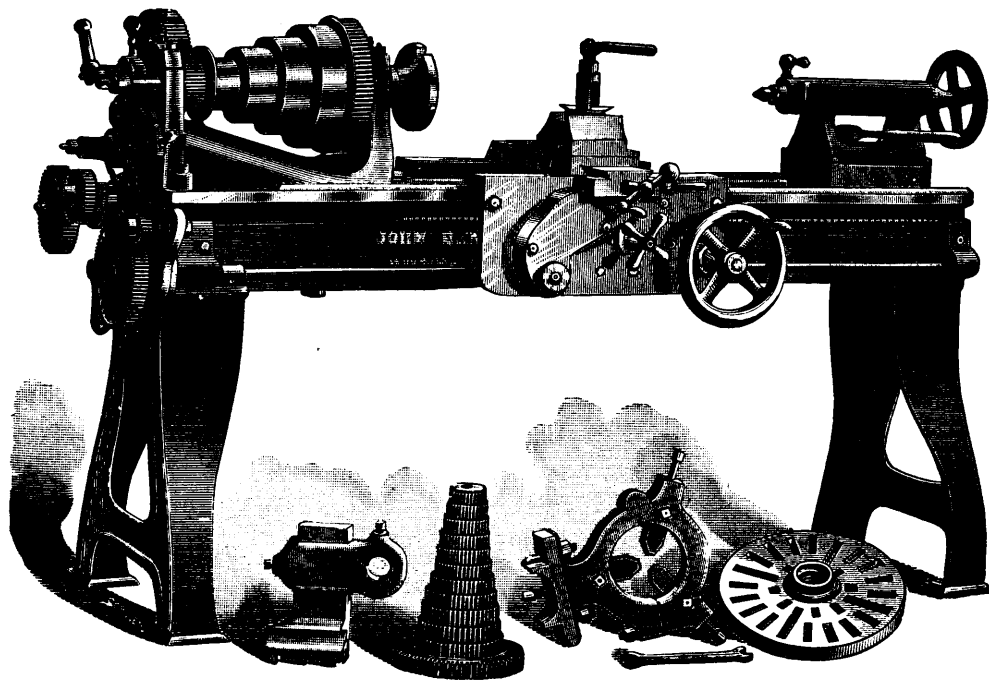
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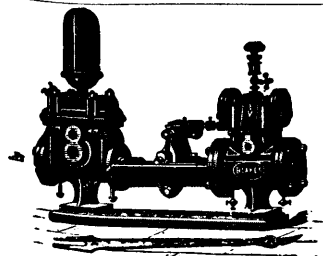
111 FEDERAL STREET

NEW YORK,

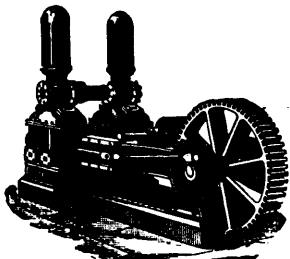
95 & 97 LIBERTY STREET.

SEND FOR ILLUSTRATED CATALOGUE.

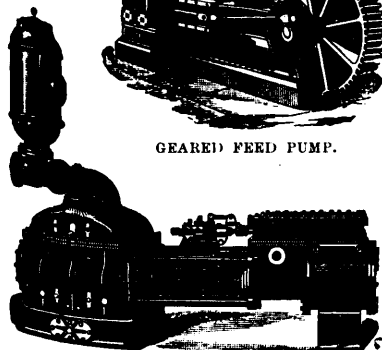
These goods may be seen at the Permanent
Exhibition 63 to 69 Front Street West, Toronto.



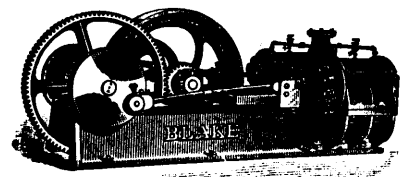
BOILER FEED PUMP.



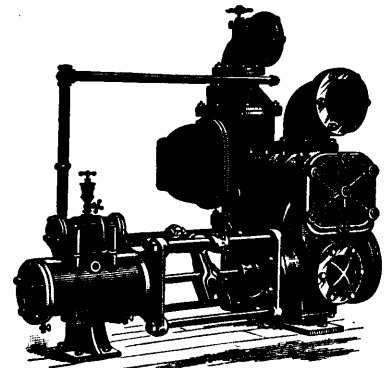
GEARED FEED PUMP.



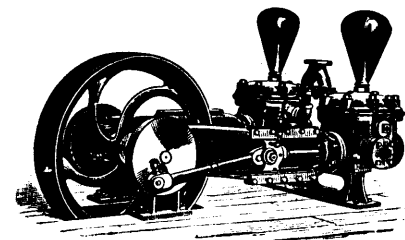
DUPLEX COMPOUND ENGINE



AIR COMPRESSOR.



AIR PUMP AND CONDENSER.



BELT PUMP.

Nova Scotia Steel Co., Limited,

NEW GLASGOW, NOVA SCOTIA

(Only Steel Works in Canada),

MANUFACTURERS OF

Hammered *and* Rolled Steel

MADE BY THE

SIEMENS-MARTIN (OPEN HEARTH) PROCESS.

ROUND MACHINERY STEEL for Shafting, Spindles, etc. MILD STEEL for Rivets, Bolts
Thresher Teeth and many purposes where Norway Iron is now used.

SPECIAL SECTION PLOW BEAMS, MILD STEEL CENTRE AND SOLID MOULD BOARDS,
COULTER STEEL HARROW DISCS,
AGRICULTURAL STEEL CUT TO PATTERN, SPRING, SLEIGH SHOE, TYRE, TOE CALK AND CROSS BAR STEEL
STEEL NAIL PLATE.

 *Binder Bars, Z and other Special Sections.*

STEEL MOWER BARS.

Particular attention given to the manufacture of Rake, Cultivator and Harrow Teeth, and other
Agricultural Spring Steel Forgings.



113 FEDERAL STREET, BOSTON.

93 Liberty St., New York.

Warren, Mass.

FOR SALE BY THE

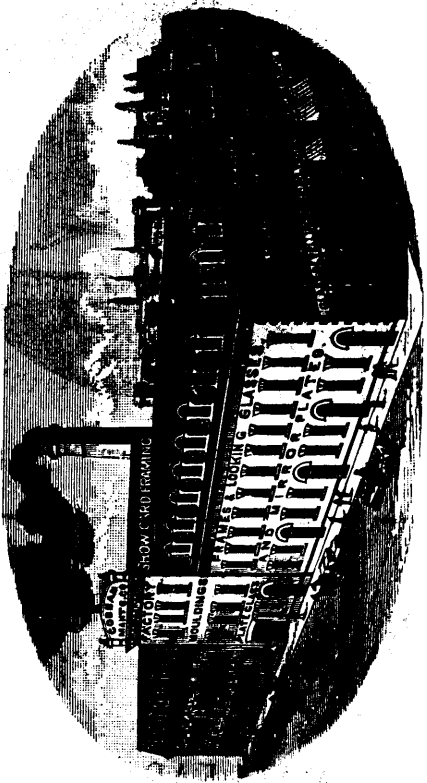
Polson Iron Works Company, 38 Yonge Street, Toronto, Ontario.

WHERE MANY SIZES MAY BE SEEN IN STOCK.

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Factory & Head Office: Toronto.



Branch: 148 McGill Street, Montreal.

MANUFACTURERS OF
Mantles, Over Mantles and Mirrors in Finest Hardwoods. Mouldings, Picture
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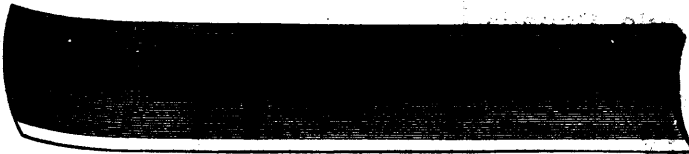
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GALT MACHINE KNIFE WORKS.

PLANING MACHINE
KNIVES.



STAVE CUTTER KNIVES.



STAVE JOINTER KNIVES.

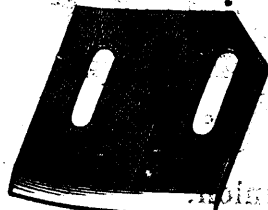


MOULDING, TENONING,

MITREING,

AND SINGLE JOINTER,

And other irregular shapes.



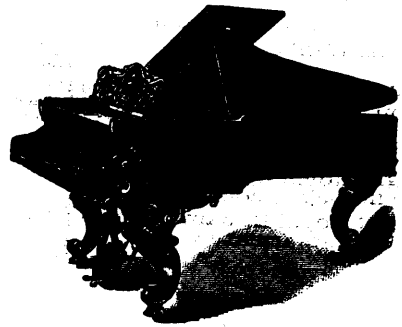
Chisel, box and Veneer, Paper Cutting, Leather Splitting and any special knife made
to order. SEND FOR PRICE LIST. All wires forwarded.

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SQUARE,
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COTTONADES, DENIMS, TICKINGS

Star Brand—BEAM WARP.

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” BALLED KNITTING YARN.

First Prize, Silver Medals, for Beam Warps and Denims,
Toronto, 1891.

General Agents,

F. McELDERY & CO.,

204 MCGILL STREET, MONTREAL.

22 & 24 COLBORNE ST., TORONTO.

For Sale Cheap.

WE OFFER THE FOLLOWING

ELECTRIC - LIGHT - PLANT

FOR SALE AT LOW PRICE:

All in good order, but recently replaced by the RELIANCE SYSTEM.

Two 25-Light Ball Dynamos, Mica Insulation. Almost as good as new.

One 15-Light American Dynamo, in good order.

One 10-Light Royal Dynamo, with 10 lamps, in first class condition.

One 40-Light Royal Dynamo, with 5 lamps, with new armature.

Apply for the above or for new plant to

THE RELIANCE ELECTRIC MFG CO., Ltd.

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HICKORY PULLEYS.

We make only hardwood bent rim spoke arm split pulley; only small split pulley; only split loose pulley with oilless bearings; only wooden hangers, in the market.



Send for discounts and circulars.

Menasha Wood Split Pulley Co.

MENASHA, Wis.

This Space for Sale.

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H. C. FRICK COKE CO.,

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SPECIAL NOTICE.

Our attention has recently been called to the fact that certain "outside," and inferior makes of coke, containing a great deal of sulphur and other impurities, are being substituted by certain unscrupulous dealers (by reason of the greater profit in handling them), to the trade generally for "Frick" coke. To obviate this imposition upon our friends and the trade at large, we beg to say that the surest and quickest way of getting the genuine "Frick" coke is to order from us direct; or, if they prefer to buy through dealers, and will drop us a line to that effect, we will be glad to give them the names of responsible dealers through whom they can purchase our coke.

H. C. FRICK COKE CO.

JANUARY, 1890.



SMITH'S FALLS MALLEABLE IRON WORKS.

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MANUFACTURER TO ORDER OF

Malleable Iron Castings

FOR

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Also CARRIAGE HARDWARE.

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THE OSHAWA Malleable Iron Co.

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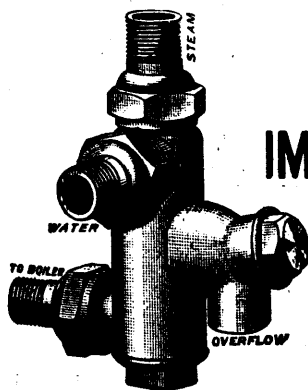
FOR ALL KINDS OF

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AND

MISCELLANEOUS PURPOSES.

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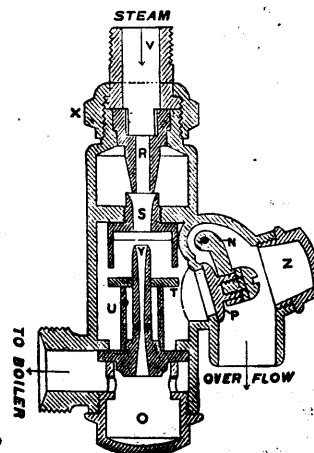
FEED YOUR BOILER WITH A PENBERTHY IMPROVED AUTOMATIC INJECTOR.

10,000 IN USE IN CANADA.

Cheaper than a Pump, takes up Less Room and Feeds the Boiler with Water at nearly Boiling Point.

SIMPLE, ECONOMICAL AND DURABLE.

And the Only Absolutely Automatic Injector in the Dominion.



PROMINENT FEATURES ARE: They start at about 25 lbs. steam pressure and work to 150 lbs. Lift water up to 20 feet, and work from a head as well. They require little watching, as, being automatic, they restart if feed to boiler is broken by air or sudden jarring. The parts are interchangeable and can be removed without uncoupling machine. Send for pamphlet to **PENBERTHY INJECTOR CO.,** Detroit, Mich. Factory at Windsor, Ont. Handled largely also by **Waterous Engine Works Co., Limited,** Brantford; **J. H. Taylor,** Montreal; **S. J. Shaw,** Québec; **Park Bros.,** Chatham; **McDonald & Co., Limited,** Halifax, N.S.; **A. R. Williams,** Toronto.