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THE DOMINION MECHANICAL & MILLING NEWS

DEVOTED ESPECIALLY TO THE INTERESTS OF OWNERS AND OPERATORS OF

Flour Mills, Saw Mills, Planing Mills and Iron-Working Establishments.

Vol. XI.—No. II.

TORONTO, ONTARIO, AUGUST, 1888.

{ Price, 10 Cents
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TILSONBURG.

THIS flourishing incorporated town is situated in the County of Oxford, on Big Otter Creek, 15 miles north of Lake Erie. The Canada Southern division of the Michigan Central Railroad and the Loop Line division of the Grand Trunk, pass through the town. It also is the terminus of the B. N. & P. B. division of the Grand Trunk, a short line connecting Tilsonburg, via Brantford, with the main line at Harrisburg. Located in the midst of the finest wheat and oat growing section of Ontario, in a country which the late Hon. George Brown fitly described as the "Garden of Canada," having unsurpassed facilities for the transportation of her products, with an abundance of water power supplied by the "Big Otter," it is not surprising that Tilsonburg has rapidly grown, until to-day it has a reputation in Western Ontario for enterprise and go-ahead-iveness possessed by few towns of far greater population.

The site for the town was selected by George W. Tillson, a native of New York State, who purchased large tracts of wild lands lying contiguous to the river, and who gave the name to the town. Early associated with his father in many enterprises was his son, E. D. Tillson, the owner and proprietor of the three mills, cuts of which appear in this paper. This gentleman, shortly after the decease of his father, erected an oatmeal mill, placing within the structure the best and latest improved machinery then obtainable for the manufacture of oatmeal, and but a few years elapsed ere Tillson's oatmeal became widely and favorably known throughout Canada, more especially in the Lower Provinces of Nova Scotia and New Brunswick, where the productions from this mill were the standard. For 12 years, or until the old mill was burned two years ago last June, the full capacity of this mill, running night and day, was not sufficient to fill the orders for the Lower Provinces alone. Such was the demand for Tilsonburg oatmeals. Two years ago last June the old mill, together with the large brick-cased elevator adjoining, with a large quantity of grain stored therein, was burned, entailing a heavy loss, but hardly had the flames been extinguished ere gangs of men were at work clearing away the debris and preparing for the new structure, which was begun at once and hurried to completion as rapidly as possible, under the personal supervision of Mr. Thomas Wallace, of Chicago, an architect and millwright of continental ability.

The fine building which now adorns the site of the

old one was erected, and within it was placed improved machinery for the making of fine oatmeal like which had never before been used in Canada. It can readily be understood that the most important part of the process of manufacturing oatmeal consists in the proper drying of the oats. Herein lies the great secret, and it is just here that Mr. Tillson's mill is said to be far in advance

The power used to drive the oatmeal mill is obtained from two Little Giant water wheels, while as an auxiliary, an engine of 65 h. p. located in the basement guarantees no stoppage for want of water.

Four years ago Mr. Tillson erected a flouring mill of 200 barrels capacity, letting the contract for the machinery to Messrs. Goldie & McCulloch, of Galt, and the flour from this mill under the names "Rival," "Leader," "White Dove," and "Tillson's Mills," is pushing its way in the lower provinces as a first-class and reliable production.

Mr. Tillson also manufactures split peas and pot barley, the peas being sold mostly for export to the West Indies.

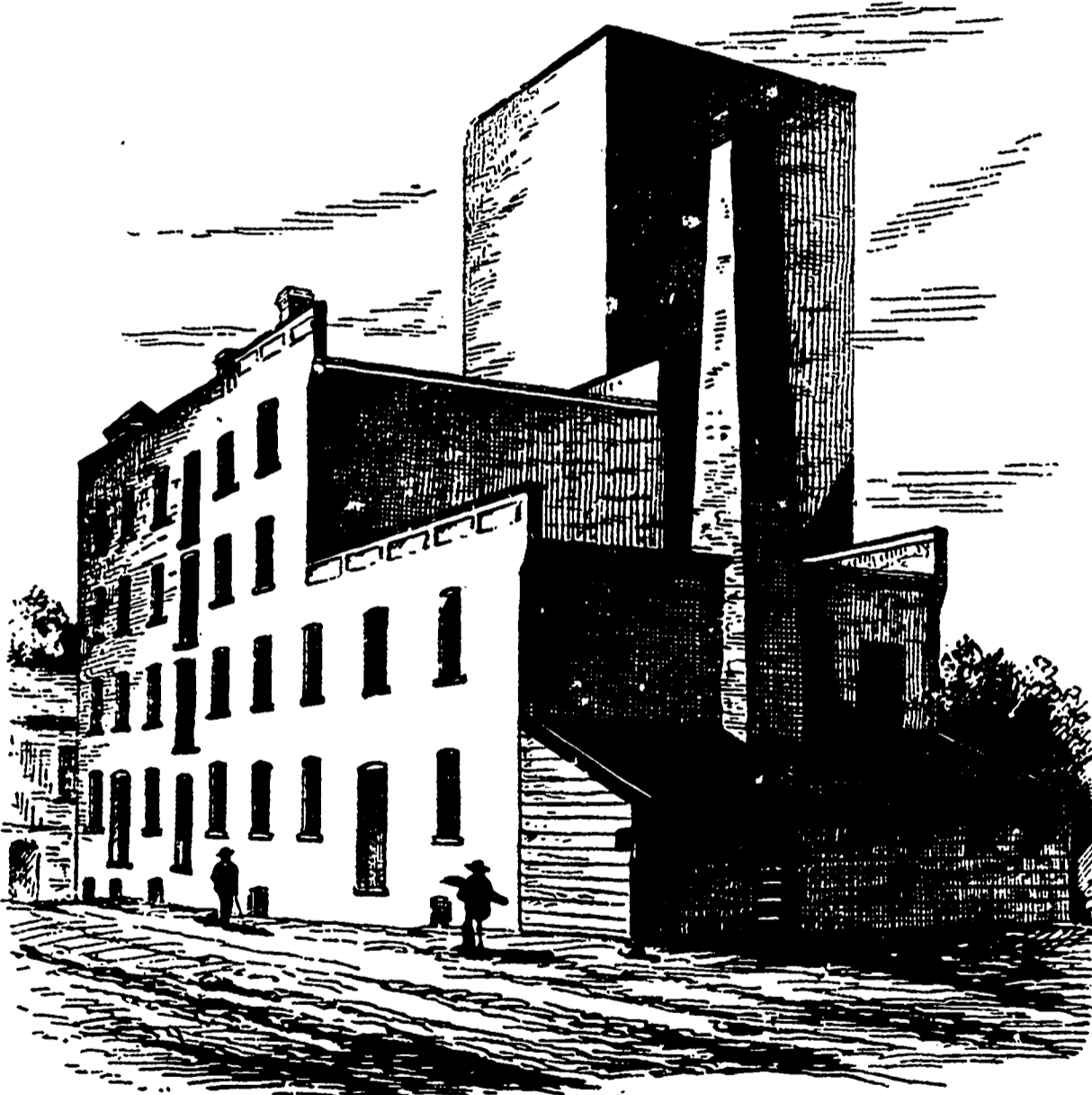
POINTS IN MILLING.

CLOSE observation in a number of mills will reveal the fact that most of the flouring establishments are badly arranged so far as motive power and manual labor are concerned. Especially is this true of the mills ranging from medium capacity downward, and of those built years ago and recently rebuilt or remodeled to modern processes of grinding. Too often the defective arrangement necessitates re-handling or causes gross loss of power through misapplication. Every miller must by this time understand the importance of the small "leaks," as competition has set him to the task of gaining or saving cents where he used to gain or save dollars and dimes.

Wherever it is possible to save labor or power, it is the mill-owner's first duty to save it. Without abating for an

instant his careful endeavors to secure the largest yield and the best quality possible, he should have an eye to the small economies, whose aggregate in a year generally makes a good showing.

More and more grain-cleaning machines are coming into existence. Not long ago I saw some wheat that was said to have been "cleaned" by a new machine that is to be brought out shortly. According to the description given me of this machine, it must be a novelty. The invention consists of a well from six to nine feet deep, built of a gritty stone imported from Scotland. In this well is an upright revolving brush of stiff bristles, filling the well nearly full and leaving a small space between the cylindrical brush and stone. Into this space the grain is fed from above and on its passage downward and through it is "cleaned" by the action of grain upon grain, of stone upon grain, and of revolving brush on grain. The specimens shown to me appeared to be roughly handled. It was a fine Pennsylvania



TILLSON'S OATMEAL MILL, TILSONBURG, ONT.

of any oatmeal mill in Canada. Situated in the basement of the mill are ten pan kilns, having a total capacity for drying 2,500 bushels of oats every twenty-four hours. Simply described, the kilns are huge boiler plate circular pans each placed over a furnace, the drying oats being constantly stirred by an automatic sweep. No smoke or fumes from the fire pass through the oats while being dried, consequently oatmeal made from pan dried oats has not that bitter taste discernible in oatmeal, the oats for which have been dried by the old process.

Upon the ground floor are placed six runs of hulling and two runs of meal stones; upon the second floor the purifiers, cutting machine, etc. The third floor contains the reels, smutters, &c., while in the 4th storey will be found cockle machines, separators, elevators and reels, seemingly without number. Adjoining the mill is a huge elevator, with a storage capacity for 100,000 bushels of grain. Taken all in all, this is a very complete establishment, and is turning out a very superior grade of oatmeals.

wheat of medium hardness, with small crease and of good average size. On its passage through the cleaner it had certainly parted with its fuzz, its crease-dirt and, unfortunately, it seemed to me, too much of its coating and the adjacent floury particles. Some of the berries were quite perfectly hulled. Others were split. Others were broken across. Others were ground off so that the germ was plainly visible on the beveled ends. Some had lost a considerable portion of flour. Only a small percentage of the berries seemed to have received anything approaching "proper treatment." The exhibitor of the specimens of manipulated grain claimed that he was willing to guarantee that the machine would enable a miller to turn out 80 per cent. of high-grade flour.

I am not criticising the new machine at all. I merely state my impressions. Probably the grain specimens shown had been "punished" more severely in the trial machine than it would be in the finished and perfected one. Evidently the stone used had too much "bite," or the brush was too rigid, or its speed was too great to secure the best results, or the pressure of the brush upon the grain was too great. Either of these causes would explain the appearance of the grain.

Neglect of the bolting-cloth means the loss of all the finest work done before the bolting-cloth is reached. When the flour becomes specky, hasten to determine the cause. Generally the location is easily made in a torn, clogged, worn-out, overloaded cloth. Decide to do two things at least in the case of your bolting: 1. Secure the best cloth at the beginning. 2. Keep it in good condition so long as you use it. Good cloth means half the battle won in the beginning, but good care means the other and probably more important half.

Millers, why will you continue to buy and pay wheat prices for stuff that is not wheat? A few days ago I visited a mill of large capacity, and while about the establishment I was shown a heap of dirt of various kinds that had been removed from a large quantity of wheat that had just been cleaned. The pile contained many bushels and had cost the purchaser many dollars. The question suggested itself. Is it right for the miller to pay the farmer money for bits of straw, wood, twine, wire, nails, leaves, bark, wood and other foreign matter in the wheat? Besides paying 40, 50 and 60 cents a bushel for the dirt and rubbish, the miller must waste his motive-power and wear out his machinery in separating it from the wheat. Thus his loss is double. Did any miller grinding 300 or more or less barrels a day ever compute what he loses in a year from the dirt he buys in his wheat? Is there any sound reason why the farmer who sells wheat should receive pay for whatever gravel, iron, wood and other substances he may leave in the grain? If any one should not pay for this mixed-in dirt, it is the miller. I think the miller has the right to insist on paying for wheat and for wheat only. Dirt at grain prices is an expensive luxury in these hustling days.—*Milling World*.

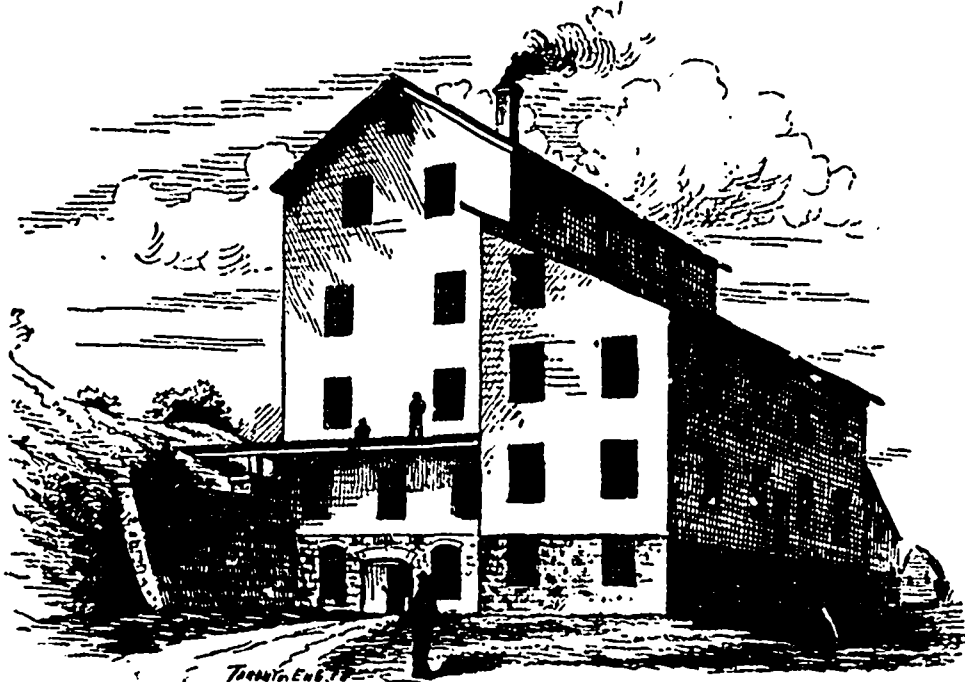
Water power is worth \$60 per horse-power per annum in Paterson, N. J., while steam power costs \$75. A lessee in that city, whose lease called for a certain number of horse-power which had not been furnished, recently sued to recover \$1900, its value at the rate of steam power, but the court held that, as water power was to have been furnished, only the cost of water power could be allowed, which was \$1,500. The lessee had not supplied the power from any other source. Had he been obliged to do so he could have claimed whatever it fairly cost him, whether more or less than steam power.—*Boston Journal of Commerce*.

There is no economy in using damaged or musty oats for oatmeal. Anyone who will taste grain of musty oats will find says the *Millstone*, that it has a decidedly bitter taste. Drying does not improve this grain, but rather seems to make it worse. White oats are preferred to the dark variety. In the former the hull is supposed to be lighter in weight and when small particles get into the meal the color is not so objectionable as when it is dark. The best oats will only yield about half its weight in meal, while the poorer varieties differ materially as to the yield; but it is easily seen that the difference of a few cents a bushel between the best oats and the poorer kinds makes little difference in the cost of the oatmeal, but makes every difference in the value of the output.

THE SUPPLY OF NATURAL GAS.

A natural gas has been recently discovered in many parts of Canada, and some are looking forward to its use for lighting and manufacturing purposes, the following extract from a paper read by Mr. E. B. Phillip before the Ohio Gas Light Association will doubtless prove both interesting and instructive:

The only durable supply of natural gas obtained in the Northwestern gas territory is found in the Trenton limestone. It is true that gas in considerable quantities is found in the shales above the Trenton; but this is not



TILLSON'S MILLS, TILSONBURG.

of continuance, being generally accumulated in pockets, which soon give out. The difference between a good gas well, or gusher, and a small well is due to the porosity or density of the Trenton limestone. I have here three samples of Trenton rock. This one, as you will observe, is very porous, of a spongy character, similar very much to a piece of pumice stone. This specimen came from the Karg well at Findlay, the capacity of which is 12,600,000 cubic feet per 24 hours. The other specimen is also porous, but not so much as the piece from the Karg. This sample came from the Heck well, near Findlay, the capacity of which is between 5,000,000 and 6,000,000 cubic feet. The third specimen here shown is from a well in the eastern Findlay territory, which scarcely shows any sign of porosity, and, in fact, is very dense and close. The capacity of this well is about 500,000 cubic feet per day. These specimens show very accurately the comparative difference in the porosity and density of Trenton rock, on account of which the difference in the flow or production of the wells exactly to the same degree is attributed. The two lead-



TILLSON'S MILLS, TILSONBURG.

ing theories, and those which have the greatest number of advocates among experts, are that it is made or produced in the Trenton rock, or that it is made far below the Trenton. At best it is all theory and not a proved fact. It is, however, our theory that it is not made in the Trenton limestone, for the immense quantities of gas that have already been used or wasted could not actually have been made in the Trenton, as the rock area could not produce it. The Trenton rock, in our opinion, is but an enormous passage-way or pipe-line, so to speak, for the distribution or conveyance of the enormous volumes of gas which the drill has liberated by tapping this passage-way or pipe line. Presuming it is true that the gas is generated far below the Trenton, it can easily be supposed, for it is all imagination, that with the enormous pressure at which it is packed or compressed in the

place of manufacture it would, on this account, find its way through the various strata until it reached the Trenton, and here becomes distributed. The shales and slates above the Trenton act almost completely as a barrier or stoppage to its rising further; and when in some cases it does reach the shales above, this fact is attributed to the presumption that it reaches these pockets or cavities through fissures or breaks. For this reason, as the shales are very close and compact, the supply found in these pockets is not lasting. Now, as far as the life of a gas well is concerned, we can only theorise. All that we are able to learn concerning this important

phase of the natural gas problem is from actual experience and knowledge, and from that limited knowledge form our conclusion. We know the flow of gas wells does diminish—not to such an alarming extent, however, as to discourage the investment of many millions of dollars in the business; for the natural gas territory of this country is of such enormous area that, should the life of the first wells drilled be comparatively short, others may be drilled in other parts of the territory, and (comparatively) the same amount of gas can be obtained. This has been demonstrated to be a fact as far as our present experience teaches us, and for this reason, if the average life of the wells should be from five to ten years, as has been claimed, the supply can be kept up by further use of the drill in adjacent territory not yet depleted. These facts and experiences from which we derive our conclusions are so numerous, and the ground to be covered in

the consideration of this great problem is so vast, that we can in this paper only mention, in a comparatively limited and concise way, some of the principal points or arguments in the matter.

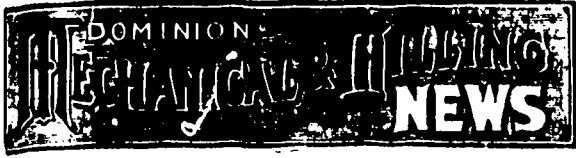
A process has been perfected and patented for drawing upon wood by means of a fine metallic point kept red hot, so that the lines are actually burned into the surface. A powerful oxyhydrogen or other flame keeps the point always at the high temperature, and yet the apparatus is so compact that it may be used with the ease and freedom of a pencil. It is so adjusted as to produce as well all shades of brown, from the lightest to that verging on black.

The following difficult fusions were effected by the Siemens electric furnace or crucible, which was patented in 1879 in Great Britain, the current employed being of from 250 to 300 amperes and obtained from five dynamo electric machines, four of which were coupled together, and one of which was employed as an exciter: (1) Six pounds of wrought iron were kept in the heat of the arc for twenty minutes and then poured into a mould. The cooled metal was found to be crystalline and no longer to possess the ability to be wrought. (2) Twenty pounds of steel were completely melted in one hour in a single charge. (3) Three-fourths of a pound of copper placed in carbon dust were melted in half an hour—only three-fourths of an ounce was found remaining in a retort. The rest had been vaporized. (4) One quarter of an hour was sufficient to reduce eight pounds of platinum to the liquid state.

To build a chimney that will draw forever and not fill up with soot, says the *Boston Journal of Commerce*, you must build it large enough, sixteen inches square; use good brick, and clay instead of lime up to the comb; plaster it inside with clay mixed with salt; for chimney tops use the very best of brick, wet them and lay them in cement mortar. The chimney should not be built tight to beams and rafters; there is where the cracks in your chimneys come, and where most of the fires originate, as the chimney sometimes get red hot. A chimney built from cellar up is better and less dangerous than one hung on the wall. Don't get your stovepipe hole too close to the ceiling—eighteen inches from it.

Mr. H. W. Petrie, Brantford, dealer in machinery, has opened an office in Toronto at the corner of York and Front streets.

According to a contemporary a considerable amount of Cheboygan, Detroit and Grand Rapids capital is being invested in pine on the wild lands on the Georgian Bay, on Spanish and French rivers along the north shore of Lake Huron in Canada. The Canadian government holds all the lands and timber in this region, as well as in every other part of its domain. The land can be bought at an average price of \$1.25 per acre, but this does not include the growing pine timber. For this the charge averages \$1 per 1,000 feet stumpage. The purchaser may cut the timber or let it grow, but when cut and scaled the government inspector collects \$1 per 1,000 feet board measure as "crown dues." The land may also from 25,000,000 to 100,000,000 feet of standing pine, so that the government has a proprietary of \$35,000 to \$105,000 in the pine of those townships in addition to the land. The government timber officials estimate the amount of timber in each township. After the purchase is made the government protects the pine from fire or theft till it is cut down.



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ADVERTISEMENTS.

Advertising rates sent promptly upon application. Orders for advertising should reach this office not later than the 25th day of the month immediately preceding our date of issue.

Changes in advertisements will be made whenever desired, without cost to the advertiser, but to insure proper compliance with the instructions of the advertiser, requests for change should reach this office as early as the 22nd day of the month.

Special advertisements under the headings "For Sale," "For Rent," &c., if not exceeding five lines, 50 cents for one insertion, or 75 cents for two insertions. If over five lines, 10 cents per line extra. Cash must accompany all orders for advertisements of this class.

SUBSCRIPTIONS.

The DOMINION MECHANICAL AND MILLING NEWS will be mailed to subscribers in the Dominion, or in the United States, post free, for \$1.00 per annum, 50 cents for six months. Subscriptions must be paid strictly in advance.

The price of subscription may be remitted by currency, in registered letter, or by postal order payable to C. H. Mortimer. Money sent in unregistered letters must be at sender's risk. The sending of the paper may be considered as evidence that we received the money.

Subscriptions from all foreign countries, embraced in the General Postal Union will be accepted at \$1.25 per annum.

Subscribers may have the mailing address changed as often as desirable. When ordering change, always give the old as well as the new address. Failure upon the part of subscribers to receive their papers promptly and regularly should be notified at once to this office.

EDITOR'S ANNOUNCEMENTS.

Correspondence is invited upon all topics pertinent to the mechanical and milling industries.

This paper is in no manner identified with, or controlled by, any manufacturing or mill-furnishing business, nor will a bestowal or refusal of patronage influence its course in any degree. It seeks recognition and support from all who are interested in the material advancement of the Dominion as a manufacturing country, and will aim to faithfully record this advancement month by month.

Readers of the "MECHANICAL AND MILLING NEWS" will confer a favor upon the publisher and derive material benefit themselves by mentioning this paper when opening correspondence with advertisers. Drop us a postal card when you have written to an advertiser, give us his name, and then we will put you in the way of getting the benefit. Don't forget this.

OUR EXHIBITION NUMBER.

ARRANGEMENTS for the publication on 1st September of the special Exhibition Number of the MECHANICAL AND MILLING NEWS, to which we referred in our last issue, are progressing satisfactorily. A number of manufacturing firms have already engaged advertising space in this special issue, which gives promise of being the handsomest and most interesting trade paper ever printed in Canada. Added to its attractiveness is the fact that a very large edition—about 20,000 copies—will be circulated among owners and operators of flour mills, saw and planing mills and iron-working establishments in every part of the Dominion. Manufacturers of machinery, belting, oil, or any other article used by the classes mentioned, should be represented in the advertising pages of this special number.

ENGLISH millers think that to make good flour with American wheat, is as easy as rolling off a log. Mr. Seth Taylor, chairman of the recent convention of British and Irish millers in London, remarked: "As to the milling abilities of English and American millers, any apprentice could make good flour from the wheat which American millers use." If this statement be correct we can suggest an easy way by which English mill owners may make money. Let them purchase supplies of hard wheat, put their apprentices to work to grind it, and save the salaries of their head millers. The wonder is that American and Canadian mill owners have not discovered this secret of profit-making before now.

A SPEAKER at the recent convention of British and Irish millers said: "The success of English millers depended on themselves; more mutual confidence was especially necessary, and more friendly intercourse one with another. He quite considered that by their associating together in the North as they did last

year, they had improved their position 6d. per sack. Having improved their mills, they no longer had such formidable competition from abroad." Here is a hint which Canadian millers might very well take home to themselves. A little more friendly intercourse might have a like satisfactory result here. Sixpence a sack is equal to a fair margin of profit in the present condition of the market, and the experiment is well worth trying.

THE report which Mr. Jones, the Canadian Trade Commissioner, brings from South America, regarding the openings there for Canadian manufactures, is very encouraging indeed. In lumber and coal especially Mr. Jones believes a large and profitable business might be done. The Argentine Republic imported last year 205,000,000 feet of lumber, only one-tenth of which was supplied by Canada. There is also said to be a profitable field for Canadian manufacturers of agricultural machinery. American lumber manufacturing firms have established branch houses, and travelers for American firms regularly visit the country. This being the case, Canadian manufacturers cannot too soon enter the field and secure a share of the profitable trade which Canadians are so well situated to handle.

BY purchasing the Duluth, South Shore and Atlantic railway, the Canadian Pacific Company has secured control of the shortest route from Minneapolis, Sault Ste Marie and the Northwest to the Atlantic seaboard. The Canadian Pacific is in the hands of shrewd managers, and is making its rivals, both Canadian and American, look well to their interests. If the Canadian Pacific would allow the Canadian people to share the benefits of its many clever moves, it would stand better in popular estimation. We hope, for instance, that the shortest route from Minneapolis to the east, will not be used in the interest of Minneapolis millers as against those of the Canadian Northwest in the matter of freight rates on flour consigned to eastern Canadian markets.

IT is many years since the result of the harvest in Canada was looked for with so much anxiety on the part of all classes of people as during the present season. It is generally felt that another crop failure similar to that of last year, would bring disaster upon the country. The daily press, by printing reports concerning the condition of the crops from all parts of the Dominion, has given the public some foundation upon which to base an opinion as to the probable yield. Accepting these reports as truly reflecting the situation, the result seems likely to be more satisfactory than many dared to hope for. The crop promises to be an average one at least in the older provinces, while a reference to our Western correspondent's letter will show that in the Northwest the yield will probably exceed in abundance even that of last year. Altogether, then, there is room for encouragement. The worst may fairly be said to be over, and a more prosperous period seems to lie just a little further on.

OUR friends of the oatmeal combine do not appear to have profited by the recent advance of 50 cents per barrel which they caused to be made in the price of oatmeal. The consumer is said to have suddenly turned from oatmeal to flour, which at present prices is considered more economical. One of our contemporaries doubts whether even Scotch economists would see the desirability of buying oatmeal under present conditions. Unfortunately for the oatmeal millers the population of this country is not even altogether Scotch. Then, again, many persons who would be loth to do without their morning dish of porridge in winter, consider it too heating for the hot months of summer, and substitute for it fruits and vegetables. Add to this the fact that quite a variety of coarse ground wheat and other kinds of meal have been introduced into the market within the last few years and sold in competition with oatmeal for the purpose for which the latter is used, and it will be readily seen that the lot of the oatmeal millers is not at present a happy one.

THE people of the Dominion will await with much interest the arrival of the Newfoundland delegation which is to confer with the Federal government at Ottawa in September regarding the taking of Newfoundland into the Confederation. We have seen nothing as yet to show that the acquisition of Newfoundland would be likely to result in any way to the advantage of Canada. On the contrary there is evidence obtainable to prove that the proposed union would very largely increase our public expenditure. The main argument urged by the advocates of union in Newfoundland is that when the colony shall have become a province of

Canada the Dominion Government will spend large sums of money in the construction of public works throughout the island. We respectfully submit that the Dominion of Canada has already plenty of territory. Our efforts should now be directed to the settlement of our Northwest territories by a proper class of immigrants, the development of our mineral and other resources, and the upbuilding of a strong and united nation. If our efforts in these directions should prove so successful that a few hundred years hence we should require additional territory, it will no doubt be time enough to make overtures to our Newfoundland neighbors.

LAST year the enterprising people of the Northwest gave representatives of a number of the leading newspapers throughout Eastern Canada a free excursion through the farming districts of Manitoba, and in return that part of the Dominion received an advertisement which amply repaid whatever expense was incurred in carrying out the idea. This year it is proposed to invite in the same way representatives of leading European journals to visit and inspect the country. The idea is a good one, and we hope to see it carried out. We have heard doubts expressed in some quarters as to whether the right class of newspapers could be got to send representatives. There is little occasion for doubt on this point. The newspapers as representing the people of the old lands, are interested in knowing whether the statements which have been made regarding the Canadian Northwest as a field for emigration are reliable or not. They are also financially interested in supplying the public with fresh and authentic information on a subject of such general interest. The Canadian Northwest is a grand country for the arduous immigrant, and we are pleased to see the enterprising way in which the people already resident there are setting about the work of making its virtues known.

THE city of Winnipeg realizes that the establishment of manufactories is necessary to its future development. In the Northwest as in Ontario in the days of its early settlement, manufactories are apt to spring up wherever good waterpower is available. Thus we hear Keewatin and Sault Ste. Marie spoken of as the scenes of large manufacturing industries in the future. Winnipeg is not so fortunate as to possess natural water power available for manufacturing purposes. Had it been otherwise that city would doubtless already be the principal manufacturing point in the Northwest. The citizens of Winnipeg are an enterprising people, however, and they do not propose to see their city stand still or retrograde because it does not happen to possess all the natural advantages of other localities. Winnipeg has no natural water power, but it has the next best thing—a river—with which it hopes to provide a very respectable artificial power for manufacturing purposes. In February last the City Council voted the sum of \$2,000 to be expended in surveys and the obtaining of information upon which to base a report regarding the best method of improving the river in order to provide water power for manufacturers, and the probable cost of carrying out such improvements. The investigation has since been in progress under the direction of the City Engineer of Winnipeg, who has just presented a lengthy preliminary report to the Council setting forth in detail the result of the work that has been done. The report suggests the construction of a dam of masonry and concrete across the Assiniboine river, at an estimated cost of \$250,000, which would make available for use 5,626 horse power for fourteen hours per day at the season of lowest water. The expenditure necessary to construct a canal for supplying water to the mills for a distance of half a mile below the dam is estimated at \$50,000. The report states that canals may be constructed on either or both sides of the river to supply water to mills, the mills being built between the canals and the river, and the tail water taken into the river by tunnels or open cuts as may in such cases be considered advisable. It is pointed out also that the amount of power stated above which the construction of the proposed dam would make available, could be doubled by the construction at some future time of a canal from Lake Manitoba to the Assiniboine at Baie St. Paul. The opinion is expressed that the water power of the Assiniboine river, 5,626 horse power, can be leased within one year of the time when it is made available, and that the demand for additional power and navigation to Lake Manitoba will be so great that it will be in the interest of the Government or of the company undertaking the works to push on the construction of the canal to Lake Manitoba at once. The report, which is certainly a very favorable one, is to be supplemented by another, stating the result of further experiments now going on. The present is the time for the city of Winnipeg to consider this project in all its bear-

ings, before younger and less important towns shall have secured the large mills and manufactories which during the next few years will be established in the Northwest. We shall wait with interest for the engineer's second report and the action of the Council thereupon.

THE news comes from Ottawa that proceedings have been taken before the commissioner of patents to annul all patents for Edison's system of electric lighting.

AN Ottawa rumor is to the effect that in consequence of the threats of the American government to impose tolls upon Canadian shipping passing through the Sault Ste Marie canal, the Dominion Government will proceed at once with the construction of a canal on the Canadian side of the river.

THE lumber manufacturers and journals of the United States are very much excited at present because the House of Representatives has passed the Mills Bill, which provides for the free admission of Canadian lumber into American markets. The hope is expressed that the Bill will be thrown out by the Senate.

THE celebrated case known as the Queen vs. the St. Catharines Milling Co., involving possession as between the Dominion and Ontario Governments of certain territory and the timber thereon, is at present being argued on appeal before the Privy Council. A cablegram states that the decision may be expected in about two weeks.

THE validity of the law lately passed to put a stop to the business of stock-gambling in bucket shops, will shortly be put to the test in this city, where the proprietors of a reputed institution of this character have been placed under arrest. The result of this action will be awaited with much interest. Should the law in its present state be found to be defective, Parliament which meets a few months hence will lose no time in making whatever amendments are necessary to secure the object in view.

WE have had some difficulty between saw mill owners and their employees during the past month. It is not a frequent occurrence by any means. Indeed the wonder is that strikes in the lumber districts do not occur oftener, owing to the number of men employed, and the reckless character of some of them. It cannot be doubted that in some instances these men have cause for complaint. Their work, though not calling for the exercise of mechanical skill, is laborious and often highly dangerous, while their wages are, to say the least, none too liberal.

IF it be true that in Sweden a telephone costs only \$4 a year and an electric light \$6, and that the telephones in use there are equal if not superior to those of America, it would prove a profitable speculation to import a few thousand of these instruments into Canada and rent them at half the price now prevailing. Considering the exorbitant figure now charged for telephone accommodation, it is surprising that the instruments have come into such general use. It will be still more surprising if some means be not soon found to get out of the hands of the present telephone monopoly, and have charges reduced to something like a reasonable figure.

A FLOATING SAW-MILL.

ALONG the bayous and lagoons of Florida grows some of the finest timber in the south, much of it in places considered entirely inaccessible until J. L. Maul & Son hit upon the plan of constructing a floating saw-mill. This idea they carried into execution, and their mammoth mill, which now lies off the banks of Burton & Harrison's hammock, near Palatka, is a marvel of mechanical ingenuity. It has a length of 80 and a breadth of 40 feet, and it is so solidly built that the machinery has no more effect upon it than if it were built upon the solid land. Although it stands five feet high out of the water its draught is only about a foot and a half, which permits it to be taken into the shallowest lagoons where imber could not be floated. It is equipped with the latest machinery, planer, box-header, shingle saws and a fine 40 horse-power engine and boiler. On the hurricane deck is the cabin and office for the proprietor, while the cook house, where the men board, is in a corner on the main deck, which is otherwise free for the piling of lumber, the machinery being all below it. This floating mill has so far proved eminently successful, exceeding the expectations of the proprietors in this respect, and is probably the pioneer of numerous craft of the same kind.—*Timberman.*

COMPARATIVE ECONOMY OF HIGH AND SLOW SPEED ENGINES.

IN nearly every case where a flour mill is built it is intended that it shall be a permanent investment. The very nature of the milling business makes it necessary, says the *Milling Engineer*, that the plant shall be built and operated, not for one, two or three years, but for a long term of years. It is the ambition of every mill owner when he builds a mill, to make it the foundation of a permanent business, and if he is wise he will build such a mill and select such machinery as will prove the most economical, not in the first cost, but in the long run. In no part of the milling plant is this more important than in the power outfit of steam mills, and as most of the mills now being built are steam mills, the comparative economy of different styles of steam engines becomes an important subject for consideration. No matter whether the mill is large or small, unless it is so advantageously located as regards its supply of fuel that the cost is practically nothing, any wastefulness in the consumption of fuel creates a steady drain on the earning of the mill which will seriously affect the balance of the profit and loss account, and where fuel is expensive may result in transferring the balance to the wrong side of the account.

In selecting a power plant, it is a mistake, frequently made, to consider the first cost of the plant as of the highest importance, and any saving in this direction as so much clear gain. Especially is this the case in flouring mills of small capacity, where the builder's capital is limited, and where the idea is to get as much mill for as little money as possible. In such cases, any money borrowed from the power plant to put into the balance of the mill is borrowed at a ruinously high rate of interest, and it is, moreover, borrowed without any chance of repayment, except by throwing out the cheap plant and substituting the higher priced and more economical one at great expense. In no way is the miller more often misled than by the claims of the builders of the high speed automatic engines, where the name automatic is relied upon to cover a multitude of sins, in the direction of low economy. In this connection some facts are given from a paper by J. A. Powers, in the July number of the *Electrical Engineer*.

After carefully analyzing the problem and considering the requirements of the load to be driven in electric lighting stations, which are more favorable for the high speed engines than is the case in flouring mill work, Mr. Powers reaches this conclusion as to the different styles of engines in the consumption of steam as stated by engine builders :

	Steam per H. P. per hour.
High speed engine.....	28 to 32 lbs.
Corliss engines, non-condensing.....	24 to 26 lbs.
" " condensing.....	20 to 21 lbs.
" " compound condensing.....	15 to 16 lbs.

With an evaporation of eight pounds of water per pound of coal, the coal consumption would be as follows :

	Coal per H. P. per hour.
High speed engine.....	3.50 to 4 lbs.
Corliss engines, non-condensing.....	3.25 to 3.5 lbs.
" " condensing.....	2.50 to 2.62 lbs.
" " compound condensing.....	1.87 to 2 lbs.

As the interest on the first cost of the steam plant should properly be charged against its economy, the following statement of comparative first cost is given :

High speed engine.....	\$31 to \$36 per H. P.
Corliss engines, non-nondensing.....	42 to 46 "
" " condensing.....	43 to 48 "
" " compound condensing.....	52 to 57 "

The comparison of first cost and fuel saving is as follows :

	Cost.	Coal Consumption.
High speed engine.....	100 per cent.	100 per cent.
Corliss engine, non-condensing.....	131 "	62 "
" " condensing.....	136 "	56 "
" " compound condensing.....	163 "	44 "

If the cost of coal is taken at \$3.00 per ton and interest is figured at 6 per cent., which figures may be considered a fair average, the results, based on the foregoing figures, for a plant of 400 horse power, will be as follows :

	Cost of coal per day.	Saving in Coal over High Speed.	Interest per day.	Loss in Interest over High Speed.
High speed engine.....	\$24.75	\$.....		
Corliss engine, non-condensing.....	18.90	5.85		
" " condensing.....	15.24	9.51		
" " compound condensing.....	11.64	13.11		
High speed engine.....	\$2.36	\$.....		
Corliss engine non-condensing.....	3.08	.72		
" " condensing.....	3.15	.79		
" " compound condensing.....	3.75	1.39		

And the saving per day over the high speed engine is :

Corliss engine, non-condensing.....	\$ 5.13
" " condensing.....	8.72
" " compound condensing.....	11.72

So far as the steam consumption is concerned, results in every day work show that the comparison is made as favorable as possible for the high speed engine, for while records of actual tests of Corliss engines show that the figures given are not understated, the average of high speed engines after running a short time is not nearly as low as 32 lbs. per indicated horse power per hour. So far as the cost of the respective plants are concerned, we should be inclined, especially for small plants to put the average cost of the high speed plant a little lower and that of the Corliss a little higher, but this change would not materially affect the result so far as comparative economy is concerned.

To bring the matter in shape to fairly apply to the requirements of the average 100 barrel mill, it may be assumed that the power required will be 50 horse power. In the absence of exact data as to the cost of the high speed plant, and to give it as favorable a showing as possible, the costs of the respective plants may be stated as follows :

High speed.....	\$1,500
Corliss, non-condensing.....	2,700
" " condensing.....	2,800
" " compound condensing.....	4,300

The economy would then be :

	Water per H. P. per hour	Coal per H. P. per hour.
High speed.....	32 lbs.	4 lbs.
Corliss, non-condensing.....	26 lbs.	3.25 lbs.
" " condensing.....	20 lbs.	2.5 lbs.
" " compound condensing.....	16 lbs.	2 lbs.

And with coal and rate of interest assumed as above, based on a continuous run of 280 days, 24 hours per day, the comparison is summarized as follows :

	Cost of Fuel per Year.	Interest.	Total.
High speed.....	\$2,016	\$ 90	\$2,106
Corliss, non-condensing.....	1,638	162	1,800.
" " condensing.....	1,260	102	1,452
" " compound cond'g.....	1,008	258	1,266

The ratio of saving the difference in cost between the high speed plant and the other may be stated as follows :

Between high speed and Corliss non-condensing.....	25 per cent.
" " " condensing.....	38% "
" " " comp. condensing.....	30 "

Or in other words it would take four years to save the difference in cost using the non-condensing Corliss, a little over two and one-half years if condensing, and three and one-third years if compound condensing. In either case, the saving would be steadily continued, long after the cost of the plant had been wiped out.

VENTILATING MILL STONES.

A VERY simple and inexpensive contrivance for ventilating millstones is described as follows in *Le Bile*: On the running stone are placed three fans 120 degrees apart, and shaped like sections of rain gutters. These fans are on hinges, so that one can vary the angle of the vertical side. A quarter circle, furnished with a certain number of holes, by the aid of a pin permits the fastening of the fan in the position desired. Corresponding to every fan are two holes made in the mill, each having a ring of brass secured in it. The horizontal side of the fan carries two gudgeons, which fit exactly into these. When the mill is running the fans draw a certain quantity of air, and so establish an uninterrupted current of air, which is of undoubted good effect.—*Manufacturers' Gazette.*

USES OF THE ELECTRIC MOTOR.

IT would be almost impossible to catalogue the number and variety of purposes for which the electric motor is now in daily use, says F. L. Pope, in *Scribner's Magazine*. Some of the most usual applications are for printing presses, sewing machines, elevators, ventilating fans and machinists' lathes. At the present time every indication unmistakably points to the probability that within a very few years, nearly all mechanical work in large cities, especially in cases in which the power required does not exceed say 50 horse-power will be performed by the agency of the electric motor.

It is an ideal motor, absolutely free from vibration or noise, perfectly manageable, entirely safe, and with the most ordinary care seldom if ever gets out of order. Indeed, there is no reason to suppose that the limit of 50 horse power will not be very largely exceeded within a comparatively short period, when it is remembered that scarcely five years ago the production of a successful 10 horse-power motor was considered quite a noteworthy achievement.

THE HURFORD FLOUR BOLT.

IN the last number of the MECHANICAL AND MILLING NEWS millers were informed that Messrs. Runciman Bros., of Hamilton and Goderich, Ont., had made arrangements to manufacture the above machine in Canada. In view of this a few particulars concerning the construction and method of operation of this machine should prove interesting. These machines can and frequently are put into old chests. When placed in old chests the feeding device is inside the chest and is fed from above as shown in the cut. The old bearings and bridge trees are used and the shaft extends at both ends of the chest the same as before the old reel was removed. The bridge tree shown in the cut inside the chest is to sustain the feeding device and is a part of it. A tube-like extension of the head casting runs inside the bridge tree. The feed tube passes inside of the revolving extension of the head casting, and is supplied with a circular flange by which the feed tube is supported, the flange being screwed to the outside of the bridge tree. The shaft passes through this feed tube and is supplied with a screw conveyor which revolves with shaft inside the feed tube. Owing to the peculiarity of this form and construction of feeding device no tight head or speck box is required, as the feed tube, flange, bridge tree and extension over the feed tube of the head casting of the reel constitutes a perfect protection against specks.

The accompanying cut shows the head end of the chest with the upper and lower portions broken away to show the arrangement of the inside brush, which is hung pivotally upon the shaft and weighted below to keep it in a vertical position. By this adjustment the cloth is brushed gently on the upper inside of the reel, thus keeping it perfectly clean from all clogging or filling up of the meshes. No material is allowed to be carried over and thrown against the down side of the reel. It is claimed by the manufacturers of this machine that by keeping the cloth clean on both sides and not allowing the material to be thrown about on the inside of the reel, a larger capacity is obtained together with a better quality of work.

When reels are furnished in chests the feed tube is placed on the outside, while it is on the inside when they are put into chests in place of centrifugal reels, the feed device is placed on the outside of the chest in the regular way, as any short centrifugal chest can be easily changed so as to conform to the standard chest built for these reels.

Any further particulars regarding this machine may be obtained by applying to the Canadian manufacturers, as above.

ECONOMICAL ADVANTAGES OF THE GANG MILL.

IN these days of close competition and small profits, writes a Wisconsin lumber manufacturer in the *Timberman*, it behooves us to take into consideration the wide difference between the saw kerf of a rotary and of a gang mill. Everyone knows what a rotary saw does, that it takes about three-eighths of an inch kerf; and this article is more for showing what a gang can do in the way of saving lumber. If a rotary could be run on timber alone, there would be scarcely any waste of lumber, and I propose to show that a gang practically cuts its logs into timber, (figuratively speaking), with little, if any waste. The following diagram representing a log of the diameter of fourteen inches at the top end, sixteen feet long, and scaling by Scribner's rule, 114 feet, will assist in the explanation (scale 1 to 2):

The sawyer slabs his log into the above twelve-inch cant, and it is thrown to the gang; in going through, it cuts into the following lumber, as per diagram:

4 pieces	2x12	16 ft.	128 feet
2 "	2x8	16 ft.	48 "
			176 "

a clear gain of fifty-seven feet. Besides this, if the log has any swell to it at all, there will be two pieces 2x6 8 feet out of the side slabs from the gang, making sixteen feet more, a total of 186 2/3 feet, a gain of seventy-three feet, or over sixty per cent. upon the log scale. Had the log been sawed into boards, the result would be nearly the same, as follows (scale 1 to 2):

In this case we get	6	2x12	16	96 feet.
	2	2x10	16	32 "
	2	2x8	16	32 "
	1	2x6	16	8 "
Also from top and bottom slabs	2	2x6	16	16 "
From swell of log we get	2	2x6	12	24 "
				Total 186 "

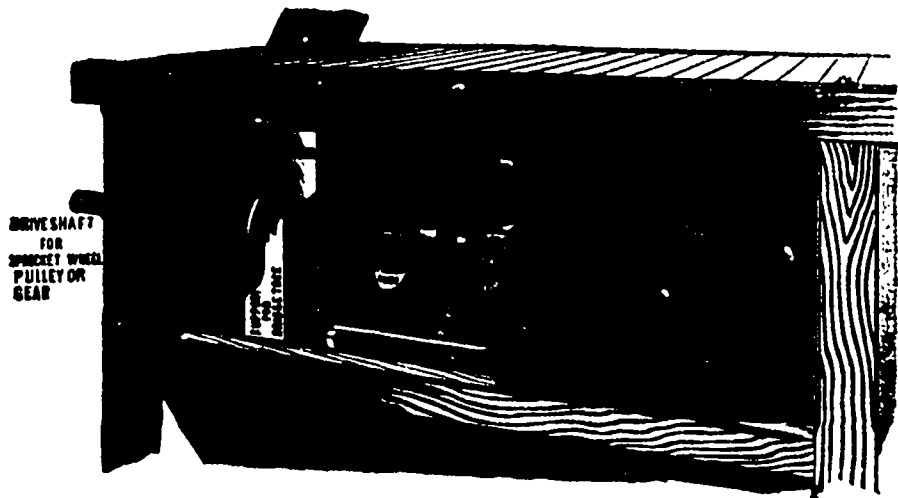
All of these boards are sawed full inch in thickness and the dimension one and seven-eighths inches. The saw-kerf makes the full width of cut two inches on dimension, and one and one-eighth on boards. The saw-kerf is therefore a loss only in the sawing of boards, while the short lumber which is cut from the sides of the cant amounts to more in sawing inch than in two-inch, nearly if not quite making the two equal, in small logs. Were the logs squared into timber by a rotary saw, the account would be:

1 piece	20x10	16	133 1/2 ft.
4 "	1x6	16	32 "
The gain in the swell would be about			165 1/2 "
4 pieces	1x4	16	21 1/2 "
			180 1/2 ft.

or the same as the gang makes in cutting two-inch.

In large logs the gain should be greater than in small logs owing to the fact that when you gain one or two boards twenty to twenty-four inches wide you are getting a good deal of lumber. I will choose a cant having a diameter of twenty-four inches and slabbed down to twenty and a half inches in thickness. The log scales 474 feet at sixteen feet. The gang cuts it into twenty-one boards each having a face at the end of log. These boards scale as follows:

12 pieces	1x20	16	293 feet.
2 "	1x18	16	48 "
4 "	1x16	16	two of them a lit. 85 "
2 "	1x14	16	the wainy at 37 "
2 "	1x10	16	one end 27 "
2 "	1x8	16	21 "
Short lumber	2 "	1x6	10 "
Slabbing on rotary	2 "	1x8	21 "
			542



THE HURFORD FLOUR BOLT.

Showing a gain of 138 feet or about thirty-four per cent.

The above diagrams and figures seem to demonstrate most conclusively that the small log is slighted by the scale rule, that is, it is not allowed enough feet. The Scribner rule which puts the fourteen-inch log above at 114 feet, is more generous than any of the other rules, none of which place it higher than 100 feet. While some of the figures on the lumber may be a little too high, yet it is a well known fact that small logs overrun more than large ones, and when gang sawed, they will yield from forty to fifty per cent. more lumber than they represent in the log. The writer once sawed a lot of very small logs running about twenty to the thousand feet, which overran just 50 per cent. in merchantable lumber. Some of it was a trifle wainy, but it was all saleable. I have had other logs scaling from twelve to fifteen to the thousand which cut out from thirty-five to forty-five per cent. There are always hidden defects in the log which the scaler cannot see, and which make a good deal of edging and trimming necessary to cut off the bad spots, and this reduces the gain somewhat. I feel certain, however, that a day's sawing of perfectly sound, straight and smooth logs, would yield over fifty per cent. increase upon the log scale, and I know from personal observation that a man can rely upon getting forty per cent. from an average lot of small logs.

There is something to be said about the method of scaling logs prevailing on the Mississippi river. The above figures are based upon Black river logs; the gain is not so great on Chippewa scale, while Stillwater scale, where it is done with calipers, is more than likely to make the buyer's lumber scale come out short of what he pays for in the log. I heard of a man who bought a Stillwater raft, had it sawed right there, rafted every piece of the lumber, and did not make any shingles, and the lumber fell short some 50,000 feet of the log scale.

A large proportion of the logs sawed by La Crosse mills are small, and it is well known there that they cut out liberally. In 1887 the log scale of the Black river

boom was 169,000,000, at least thirty-five millions of which was sold to down river parties. The mill cut out 210,000,000. To these we must add some thirty million Chippewa logs which were sawed there, making 148,000,000. As will be seen from the above, the gain was about 40 per cent. over log scale.

I do not wish to make my readers think from this that La Crosse or other mills are coining fortunes from sawing small logs. If one pays \$8 for the logs and \$2.50 for sawing, and sells his lumber in the raft at \$10.50, \$8.50 and \$5.00, the ruling price, he makes about 8 per cent. on his investment. But the point is this: without gang mills it would be impossible to make even that, as a rotary would take one-eighth more kerf than a gang and make the profit pretty slim, unless it could all be put into timber, and the market would not stand timber alone. The gang theoretically cuts the log into timber and yet makes saleable lumber of all kinds.

THE BENEFIT OF BUSINESS CONVENTIONS.

THE beneficial results of conventions in general, and of this year's in particular, says the *Millers' Gazette*, are too patent to require much support in these columns. In the first place we consider the annual convention to be one of the main props of the Association, without which it would be still less representative or national than it is. As we have heard many a miller say, "It is quite worth joining the association to take part in these conventions." The pleasure is great—the profit equally so. If there be a miller in the kingdom so lamentably old-fashioned and conservative as to believe that he is possessed of trade secrets which he would rather keep to himself (unless they be local ones), and so ignorant as to suppose that he cannot learn anything from intercourse with brother millers, let him join the Association and take part in one convention, and he will quickly find out how seriously he errs in his supposition. It is a fact that several fresh millers enrolled themselves for this convention, and their unanimous out-spoken verdict is, "We have learned more that is of practical use to us in this one convention than we could possibly have thought of." What is thus learned cannot possibly be printed, for unfortunately we cannot pick up and store for the public benefit every item of interest and usefulness which falls from millers' lips in their conversation on these occasions. If we could we should doubly enhance the value of this journal to millers. Points of detail crop up at every turn, and it is points of detail which go to form the successful mill. This, then, is the great benefit which accrues from mutual intercourse, such as is only possible at the conventions and general meetings of the Millers' Association.

METHOD FOR THE ESTIMATION OF MANGANESE IN STEEL.

BEFORE the American Institute of Mining Engineers, Mr. Frank Julian, of Chicago, gave the following formulae:

In an 8-ounce Griffin breaker dissolve 1 gramme drillings in 15 c.c. nitric acid (1.2 sp. gr.) Evaporate to 5 c.c.; add 20 c.c. concentrated nitric acid and precipitate with chlorate as usual, avoiding a large excess; then add successively 5 c.c. concentrated nitric acid, about 60 c.c. warm water, and 10 c.c. of the oxalic solution; stir until of a clear, light yellow color, and tritrate with permanganate while the solution is at about 70° C.

The binoxide should dissolve immediately when the oxalate is added. The titration is rapid, and the end-reaction easy after a little practice. The standard solutions used are 15 grammes crystallized ammonium oxalate to a liter, and 1.6 grammes potassium permanganate to a liter.

For standardizing the permanganate, to 10 c.c. of the oxalic solution is added 50 c.c. of hot water, and a solution of 1 gramme of steel in concentrated nitric acid, from which the manganese has been removed by potassium chlorate and filtration through asbestos.

I have made a large number of determinations in steel, pig iron, and ore with very satisfactory results for technical work, these being generally from .02 to .05 per cent. lower than by standard gravimetric methods: and the rapidity with which results can be obtained is greater than in any other method with which I am acquainted.

A new process for amalgamating zinc and quicksilver without the admixture of any other material, it is stated, has just been invented.

THE GREAT BOILER EXPLOSION AT FRIED-ENSHUTTE.

THE *Locomotive* published by the Hartford Steam Boiler Inspection and Insurance Co., Hartford, Conn., gives the following interesting particulars of the above terrible explosion, which has seldom if ever been equalled in any part of the world :

At the request of several members of the Union of Societies for the Inspection of Boilers in Prussia, a general meeting of the whole Union was held at Berlin last February, to investigate the terrific explosion of twenty-two steam boilers, which occurred at Friedenschutte, in Upper Silesia, on the 25th day of July, 1888, of which a short notice appeared in our April issue. The Prussian government was also represented by officials from several departments.

Two papers were read upon the subject, one of which was compiled by the engineers of several Rhenish boiler inspection companies and the other by engineers of companies working in the north and east of Prussia, which differ only in matters of minor detail. The assembly, therefore, appointed a committee of six chief engineers to compare the two reports and draw up a new one embodying the essential points of the two, to be sent to government officials, the various industrial or technical journals, and reputable daily newspapers. The committee consisted of the following named engineers:—Weinlig, of Magdeburg; Eckermann, of Hamburg; Bocking, of Dusseldorf; Vogt, of Barmen; Munter, of Halle; and Emundts, of Gladback. The following is a synopsis of their report, for which we are indebted to Herr Minssen, of Breslau, editor of the *Journal of the German Boiler Inspection Societies*.

The terrible accident at Friedenschutte stands without a parallel in the history of boiler explosions. Neither German, American, nor English statistics show anything approaching in magnitude and destructiveness the huge catastrophe in Upper Silesia. A consideration of all the facts in the case leads invariably to the conclusion that the explosion was not due to the causes which ordinarily bring about boiler explosions. Before entering into a discussion of the explosion, we must say that there was no fault to be found with the inspection or management of the boilers. We make this statement here in order that we may not be misunderstood when we afterwards speak of defects of construction and in the general arrangement, for the explosion was partly due to this and partly to defects or conditions arising suddenly and not visible after the explosion. The investigation of a single boiler explosion often involves much trouble in the search for details, and in this case is rendered much more difficult by the fact that the fragments of the different boilers could not be identified. Portions of some of the boilers could not be found at all. All the details of the disaster will certainly never be known; it is without precedent, and all that can be done is to give a reasonable explanation that accords with what facts are known.

The boiler-house at Friedenschutte contained twenty-two steam boilers, which were arranged in one continuous battery, side by side. They were all precisely alike. Each consisted of an upper cylinder, 1,570 millimetres

(61.8 inches) diameter, and 12,550 mm. (41 ft. 2 ins.) long, and two lower cylinders 785 mm. (30.0 ins.) diameter, and 18,765 mm. (38 ft. 7.2 ins.) long. These lower cylinders were connected with each other by one neck, about 20 inches in diameter, near the front end, and each was connected to the upper cylinder by two similar necks a few feet from the ends.

The plates of the upper shells were 13 mm. (½ in.), those of the lower shells 8 mm. (5-16 in.), and those of

Near the middle of this flue was a division wall, causing boilers Nos. 22, 23, and 1 to 7 inclusive, to discharge into the northern stacks, and 8 to 20 into the southern one. (See Fig. 1.)

The boilers were all fired by high furnace gases, distributed from an iron pipe to all in the same manner, by smaller vertical pipes to each boiler. Besides this, there was a double grate, each 1,885 mm. (6' 2") long, and 940 mm. (3' 1") wide beneath the front end of upper cylinder.

The furnace gases were introduced above this grate, on which was kept continuously just sufficient fire to ignite the gases as they entered. The amount of coal-dust burned for this purpose did not exceed from 2 to 3 lbs. per square foot of grate surface per hour, so that two men and a boy were sufficient to do the firing and attend to the water in all the boilers.

Steam was required only for the blowing engines, and some other minor purposes, so that eighteen boilers were always sufficient to do the work; four boilers were therefore always out of use for cleaning and repairs. Shortly before the explosion, Nos. 1, 3, 16 and 20 were blown off and were empty.

The feed-water was, as is apt to be the case in coal districts, bad for boiler use. It made a bad scale, which became detached, and, falling to the bottom of the boilers, formed a deposit which caused some pitting of the shell-plates. The analysis of the water gave the following result :

Silicic Acid,	-	.0300	grammes.
Iron Oxide,	-	.0100	"
Lime,	-	.2624	"
Manganese Oxide,	-	.0540	"
Sulphuric Acid	-	.2698	"
Chlorine,	-	.0139	"
Organic matter,	-	.1200	"

The feed apparatus was of sufficient capacity, in good order.

Twenty of the boilers were built in 1872. The plates were of iron. It is well known that iron plates made from 1871 to 1873 lack the electricity and ductility essential in boiler plates. They were very brittle, and tests made on fragments of the exploded boilers showed a quality much below the usual standards, although it is impossible to ascertain how much the plates had deteriorated by their fifteen years' use day and night.

For fifteen years, day and night, the boilers had run without interruption, until, at half past 12 o'clock, on the night of July 25, 1887, the twenty-two boilers, including the four empty ones, exploded without any warning whatever. The boiler house was completely demolished, and several small houses in the vicinity, occupied by the workmen, were set on fire by red-hot bricks, which were scattered over their roofs. The three firemen were instantly killed, nine more workmen were so badly injured

that they died three days afterward, and thirty other men and women were more or less severely injured, but recovered.

The heap of ruins was so vast and chaotic that the discovery of every detail of the explosion was impossible, although the investigating engineers examined every piece of iron which was found during the clearing-away of the debris, which work required several weeks to accomplish.

Low-water at the same time in eighteen boilers cannot be considered possible. It is not at all probable

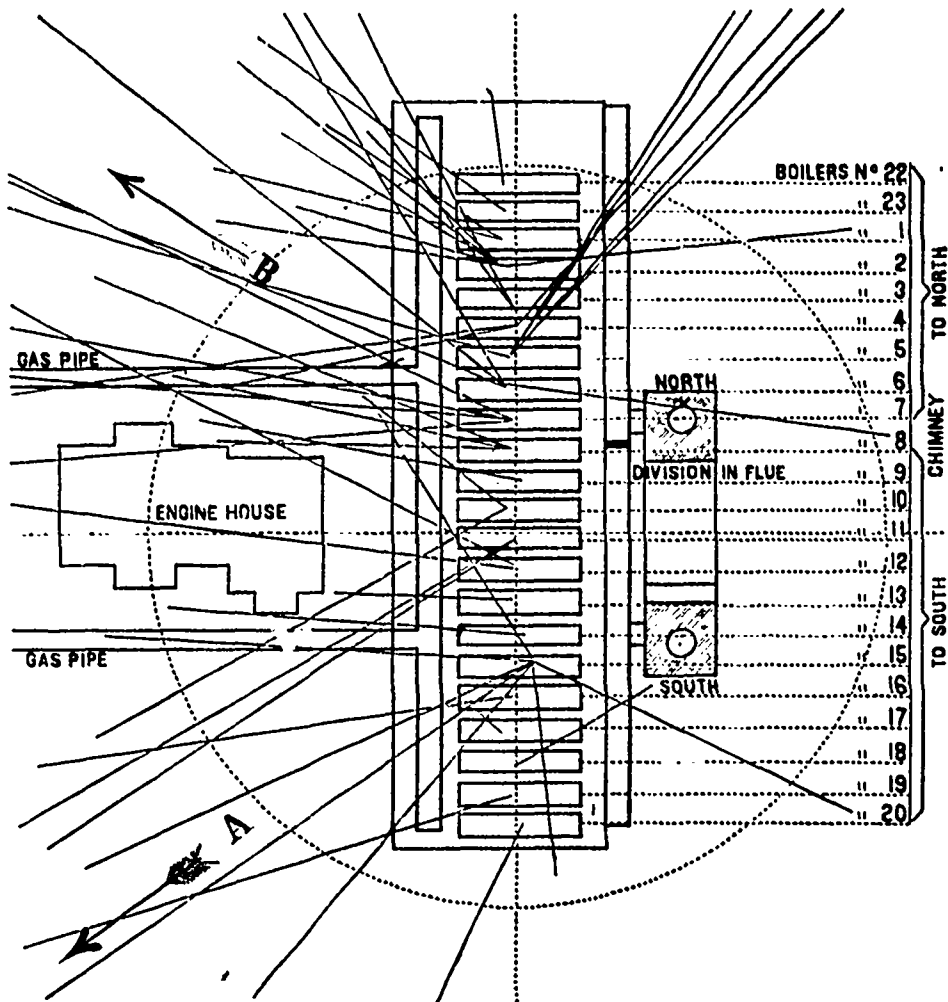


FIG. 1.

the necks 11 mm. (7-16 in.) thick.

The upper cylinders were supported in the usual manner by wrought-iron brackets resting upon the side walls of the brick-work; the lower ones rested, one upon three, and the other upon two iron chairs.

The pressure allowed was 75 lbs. per square inch (5 at.mos.) With the above thicknesses of plates, this was not excessive.

The boilers were all connected to one main steam-

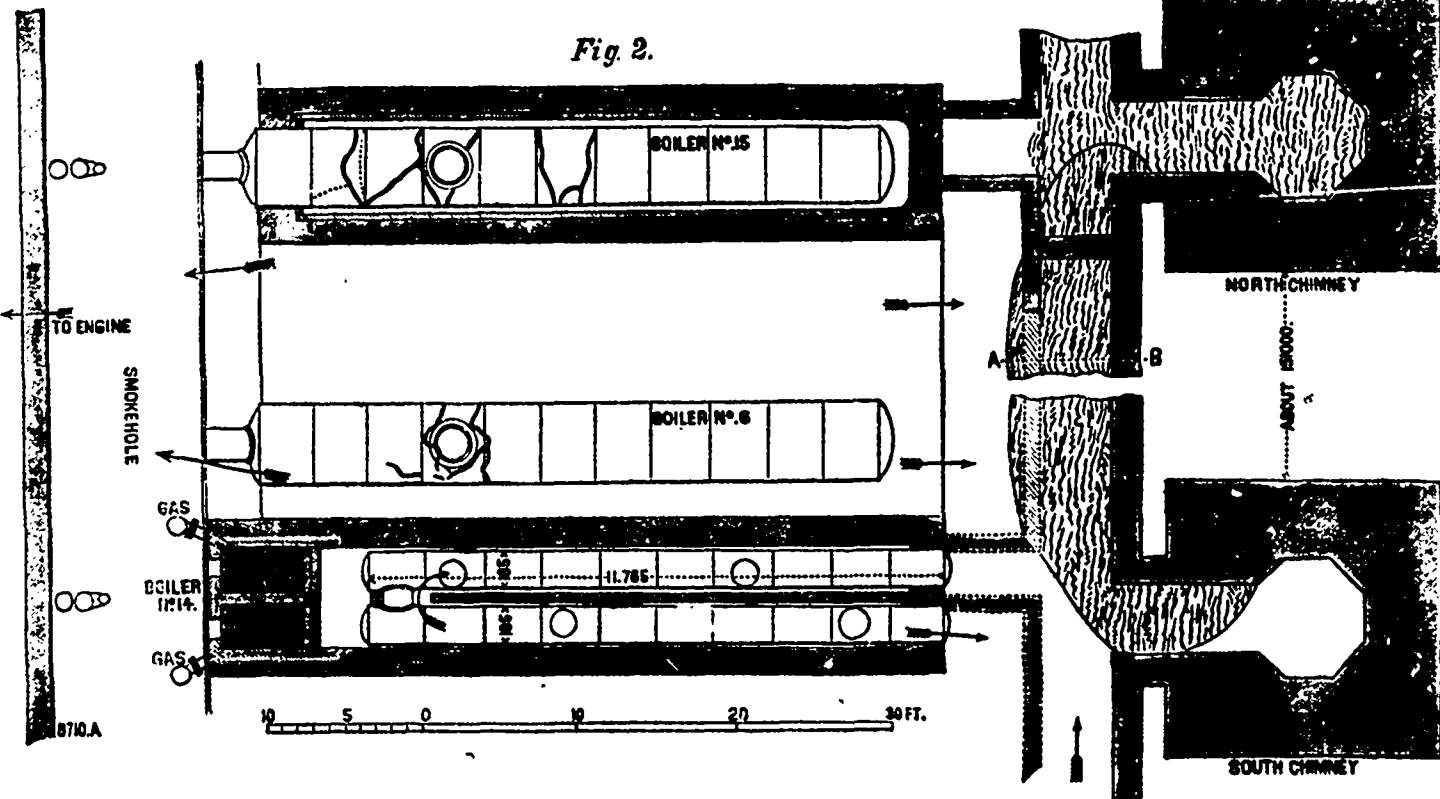


Fig. 2.

pipe passing over them by copper pipes, which were furnished with self-acting steam valves of 150 mm. (6 1-8 ins.) diameter, and two safety-valves of 85 mm. 3 5-16 diameter, as shown in Fig. 3.

The feed apparatus was the same for all boilers, there being two pipes with check-valves in front of each boiler, in the ordinary manner.

The flues were arranged as they usually are with boilers of this type. At the rear end of the battery a large flue received the gases from all the boilers and carried them to the chimneys, of which there were two.

that the pumps did not draw, or that five pumps, of which three were continually working, would all fail at once, nor could it occur in so many boilers all at once by leaking seams or unusually great evaporation without being discovered.

A soft blue annealing color, which showed itself upon some plates of boilers 6, 7 and 12, was found, but only upon single plates of three boilers, and in no instance extended over the whole surface of the plates. To find it at all it was necessary to scrape off the oxide of zinc with which the plates were covered: the inner surface of the plates and the fractures through them did not exhibit the blue color at all. All things considered, low water as a possible cause of the explosion cannot be considered.

An excessive steam pressure could only arise when the engines were stopped and the firing of the boilers was continued, with all thirty-six of the safety-valves stuck fast to their seats. And in this case, with the blowing engines stopped, the flow of gas would have ceased, and the pressure would have to be raised by firing with coal alone; and, as we have seen, the amount of coal used was so very small, a dangerous pressure could not have been reached for many hours. There can be no plausible explanation of a dangerously high steam pressure.

There is still to be considered the question whether the catastrophe would not have been brought about if, by chance, one or two of the boilers had exploded from some of the ordinary causes.

There is no doubt that, by the explosion of one or two of the boilers, a violent shock and a destruction of the large main steam pipe would have occurred, and we must suppose there could occur a sudden discharge of pressure from the other boilers, in consequence, and their explosion might follow as a result. But this is not probable. Each boiler was connected to the main steam pipe by a pipe six inches in diameter, through which the steam would have to escape; and experience shows that the sudden opening of a pipe of this diameter in a boiler having the amount of steam and water room of those under consideration is not sufficient to produce any serious disturbance. Besides, it must be considered that the upper cylinders flew in a direction just opposite to that which they ought to have taken had the explosion occurred in this manner.

Official statistics of boiler explosions in Germany show, of fifty-seven explosions of boilers of the same type of construction as those of Friedenshutte, eighteen boilers exploded in batteries, and in only one case did the explosion of one boiler cause the explosion of a neighboring one, the number of boilers in the batteries ranging from two to ten.

All things being considered, we must believe that the accident was caused by the use of the furnace gases for heating the boilers. An explosion of these gases, either alone or mixed with gases from the coal used, is the only thing that could produce the effect shown by the direction of flight of the boilers. We should not think the effect of the exploding gases would be so serious were we not convinced that the construction of the boilers was favorable to it and the materials of bad quality.

The furnace gases burn all along the flues, so that there are not really well defined furnace plates. This gives rise to great expansion and contraction in different parts of the boiler, which is manifested by cracks at girth seams, etc. The construction of such boilers is also inherently defective, and they are fortunately fast going out of use.

The fan-like form of the direction in which the fragments of the upper cylinders were thrown, the manner in which the flues were destroyed, the front side of the main flue between the chimneys being squeezed against the back wall, and the top blown off all show that the active agent was a force acting from a center between the two chimneys. This could be nothing but an explosion of the furnace gases mixed with gases from the coal.

The composition of the gases from the Friedenshutte furnace is estimated as follows:

Nitrogen,	-	-	63 per cent. by vol.
Carbonic Oxide,	-	-	34 3 " "
Carbonic Acid,	-	-	.6 " "
Hydrogen,	-	-	1.4 " "

on the authority of Bunsen, Ebelman, Schurer, etc.

Jung of Burbacher-Huette gives their composition as follows:

Nitrogen,	-	-	60 per cent.
Carbonic Oxide,	-	-	24 "
Carbonic Acid	-	-	12 "
Hydrocarbons,	-	-	4 "

and says: "The greater the amount of carbonic oxide, the greater the value of the gases for heating purposes."

Lurmann, a well-known furnace engineer, says furnace gases are "difficultly burning" and warns against trying to burn them and coal together.

The furnaces at Friedenshutte blew grey Bessemer iron. The gases are very rich in carbonic oxide, and poor in carbonic acid.

By stoppages, for instance, at drawing the furnace, by sudden shutting down of the steam engines, or by simultaneous opening of the furnace lids, the flow of gas under the boilers might entirely cease and the flames be extinguished. When the flow again begins, unburnt gases enter the flues, air enters through the grates, fire-doors, cracks in the brick-work, etc., and the explosive mixture is formed, and only waits ignition, which occurs sooner or later.

During the hour from 12 to 1 at night there was a pause for taking supper, as for dinner at noonday. Very likely, at this time an extra thick layer of coal-dust was put upon the grates, or the flames were extinguished after the coal was burnt out. After mixing of both sorts of gases, from the furnace and from the coal, it would be quite immaterial where the ignition of the mixture began, or whether several explosions occurred at once, or only a single one in several flues.

In either case, if a gas explosion occurred, the effect upon the boilers would be the same. The thrust from underneath the upper cylinders would first break the middle of the boiler and, simultaneously, the rear connecting leg, thus separating the upper from the lower

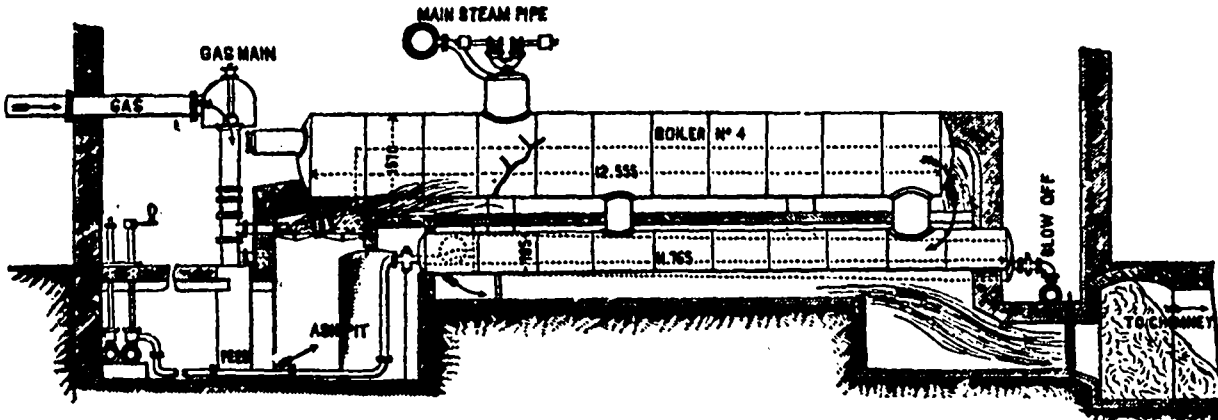


FIG. 3.

cylinders, the upper boiler rising at its rear end and turning on the forward connecting leg, would be projected forward, upside down. This was exactly what occurred in this case.

It is not our purpose to criticize the use of furnace gases as fuel for boilers, nor to condemn the above-described arrangement, for it is only in very rare cases that there would be a coincidence of all the dangerous conditions, as at Friedenshutte. Other and better constructions than these, which do not allow of the extinguishment of the gases, are well known and appreciated in German iron districts.

In short, we may sum up the results of our investigations in the following words:

By an unfortunate coincidence, an explosive mixture of gas and air formed in the boiler flues, and suddenly ignited. The effect of this gas explosion was a local rupture of some parts of the boilers, which was easily effected in consequence of the great length and inferior construction of the boilers, and the bad quality of the materials. The explosion of the gas worked the lifting and breaking of the boiler-shells, which resulted in the tremendous explosion and devastation of the whole boiler-house.

BRAINS VERSUS MUSCLE.

METHODS of work keep pace with the higher idea of its place and spirit, says a writer in the *Age of Steel*. Manual toil transfers its perspiration to iron wheels and leather straps; a big arm once the agency of labor—now a spoonful of brains counts for more than a lump of biceps. New forces at work cutting logs, lifting mud, lighting lamps, threshing grain and making nails—these are gradually supplanting the muscular with the mental. The new methods demand intelligence—pounding sand needing nothing but hard licks; working a lathe and running an engine calling for something else. Ignorance, that can eat well and hit hard, is left behind in the industrial race. The changed condition of labor makes trained intelligence indispensable. Man is not a mule, as heretofore ten hours in

the shaft and the rest in the straw. He has been transferred from the traces to the driver's seat; he controls the new forces; a touch can lift a thousand tons; a wheel revolve a thousand spindles; an electric button illuminate a city; a hand on a throttle start a loaded train. One can easily see that this change in agency fetches man around to the fact that intelligence is henceforth the most important of industrial qualities.

ANNUAL PICNIC OF WM. & J. G. GREY'S EMPLOYEES.

THE above event, which had been looked forward to with eager expectation by those who cherished pleasant recollections of the good time enjoyed in previous years, took place on Saturday, the 14th of July. The weather proving propitious, there was a full attendance of the employees, their families and friends. The party boarded the steamer Hastings at 7.45 o'clock in the morning, and after waiting ten or fifteen minutes for late-comers, set sail for Oakville, the scene of the day's enjoyment. Stationed on the bow of the steamer was a very efficient band, whose services were rendered unstintedly throughout the day. The trip to Oakville occupied about two hours, and was spent quietly in conversation with acquaintances, and in making the acquaintance of persons not met before.

On landing at Oakville the party made their way direct to the park, carrying with them large baskets containing the wherewithal to satisfy the demands of appetites sharpened by the lake breezes. Ascending the platform in the park, Mr. J. G. Grey made a brief address, in which he acknowledged the guiding hand of Providence which had crowned the labors of his firm with success. He also alluded in feeling terms to the absence of an old grey-haired man—his father—who was one of the happiest of those who attended the picnic last year, but who in the interval had been called from earth to heaven. After a few words of kindly advice and the singing of a hymn, the baskets were opened and a vigorous and well sustained onslaught on their contents began.

After luncheon a lengthy and interesting programme of athletic competitions divided attention with the music of the string band and the graceful movements of the dancers on the platform. A baseball match in which some "tall" catching, hard hitting and fine fielding were displayed, was one of the most interesting events of the day. The heavy weights, who were precluded from taking part in this active and popular amusement, were conspicuous figures in the "tug-of-war" contest which followed.

About five o'clock everybody, by a strange coincidence, suddenly renewed the attack on the baskets. The conflict was short, sharp and decisive, and when concluded, the fragments which remained would not have numbered many basketsful.

After tea everybody started for the lake side, where a keenly contested rowing and swimming contest closed the list of sports and kept the attention of the party fully engaged until the arrival of the steamer which was to convey them back to the city, where all arrived safely shortly after nine o'clock.

It has seldom been our good fortune to attend a picnic where every person present succeeded in enjoying himself and herself so fully. This was largely due to the completeness of the arrangements, and the untiring efforts of Mr. J. G. Grey, Mr. W. S. B. Lawrie and the Managing Committee to secure the pleasure of all present. Such gatherings as these bind together the interests of employer and employees, and if more generally made use of, would avoid much of the antagonism between these two classes which is so painfully marked a feature of the present day.

PUBLICATIONS.

OUR Chicago contemporary, the *Timberman*, has entered upon its fifth volume, and comes to hand in enlarged form. Its pages give evidence of the well-earned prosperity which it enjoys.

The *Barrie Advance* kindly says of us:—The **DOMINION MECHANICAL AND MILLING NEWS** for July has been received. We know of no publication in this line at all comparative to this. It contains a large amount of matter useful to mill men and mechanics generally, and also to ordinary readers. It is well worthy of patronage.

THE PRESENT UNFAIR EXCHANGE SYSTEM.

THE following table, which was adopted as a standard by the Western Indiana Millers Protective Association, is worthy the consideration of every miller who has exchange or custom trade :

Table with columns for 'Fultz', 'Hybrid', and 'Mediterranean Wheat'. Each column lists 'lbs. flour' and 'bran' with corresponding numerical values.

Very many millers favored the total abolition of the exchange trade and the substitution of a system of buying farmer's wheat and selling flour for cash. This is undoubtedly the best plan, but at present, for different reasons, it would be difficult to generally adopt such a

system. While some associations have adopted it, others have not. For instance, we cite the Air Line Association which had the matter under consideration, but were unable to agree.

As may be seen by reference to this table, the amount of flour given by exchange is governed entirely by the quality of the wheat and the quality is determined by a method which allows no partiality either for the miller or the farmer. This method is the use of a standard tester.

There is no business in existence which depends more largely on judgment than the milling business. The carpenter has his rule and square, the machinist his caliper, the merchant his market or cost price and his scales. The merchant known how many yards of cloth or pounds of sugar, coffee, etc., he buys at wholesale and also what amount he puts out at retail. How is it with the miller? From the beginning it is the use of his judgment and the exercise of his perceptive faculties. When he buys his wheat he must use his sight to see it is clean, his sense of smell to ascertain if it is affected by any taint the sense of feeling to detect any undue moisture. In the matter of manufactured products the different tests of flour and offal is determined in regard to quality by sight and feeling, and first and last of all by weight. When the wheat comes into the mill its value is determined by weight, when his flour goes out it is determined by weight, and as far as the wheat that comes in, and the flour and feed that go out is determined the incoming and the outgoing cash or its equivalent is governed altogether by weight, if the judgment that decides the quality is at fault, the decision is a loss, and from this decision there is no appeal. As by weight is governed the matter of income and outlay, so by weight should the quality be governed. As by exercise the faculties are developed, so the men in the milling business are as a rule men of much perception and good judgment. In spite of this, if the matter was thoroughly tested it would be found that not one miller in ten who has had ten or fifteen years' experience in the business, is competent to buy wheat, through relying on his judgment, so that it would stand the test of a standard board of trade inspection.

There are many causes too, which affect his judgment. The urging of the farmer, who always claims that his wheat is No. 1; the desire to please; the desire to secure trade; a laudable ambition to keep the mill running, and

many others of a like manner. You all know them. You read in the columns of the different milling journals how this mill is making a yield of 4:40, how that one is down to 4:30 and the other one gets his out of 4:25. You look around and you see his offal is rich as yours or a little more so, and as he is making it out of 4:30 you are doing just as well, and as you are getting so much out you are disposed to be liberal in your exchange, and you start in with a standard of 35 pounds of flour for the best wheat. The next customer comes and claims that his wheat is as good, and you allow him the same. You get in a rush and your flour-hands take 35 pounds for a standard and give it on everything. Your mill runs along and you are feeling good. After a while you begin to make your calculation on your increase, you reckon up your sales and output of flour and then you take stock and find you are taking five bushels or over to make a barrel. What is the reason you cannot tell. Your offal is clean and everything is running all right apparently? You go and see your neighbor, who is making his close yield: you find him watching his wheat, and not only watching, but his little brass kettle is with him, and when his wheat comes in, it is sixty pounds of wheat and not five or six pounds of dust and the balance of wheat. This is not altogether a fancy picture. In the writer's mill, the rule has been for Fultz wheat 34 pounds flour. For Mediterranean, 36 pounds. A record has been kept of every day's exchange, and the record shows an average output of 35 pounds of flour to the bushel. Since the adoption of the above table, the average has been 31 pounds to the bushel.

One of the members of the association, who has been testing his exchange wheat during the past two weeks, said that he could clearly see where he would have been several hundred dollars better off, had he used the tester during the past six months. It will pay every miller many times the cost of the tester to use one even though he should not adopt this rule. He is governed by weight, both by what comes in and what goes out of the mill, and while it is only justice to himself to use such aid to his judgment as the use of a tester will give him on all occasions, if he does not use it at all times it will give him a standard to go by and a guide to help him back before he goes so far astray that he finds himself confronted by a heavy loss instead of a good round margin which should be the just due for his time and labors.—J. A. Y. P. in the Millstone.

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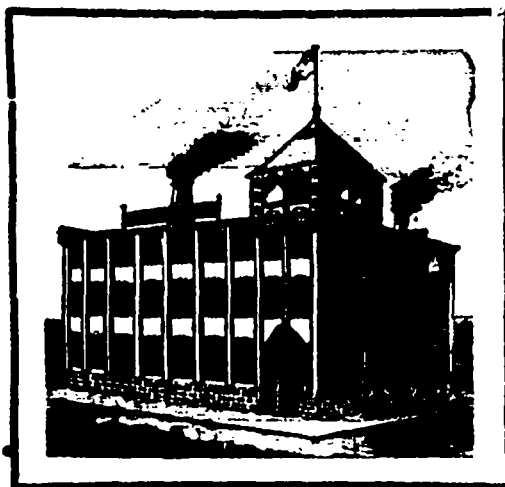
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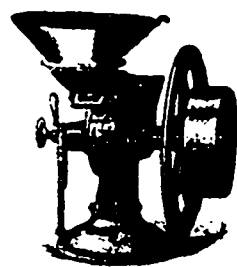
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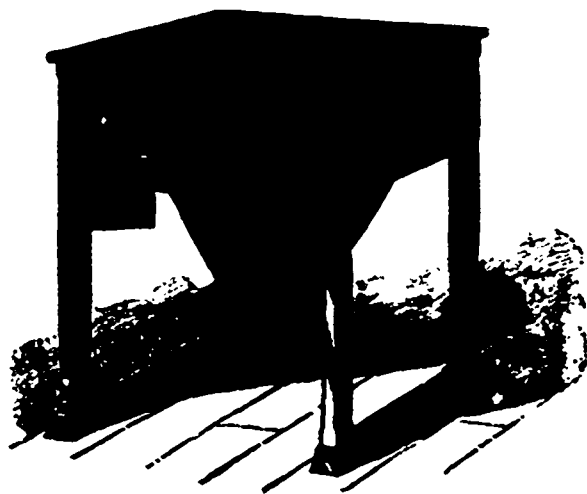


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Western Letter.

LAST month I dwelt mainly on the crop conditions and the estimated acreage sown to the various crops in Manitoba. It was shown that though the early part of the spring—up to the 1st of June—was very unfavorable to agricultural pursuits, yet the month of June was so extremely favorable that the adverse climate conditions prevailing in April and May had been largely overcome. These favorable conditions have existed up to the time of writing, and the crop outlook is now the most hopeful in the recent history of the West. Since about the 1st of June the weather has simply been perfect, and all that is now required is continued warm and dry weather through August, and with this secured this country will this year produce a crop of grain which will be the admiration of the world. In some sections the crop is a little later than last year, and owing to the extraordinarily heavy growth, it is expected that the grain will be slow in ripening; but one month more of favorable weather will make everything safe. Manitoba produced an enormous crop last year, but this season bids fair to eclipse all former records. From all parts of the country come the most gratifying reports. It is the same story, from the Lake of the Woods to the Rocky Mountains, wherever agriculture has been engaged in to any extent—"Crops looking magnificent," "Promise an enormous yield," "Better than last year." So much for the crop outlook. Of course it does not do to crow too much before one is out of the woods, but at present the situation is extremely hopeful. The glowing outlook may be imagined from the sales of agricultural machinery. The firms dealing in these goods have done a very heavy business this season—much the largest in the history of the country. One Winnipeg house has sold 800 self-binders alone, and it must be remembered that all the Canadian and several United States firms are represented here. As to the area sown to wheat, I think that my estimate of 450,000 acres, or about ten per cent. over last year, will be found pretty close to the mark. Some estimate a larger acreage, but allowance must be made for the western habit of "booming" things. One of the best informed persons in the province lately informed me that 10 per cent. would be the very maximum increase in the wheat acreage, and his opinion was that it would not be as much as that.

The Winnipeg board of grain examiners presented their annual report at the last meeting of the Board of Trade. The grain examiners, among other things, recommended the appointment of a flour inspector at this place. A petition to the same effect was presented to the Board of Trade from the Winnipeg grain and produce exchange. The board took the necessary action and appointed a board of flour examiners, who will examine applicants for the position of flour inspector. The appointment of the proposed flour inspector, of course, lies with the Dominion Government, but it is expected that the Government will merely confirm a selection which will be made under the auspices of the board. Examinations for the position will be held as soon as the flour samples are received. The appointment of a flour inspector will mark a new era in the industry here, and will show to what importance the industry has grown. The flour business has assumed such importance that it is now necessary to have the services of an inspector. There are now about twenty-five roller flour mills in the country, and the grading of flour will be a convenience to these, as well as to buyers. The report of the grain examiners shows that 3,878,550 bushels of wheat were inspected at Winnipeg for the year ending June 30th, 1888, against 1,342,600 bushels for the previous year, or an increase of 2,535,950. Wheat inspected at Winnipeg only includes shipments made all rail from the province. Grain going into store at Lake Superior ports, or shipped by rail and the lakes to the east, is not inspected here. The quality of the crop of 1887, it is shown, was not nearly up to the standard of 1886. In the latter year 61 per cent. graded No. 1 hard, whilst last year's crop only graded ten per cent. No. 1 hard, 11 per cent. No. 2 hard, 40 per cent. No. 1 northern, and 17 per cent. No. 2 northern.

Another matter which was discussed in the report of the grain examiners, and about which there is likely to be some "kicking," is the time for holding the annual meeting of the Dominion Board of Grain Examiners at Toronto. Under the provisions of the Inspection Act, the meeting for the selection of samples or standards to guide grain inspectors, is called by the Council of the Toronto Board. It has been found that the date at which the Toronto Board has been in the habit of calling the meeting is altogether too early to suit the interests of Manitoba, as it has been found impossible to procure proper samples of wheat and forward them to Toronto

in time for the meeting. Last year an effort was made by the Winnipeg examiners to have the annual meeting at Toronto postponed to a later date, but without success. Correspondence to this end was opened with the Toronto Board last year, previous to the holding of the annual meeting. The reply, however, was to the effect that the barley interests of Ontario demanded that the meeting should not be held later than the date fixed, namely, September 15th. An effort was accordingly made to obtain samples here for inspection at the meeting, but as threshing had hardly been commenced in Manitoba by September 10th, five days previous to the holding of the meeting in Toronto, it was impossible to do this country justice in selecting samples. The examiners declare that it is impossible to select proper samples in time for the annual meeting as usually held, and they think it hardly fair that the meeting should be held to suit the interests of the Ontario barley trade regardless of Western interests. It is claimed that September 1st is the earliest date at which wheat samples can be secured here to advantage, in average years. No definite announcement has been made by the grain examiners here, but it is understood that unless arrangements can be made for holding the meeting for selecting the grain standards at a later date than has been customary heretofore, no samples will be sent from here to Toronto this year.

The Winnipeg Grain and Produce Exchange, which was first established last fall, has been a great success. At the last meeting it was stated that the membership numbers 78, and it is certain that the membership will be increased to over 100 as soon as the new grain commences to move. With the prospect of a heavy crop this year, it is expected that the number in grain business here will be largely augmented soon by arrivals from Eastern Canada. The Exchange has regular quarters in the city hall, open every day, and a meeting for conducting trading is held every day. Telegrams are received at frequent intervals from leading grain, produce and stock markets in United States, Britain and Europe. The Winnipeg Exchange promises to become one of the most important business institutions in Canada, if not already able to claim such a distinction.

Grain dealers here have been considerably pleased over the action of the United States Millers' Association in asking Congress to place wheat on the free list. Most of the dealers here would be highly satisfied to see United States markets opened for Manitoba wheat. One of the great disadvantages to dealers here in the past has been found to be the distance from realizing markets. On this account dealers have been unable to realize on wheat or to take advantage of any bulge in the markets. Last winter dealers were practically blocked up at home all winter. The great distance of Eastern Canada markets, even when the road was open, rendered it often impossible for holders of wheat here to take advantage of any advance in prices. But as the only available way of shipping wheat out of the country—the C. P. R. North Shore route—was practically blocked up the greater part of the winter, there was no other way but to hold wheat until spring. This year the advance in wheat prices in the spring made it very profitable for dealers to hold their wheat over the winter, but prices are not always liable to run the same way as they did last spring. Had there not been a sharp advance in wheat in the spring, the Manitoba dealers would have been serious losers on account of having been unable to market their wheat during the winter. Our nearest markets are Minneapolis and Duluth, and were they available, in case of a bulge Manitoba shippers would be enabled to pour in their wheat on short notice. The advantage of Duluth over Port Arthur is that the latter is simply a storage point, whilst the former is both a storage point and a market. Wheat at Duluth can be realized upon at any time, but at Port Arthur it is there for the winter, simply in store, and cannot be sold on short notice. The agricultural population here would also be favorable to the placing of wheat on the free list by the United States, even should Canada follow suit and admit wheat from the United States free. The advantage to Manitoba producers from the opening of Duluth and Minneapolis markets, would be greater than the disadvantages from the loss of eastern trade. Of course, were wheat placed on the free list, Ontario millers could go to Duluth for wheat, instead of coming to Manitoba, but this it is thought would be more than compensated for by the opening of Minneapolis and Duluth markets to Manitoba wheat. The action of the United States millers in asking for free wheat, was no doubt prompted by Minneapolis millers who are anxious to get into Manitoba. No doubt Minneapolis millers would extend their elevator systems into Manitoba, in the event of wheat being placed on the free list. Minneapolis millers now have elevators along

the railways in Minnesota and Dakota as far as the Manitoba boundary. Manitoba producers have been made more anxious to have wheat free between the United States and Canada on account of the fact that during the greater portion of last winter, wheat ruled relatively higher in Minnesota and Dakota than it did here.

The latest addition to the milling interest in Manitoba is a new roller mill, built by R. Whitelaw, of Woodstock, Ontario. The mill is located at McGregor, Man., on the main line of the C. P. R. west of Winnipeg, and has a capacity of about 80 barrels per day. The mill has been completed and sold to Geo. Rogers, of Winnipeg, an old Ontario miller. It is claimed to be a model mill in every respect.



Banca tin is considered the best metal for fusible plugs for boilers.

At a recent convention of American master mechanics one of the members, a Mr. Stevens, gave the following figures as the pounds of water evaporated per pound of coal in some experiments conducted by him under the following conditions: Mackenzie straight stack, 5.70; diamond stack, 5.76; straight stack and extension front, 5.80; straight stack, extension front and brick arch, 7.03.

Experiments made in Newport, Ky., a few days since, are reported to have demonstrated that aluminum which now costs \$20,000 a ton, and is produced only in France, can be obtained anywhere by a most simple process and at less than a hundredth of present cost. The discovery resulted from a successful attempt to extract aluminum chemically from common clay and cryolite.

An important invention in railway practice is the method invented by a Baltimore electrician for welding steel rails by electricity which will enable track layers to lay a continuous track. The end of the rails, after they are placed in the track, are welded together through the application of a transformed electric current and are afterward tempered so as to make the joint as hard as the rest of the rail.

Industries says that Mr. R. Murray, Glasgow, has perfected a process by which castings of solid copper are obtained, equally as reliable and sound as those made of brass or any other alloys. It is said to be applicable to the production of bends and special pieces of copper pipes, as such work can be produced much cheaper, and but slightly heavier than the built-up pipes, and with a greater saving in weight than where brass is used. The castings are guaranteed by the inventor to be commercially pure copper: the analysis of two samples showed 99½ per cent. of pure copper.

According to the report made to the Russian government by Dr. Kauffmann, who has had the principal charge of experiments with the object of finding a method of solidifying petroleum used as fuel, a successful method of accomplishing the desired results consists simply in heating the oil and afterwards adding from 1 to 3 per cent. of soap. The latter dissolves in the oil, and the liquid, on cooling, forms a mass having the appearance of cement and the hardness of compact tallow. The product is hard to light, burns slowly and without smoke, but develops much heat, and leaves about 2 per cent. of a hard, black residuum.

A new instrument for the measurement of color, as applied to the estimation of carbon in steel, has been patented by J. W. Lovibond, of Salisbury, and may be used for matching carbons in steel by the Eggertz color method or by Sead's alkali method. A standard set of colored glasses, each set being the same color, but regularly graded for depth of tint, go with the instrument. By using several superimposed glasses from a set a depth of color is represented by the aggregate of that number on glass used, whilst glasses from a different set produce a composite color, and the exact proportion of each component color can be read off.

Patents have been granted to Mr. Francis J. Clamer, of Philadelphia, for coating sheet metal plates with lead, the principal features in the process being the manner in which the plates are previously cleaned. In describing it, the *American Manufacturer* says: Mr. Clamer holds that the bubbles under the surface of the coating, the arsenic giving to the coating a greater hardness, and the phosphate of lead increasing the fluidity and permitting an even distribution of the lead over the plates. A working plant in Philadelphia is said to have demonstrated the success of the method, and to show that leaded iron and steel can be produced cheaper than galvanized plates.

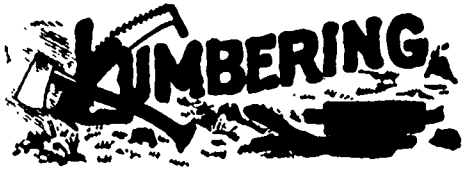
By a secret process, recently discovered, says a correspondent of the *Northwestern Lumberman*, an addition has been made to the furniture woods of the Pacific coast. The Madrona (*Arbutus Menziesii*) is easily worked, takes a high polish, and is of uniform texture and beautiful tints. Of course these properties have long been known, but the wood in seasoning checks and cracks to a disastrous degree, and until the present time the only use known for the beautiful madrona have been shade and firewood. The trees abound on the Pacific slope, from the gulf to Alaska. They attain a height of 100 feet, and an average diameter of two feet. The wood is harder than redwood, but more easily worked, and the bark furnishes many elegant designs for panel work. For a number of years Lewis Clark, a Californian, has been experimenting with the wood to devise some way of avoiding the perverse checking. He has succeeded, and has built at Soquel, Santa Cruz County, Cal., an establishment for the manufacture of madrona chairs. His experiments are reported to be eminently successful. First Sound furniture makers will be swift to take up with the process as soon as it is made available.

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A large saw mill is being erected at Falkenburg, Ont. The Rosseau saw mill at Somerset, Que., has been burned. The first sale of new wood this season, at Quebec, has been reported. The new mill at Fort Ellice, Man., is offered for sale, together with timber limits. No more rafts or parts of rafts will be permitted to pass through the Grenville canal. The Edgar, Ont., saw mill men have shut down, spring work being all finished up. A thirty feet addition is being built to Mr. C. Young's saw mill at Young's Point, Ont. There will be more lumber cut at Parry Sound this summer than for many years past.

The Canada Lumber Company have decided not to remove their mills from Carleton Place.

The bark Loyal, timber laden, Quebec to Liverpool, is a total wreck in the straits of Belle Isle.

The big mill at Midland, cutting for the Emery Lumber company, cuts 100,000 feet per day.

Mr. Wm. Fortune has rebuilt his saw mill at Kamloops, B. C., which was recently destroyed by fire.

Mr. D. Tennant's shingle factory at Hepworth, Ont., was destroyed by fire July 11. Loss, \$2,000.

The Midland & North Shore Lumber Co.'s new mill at Parry Sound, will shortly commence cutting.

Mr. Wiley, late of Midland, has leased the water power saw mill of Messrs. Irwin & Bennett, South River, Ont.

Messrs. Davidson & Hay, Toronto, will build a large steam saw mill on their lands at Lake Nipissing, Ont.

There is a decrease of \$153,000 in the export of lumber from Canada to the States during the past six months.

The demand for square timber in Quebec market this year is very brisk, and good figures are obtained all round.

Lumbering in some parts of New Brunswick is reported to be backward because of the want of the usual spring rains.

The annual output of lumber from the Shusmay Milling Co.'s mills at Kamloops, B. C., is estimated at \$2,500,000 feet.

10,000 saw logs are still in the river above the mill, at Birtle, Man. There is a prospect that they will be cut up at Birtle.

Mr. James Smith's shingle mill at Elba, Ont., was destroyed by fire on July 7th. Loss about \$1,000, on which there was no insurance.

Messrs. Pettinger & Bain, Cobocok, Ont., are making considerable improvements to their mill premises and machinery.

Messrs. Belding, late of Wyeval, Ont., have erected a large saw mill at Huntsville.

Lumbermen returning from the Upper Ottawa region report destructive bush fires on some timber limits, and much valuable pine timber being burned.

Mr. Melburn Sprung, of Maitland block mills, Hullett, Ont., has lately put in a new 35-horse-power engine and boiler and in other ways improved his mill.

The possibility of navigating the Fraser river to Westminster, B. C., having been demonstrated, an impetus will probably be given to lumbering operations.

Messrs. W. H. Thistle & Co., Pembroke, Ont., have purchased Mr. Samuel Bromley's planing mill and plant, and will carry on the business in the same place.

The McBurney & Laycock Lumber Co.'s mill at West Gravenhurst, is reported as having recently cut 250,000 feet of lumber with one circular saw in a week.

Block Bros., lumbermen, have discovered rich silver and copper mines on their limits on the Montreal river. They have engaged an experienced miner to develop the mines.

Complaint is heard that the Act lately passed by the Quebec legislature abolishing forestry reserves, will injuriously affect the interests of the lumbermen of the Ottawa Valley.

There is on exhibition, outside the C. P. R. office at Ottawa, an immense piece of bark from a tree in California, which measured 500 feet high, 150 in circumference, and 45 in diameter.

Mr. C. J. Smith, of Toronto, is building a new saw mill at Kinmount, Ont., 50 by 70 feet, for the manufacture of lumber, shingles and lath. A planing machine will also be added.

Destructive bush fires are raging in the timber limits in the Petawawa and Chalk river districts, also in the vicinity of Hudsonell and Golden Lake, and great damage is reported.

Competent judges say that Messrs. Hall & Booth's Amiable du Nord raft of white pine timber is the finest taken out of the Ottawa for over twenty years. It contained in all 150,000 cubic feet.

The extensive saw mills of La Freniere, situated at Louisville, Que., were recently destroyed by fire. A large number of logs were also lost. The loss is estimated at \$100,000, partly covered by insurance.

British Columbia fir, on account of its extreme length and inferiorness to decay, is found to be very valuable in bridge construction. It is stated that a truss of this wood well seasoned and painted will last 40 years.

A recent visit of the Inspector of Forests for the Province of Quebec to the timber lands at the head of the Ottawa, is said to have revealed the fact that certain speculators had taken from the government limits in the vicinity of Lake Expansé 2,000 valuable pine trees without paying stumpage dues.

The station at Corson's siding on the Midland railway, with 4,000 telegraph poles, sawmill and a large quantity of lumber were burned on the 7th July. The loss is over \$10,000; no insurance.

Ash before oak,
There'll be a smoke.
Oak before ash,
There'll be a big smash.

The immense saw mills of Mr. Lafriere, at Louisville, P. Q., were destroyed by fire a week or two ago. The damage is expected to exceed \$100,000, and there is no insurance on a good part of the property destroyed.

The *Northwestern Lumberman* assumed authority for the statement that there have been several cases of a change in sentiment about free lumber on the part of American lumbermen, immediately upon the acquiring of Canadian timber.

Some of the mills at the Chaudiere are being supplied with a new patent fire alarm apparatus, which will locate the exact vicinity of fire a few seconds after it starts. In various parts of the buildings, thermometers are attached to an electric wire.

Up to July 7th, 300,000 logs for various firms at the Chaudiere had been towed by the Upper Ottawa Improvement Company's boats from Qulo boom to Hull and Chaudiere. It is expected there will be in all about 3,000,000 logs in this year's drive on the Ottawa.

Messrs. Flatt & Bradley, the well-known lumbermen of Hamilton and Casselman, Ont., and East Saginaw, Mich., have just secured an order from England for 5,000,000 feet of lumber to be shipped there during the present season. The consignment will amount to more than \$75,000.

Mr. W. A. Hungerford's mill dam at Glen Lewis, Hastings County, was blown up by dynamite on the evening of July 1st. The dam was a very valuable one, and the loss will be very great, especially in view of the dryness of the season. The miscreant is unknown.

Mr. W. C. Edwards, M. P., is reported as having said that he will cut about 40,000,000 feet in his mill at Rockland, this summer. He had almost decided to remove his mills from Carleton Place after the season, but operations have been so satisfactory that he will leave the mill there for the present.

The recent failure of William Little, lumber merchant, Montreal, is attributed to depreciation in the value of timber limits, but an American contemporary suggests that inasmuch as timber limits have been going up, possibly Mr. Little bought stumpage at too high a price to make the business pay.

Trade statistics show that the railways have secured much of the lumber carrying trade formerly done by the canals. The quantity of sawn lumber carried from Ottawa and Hull by the Canada Pacific and Canada Atlantic railways for 1886 was nearly 90,000,000 feet. For the same period the quantity carried by the Ottawa canals was, in 1886, 357,132,600 feet of sawn lumber, and last year 335,694,000 feet.

One of the largest timber limit sales ever held in Ottawa was that of the Hamilton estate. The property consisted of a mill at Hawkesbury, limits on the Gatineau and tributaries, and the Dumoine and tributaries, farms at Hawkesbury and on the Gatineau. The Gatineau limits, 934 square miles, were bought by W. E. Edwards for \$128,000. H. K. Egan secured 751 square miles on the Dumoine for \$396,000. All the other property was withdrawn on account of the low prices offered.

The big raft which has been under construction since February last at the Jogjias, N. S., was successfully launched on July 24th, in the presence of a large number of interested spectators. Its weight is estimated at 1,100 tons. It is therefore the largest structure ever launched. The launch ways are inclined at the rate of six in the hundred feet. The raft when launched was taken in tow by a tug boat to a safe anchorage around the point. Tug boats have been ordered from Boston to take it in tow. These boats will be 750 and 400 horse power, respectively. The raft will be insured for \$50,000.

Messrs. Paterson & Hall have just completed and put in operation at Midland, Ont., what is claimed to be the most complete planing mill in the Dominion. The machinery consists of a double cylinder lightning matcher, capacity from twenty to thirty thousand per day; No. 0 sticker, capacity 10,000 lineal feet per day; 26 inch double surfacer, capacity 40,000 feet; re-sawer, and gang rip, capacity 20,000. Power is supplied by a 45 h. p. engine, and 45 h. p. steel boiler. The mill is supplied with the best modern labor-saving and fire protection devices. It is intended to supply the Ontario market with every description of dressed lumber, moldings, etc. The mill has a capacity of 8,000,000 feet per annum.

A Finger Board, Nova Scotia, despatch says: J. D. Leary's great log ship, just completed, will soon be launched. Leary is certain that he will get it to market without loss, as was the case with his other great raft, in the big blizzard. The log ship is a monstrous, unwieldy fabric, but it is claimed is nearly indestructible. It is constructed of 30,000 logs, varying in size from a pine tree 200 feet long to a short spar twenty-five feet in length. The logs are placed together in the shape of a ship's hull, and are firmly bolted besides being lashed into one compact mass with thirty-five tons of wire rope. The ship is 700 feet long—200 feet longer than the steamer City of Rome. She is 65 feet broad, and 35 feet deep. She draws about an foot of water. It would take fifty trains of fifty cars each to transport the lumber contained in Leary's log ship. The ship will be launched during the early part of this month, when the tide is highest in the Bay of Fundy. The cost of this ship, if landed successfully in New York, is as follows: lumber's cost in Nova Scotia, \$23,000. The towage will cost \$100 per day, and the logs will be sold in New York for \$90,000.

H. R. Robertson contractor for the big timber ship at the Jogjias, will confer with the customs authorities with respect to the recent seizure of wire rigging, and endeavor to persuade them not to put an export duty on the logs in the raft. The rigging which

was seized was admitted free on an affidavit being made that it was to be used for ship purposes. The customs officer who seized it says it is not for a ship but a raft. Robertson has armed himself with a score of affidavits from people who swear that the structure he is building is in reality a ship. With respect to the export duty on logs the customs department has notified him through the collector at Amherst that an export duty of \$1 per thousand superficial feet will be charged on all sticks capable of turning out a piece of scantling four inches square. This Robertson says would cover nearly every stick in the raft. He doesn't object to paying a duty, but can't see why his lumber should be taxed while similar lumber is allowed to go free in schooners. The export duty on the raft would aggregate about \$2,000.

A raftsman from the northern lumber districts reports the drowning of fourteen drunken shantymen while attempting to run the rapids.

While out in a boat a short distance below Calgary, N. W. T., a few days ago, five lumbermen were swept over the falls and drowned. One man, named McNeill, was from Paisley, Ont.

Mr. Darwin Stevens, chief millwright at Hamilton Bros' mills, Hawkesbury, Ont., while walking on a boom at the edge of the Yuile on the 24th July, slipped off into the rapids and was drowned.

Our Canadian friends are strangely in luck. There is every probability that the congressional action on the Mills bill will be in their favor, at least not a detriment to them, and on top of what some of the more sanguine operators in the British territory above us expect in this way, comes the reassuring advices of excellent prospects for the lumber trade this season. All the mills are running night and day. The unusually high water in the Upper Ottawa has had the effect of making the drive an exceedingly easy and successful one. The lumbermen say they never had a drive of logs down in better time, and never had so few hung up and stuck in small streams.—*Timberman*.

Following is a statement of the declared exports from Ottawa to the United States for the quarter ending June 20:

	Feet.	Value.
Shipped by water.....	24,922 012	
Shipped by rail.....	20,503 784	
Total lumber shipped.....	44,425,796	\$632,714.64
Shipped for consumption.....	39,283,760	550,132 88
Shipped for re-export.....	5,142,039	82,581.76
Lath.....	12,488,700	15 475.00
Railroad ties.....	87 352	18,274.95
Fence posts.....	18,477	920.40
Shingles.....	983,000	1,603.07
Pickets.....		8,447.76
Match blocks.....		1,076 00
Box shooks.....		29,199.42
Hemlock bark.....		14,490.00
Total.....		\$722,207.24

An Alpena, Mich., paper describes a new invention in the shape of a snow plow for the use of lumbermen consisting of a platform placed on any ordinary bob-sleds. This platform is provided with large wings for pushing back the snow plowed out of the road. Underneath the platform and about midway of the sleds is suspended the plow proper. This plow is in the form of the letter A, and is suspended by three strong posts which can not be moved in any direction except up and down. The under surface of the plow is so constituted as to cut clean channels for the horses and sleigh runners, at the same time leaving a comb four or five inches high on the outside of each track. These furrows can be cut near together or far apart to accommodate any width of sleigh, and by moving the levers, either track or the comb may be cut high or low at will. The wings may be instantly opened or closed by means of lever, or set by automatic lock at will to any desired width. Should the operator meet a load of logs on the road, he can, without stopping, fold up his plow and wings, and turn out, the whole apparatus requiring no more room than an empty sleigh. The operator can also, by means of the levers, lift the platform from off the sleds, take them and go about his business. In case snow is dry, there are two extra mould boards behind the main mould board, which may be drawn out, thus effectually preventing any snow from falling back on the track. The inventor, Mr. Dewey, of Alpena, Mich., used this description of plow all last winter at his camps, and all who saw the work it did, pronounce it useful.

Messrs. Farworth & Jardine, of Liverpool, in their wood circular dated 4th July, speak as follows of the state of the market for Canadian woods: There has been a better demand for both waney and square pine, and the deliveries from the yards have been fair. There is no change in value, and the stock is unusually light. Red pine is more inquired for; the stock is exhausted. Oak: In Quebec wood little has been doing. Oak planks are still arriving much too freely, and the stock is excessive; prices have again given way, and are now very low. Elm has gone more freely into consumption, and the stock is moderate; there is no change in value. Ash: A large parcel of prime fresh wood has been imported by steamer, but it is difficult to move, and prices are unsatisfactory; have been heavy and considerably in excess of same month during the stock is ample. Pine deals: The arrivals, entirely by steamers, have been largely and considerably in excess of same month during the past few years; the deliveries from the quays have been large, and may be considered satisfactory; still there is no improvement in prices, and it is difficult to maintain values. Fir and second qualities, and all odd sizes, are very difficult to sell. Staves have not been imported, and there is no change to report. New Brunswick and Nova Scotia spruce deals have arrived more freely; the import being increased by several large steamer cargoes during the past few days, the deliveries have been satisfactory, and as most of the recent arrivals are sold, and will go direct from the quays into consumption, the present stock in first hands is very moderate; notwithstanding this, and advancing freight, there is no improvement in value, and shippers must keep supplies moderate to maintain even present low prices. Pine deals: Several parcels have arrived from Miramichi and are in fair demand, but prices are low.



There is a probability that the Grand Trunk car shops at London may be rebuilt.

Mr. Wm. Fleming, St. Johns, N. B., will establish new locomotive works in that city.

The Kingston locomotive works give employment to 500 men, and pay \$1,200 daily in wages.

Mr. Hugh McCulloch, of Galt, Ont., left on a business trip to British Columbia a few days ago.

The Halifax Iron and Steel Mfg. Co., Halifax, N. S., has been incorporated, with a capital of \$700,000.

The second Corliss engine recently purchased by Messrs. Sadler, Dundas & Co., has been placed in position.

Mr. J. D. Baprie has lately added to his planing mill at Peterboro', a planer and matcher with a capacity of 20,000 feet per day.

The Beaverton foundry, was totally destroyed by fire on the evening of July 25th. Loss, \$20,000; no insurance. The fire originated in the boiler room.

Elevator capacity in the northwest will be immediately increased by the C. P. R., and by private enterprise to the extent of 3,000,000.

There are five blast furnaces in the Dominion, two on coke iron and ten rolling mills, one making nail plate or scrap and puddled bars and one on butt-weld pipe.

Mr. Peter Hay, manufacturer of machine knives, Galt, Ont., has built an addition to his shops to be used as a grinding room. He has also put in a new 40 h. p. engine.

Mr. P. B. McHaffie's planing mill and carriage factory at Dunedin, Ont., was destroyed by fire on the 26th inst. Loss, about \$3,000 on which there is no insurance.

Messrs. Campbell & Stevens, of the Kent Mills, Chatham, Ont., are erecting a cooperage to supply their mills with barrels. It will be finished about the middle of August, and will cost about \$4,000.

The Enterprise Foundry Company, of Sackville, N. B., has acquired Cogswell & Co.'s foundry of that place. Mr. E. Cogswell is president of the new firm which has a capital of \$40,000.

Snowball's machine shop at Chatham, N. B., containing trip hammer, lathes and other machinery and tools and valuable patterns of mill and steamboat machinery, was destroyed by fire, recently.

A machine shop will be started at Nanaimo, B. C., by Mr. Robert Wenborn, late superintendent of the Vancouver Coal Company's machine shops. Machinery is now on the way from England.

The Aldermen of Victoria, B. C., have what is called a bonus committee, whose duty it is to encourage the establishment of manufacturing enterprises by granting assistance in the way of land and money.

The old established foundry business of Rogers & King, Montreal, will in future be carried on under the style of Warden King & Son, Mr. Warden King having admitted his son J. C. King, into partnership.

The E. B. Eddy Manufacturing Co., of Hull are manufacturing from sawdust, vessels in the shape of a pot, capable of resisting heat and fire. These sawdust pots are said to be as good as iron pots for kitchen purposes.

The Toronto City Council will introduce a by-law making it imperative on the part of manufacturers and all users of large quantities of bituminous coal as fuel, to place smoke-consuming apparatus in their furnaces.

A New York leather belting manufacturer has been granted a patent on an improvement in leather belting, which consists of the solid layers of leather composing the belt being perforated, which is claimed to practically prevent the slipping of the belt on the pulleys.

Mr. Apgar, of the Westinghouse Machine Co., Pittsburg, Pa., visited Guelph recently with the object of trying to form a joint stock company to introduce incandescent electric light in hotels and factories. We have not learned what measure of success he achieved.

The Waterous Engine Works Company has sent in a tender for the construction of a system of waterworks for the city of Bradford, and have offered to operate the system if the citizens refuse to vote the money necessary for the purchase of the system by the corporation.

The Nova Scotia Steel Co., New Glasgow, are asking to change their title to the "Nova Scotia Steel and Forge Co., (Limited)," and to be given power to increase their capital stock from \$300,000 to \$1,000,000 for the purpose of manufacturing steel and iron in all its branches.

W. A. Lyman, of Milford, Conn., is making the smallest possible specimen of an engine. It will be made from a silver half-dollar. The boiler is to hold about eight drops of water, but with four drops the engine can be worked several minutes. When finished it is to be placed under a glass case three-quarters of an inch in diameter and an inch and one-eighth in height. Some of the parts will be so fine and delicate that they cannot be made without the use of a magnifying glass.

For sharpening tools, instead of oil, whirly thickness and swears the stone, a mixture of glycerine is recommended. The proportions of the composition vary according to the class of tools to be sharpened. One with a relatively large surface is best sharpened with a clear fluid, 2 parts of glycerine being mixed with 1 part of spirits. A graver, having a small cutting surface, only requires a small pressure on the stone; in such cases mix the glycerine with only 2 or 3 drops of spirits.

The opinion of prominent boiler makers seems to be that domes on steam boilers, except in some special cases, are at least unnecessary, if not positively injurious, because they weaken the shell. The prejudice of customers generally governs in the matter of dome or no dome, however.

We learn from the Guelph *Mercury* that Robert Hunter, son of Mr. P. Hunter, who went to Michigan some months ago, is a partner in the Ann Arbor boiler, moulding and machine shops, under the name of the Reeves-Hunter Co. They are doing a good business, and Mr. Hunter is well pleased with his new home. His wife and family arrived there from Guelph some months ago.

The Polson Iron Works Co., of Toronto, in connection with the ship-building business in which they propose to engage at Owen Sound, Ont., will erect a machine shop, 260x61 feet, furnace building 160x60 feet, wood-working shop 240x40 feet, in addition to blacksmith shops, offices, etc. Five car loads of machinery are now en route for these new works.

The *Milling World* says: The millers of Buffalo, at a recent meeting, discussed the acts of the Canadian Pacific Railway in competing for American business, and as a result they telegraphed to Senator Cullom, urging him to push the passage of his resolution reciting that that foreign corporation is, by evading the Interstate Commerce law, seriously injuring American business, and asking whether legislation is not necessary to prevent the diversion of commerce into foreign channels.

It is found practicable at last to make the waste of pine saw mills available for paper pulp. In reducing the wood to pulp bisulphate of lime has been used, this powerful chemical acting on the fibre only when heated; heretofore only lead-lined boilers would resist its action, these, however, being costly and hard to keep in repair. More recently there has been discovered in Germany a kind of brick lining for boilers, which serves the purpose in question. The wood, sawed in small pieces, is digested with bisulphate in large boilers lined with this brick, heat being supplied through lead steam pipes, nothing further being necessary except washing of the fibre. The bisulphate is made on the spot, by passing sulphurous vapor through porous limestone kept thoroughly wet.



There are said to be forty-one flouring mills in Manitoba and the Northwest.

A new 20,000 bushel elevator is to be built at Whitewater, Man.

Mr. James Goldie, Guelph, will erect a new grain elevator about 70 by 50 feet, five stories.

New purifying and dust machines have been added to the Jackson mill, Blenheim, Ont.

It is expected that Messrs. Bickle & May's new mill at Petrolia, will be completed very shortly.

Mr. Martin, of Morris, Man., has commenced the erection of his elevator at St. Jean Baptiste.

Mr. J. East's grist mill at Ailsa Craig, was burned at an early hour on July 19th. Fully insured.

James McQuibben, late of Woodstock, has purchased the Great Western flouring mills, Harrison, Ont.

All the flour used in the Children's Home, Winnipeg, the past year, was donated by the Ogilvie Milling Co.

The Regina Milling Company has received an order by tender, for 6,500 sacks of flour from the Indian department.

The reflection of the sun's rays upon the Deseronto flour mill caused some excited citizens to shout that the mill was on fire.

The Police Committee, of Montreal, have instructed the chief of police to wage war against suspected keepers of bucket shops.

Mr. Wm. Mitchell is renewing the foundations and making other improvements on the elevator at the Deseronto flour mills.

Mr. Wm. Needler has purchased the Hoyd grist mill at Bobcaygeon, Ont. He intends putting in the roller process, and making other improvements.

Damage to the extent of nearly \$10,000 was the result of the breaking away of the dam across the Winnipeg river about a mile west of Rat Portage.

Messrs. Ogilvie & Co., of Winnipeg, J. T. Gordon and Chalmers Bros. & Bethune, intend building elevators at Pilot Mound, Man., this summer.

The Messrs. McKechnie, roller mill owners, of Durham, Ont., will bring suit for damages against the Town Council of that place for bonusing a second mill.

Exports of wheat and flour from the United States for the twelve months ending July 1st, have been about 121,000,000 bushels, against about 154,000,000 in the preceding twelve months.

A by-law was passed at the last meeting of the Petrolia Council to exempt from taxation for a period of six years the flour mill of Messrs. Bickle & May, which will be ready for operation in a short time.

Mr. Geo. Hastings, architect of the Ogilvie Milling Company, has commenced the erection of a 30,000 bushel elevator at Glenboro, Man. Similar ones will also be erected at Pilot Mound and Plum Creek.

A warehouse at Lindsay, in which the milling firm of Sadler, Dundas & Co. had stored 15,000 bushels of wheat, was destroyed by fire on the 23rd ult. The property is understood to have been covered by insurance.

The Snyder property at German Mills, consisting of the mills, farm, stock &c., has been sold, and purchased by Messrs. Wm. and E. W. H. Snyder for \$10,005, under whose management the mills will be operated.

Fire originating in the engine room completely destroyed Mr. J. H. Brick's grist and saw mills at Formosa, Ont., on the afternoon of July 18th. The loss will amount to about \$10,000, and the insurance only \$2,000.

A partition gave way in Stevenson's elevator at Peterboro' under the pressure of 12,000 bushels of wheat. One of the legs of the elevator was broken, but none of the grain was lost, and none of the employees injured.

Representatives of the Duluth Chamber of Commerce will interview the members of the Montreal Board of Trade and Corn Exchange with the object of securing better transportation facilities for grain to the seaboard.

An action for \$400 damages is said to have been entered against the C. P. R. by Onesive Prouze, of Yamachiche, Que., on the ground that grain shipped by that line was injured by not being placed in regular grain cars.

A movement has been inaugurated for the consolidation of the flour mills and bakeries in Liverpool in one great establishment where the breadmaking of the city may be done in immense ovens, under the most highly scientific conditions and of a material saving in cost.

Mr. Edward Dalkin, of Barrie, Ont., is about to form a joint stock company for the erection of a much needed grain elevator at that place. Plans for the structure are being prepared, and the amount required will be about \$5,000, divided into 200 shares of \$25 each.

The water in the Cornwall canal has got below the statutory depth, viz. nine feet, and an effort will be made to compel mill owners using water from the canal to shut down their establishments to allow a sufficient depth of water to be obtained for navigation purposes.

The large roller mill, saw mill, and private residence of Messrs. Eidt & Schmidt, at Mildmay, Ont., were totally destroyed by fire on the morning of July 26th. About 2,000 bushels of wheat and a large quantity of flour and lumber were destroyed. Loss, \$20,000; insurance, \$5,000.

At the recent meeting of the shareholders of the Sarnia Grain Warehouse Company it was decided to organize and proceed with the erection of the warehouse at once. The provisional directors of the Company are Messrs. Geo. Leys, Thos. Kenney, D. McCaul, Wm. Storey and T. Synnington.

The employees of the mills of the firm of Ogilvie & Co., are hereafter to be uniformed. The suits are to be made of cricket flannel with a leather belt, and a cap, upon the front of which will appear the name in gilt letters of the mill at which the men work "Glenora," "Royal," "Goderich," "Sealorth," "Winnipeg," etc.

Mr. Whyte, general superintendent of the Canadian Pacific Railway, has stated it to be the practice of his company not to erect either stores or elevators at inland points in the Northwest, but to trust to the grain dealers to provide sufficient storage accommodation. Mr. Whyte states that although the company may find it convenient in order to give facilities to erect elevators at some inland points, it will hesitate before putting capital into enterprises of this kind, as against private capital, as it would no doubt be regarded by the grain dealers as interfering with their rights and privileges.

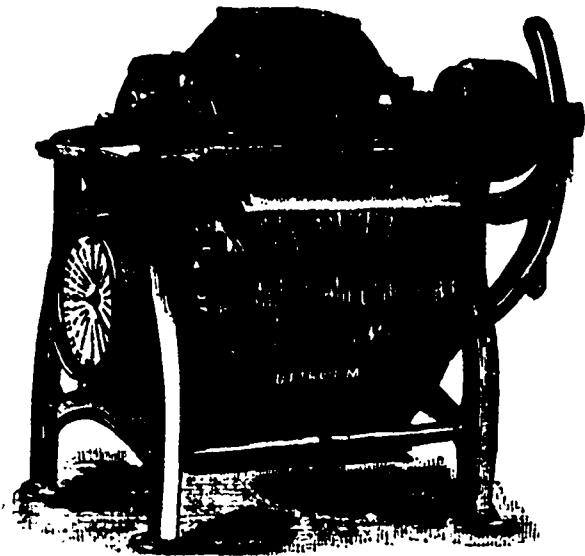
Speaking of the roller mill—the only one in British Columbia—established last year at Enderby, in the Spallumcheen district, the *Kamloops Sentinel* says:—The success of the Columbia Milling Company in manufacturing first class brands of flour at the Enderby mills, is a matter of great importance and gratification to the people of the interior country, and of Spallumcheen and Okanagan in particular. For some time it has been questionable whether the Enderby mills could successfully compete with Manitoba flour and from various causes the result seemed doubtful. But success is now assured. The company is manufacturing an article that cannot be excelled and repeated tests by almost general use throughout a section of the interior and in other markets has given entire satisfaction.

The *Winnipeg Commercial* says:—No better testimony could be given as to the high standard of Manitoba wheat, than is to be found in the action of the Millers' National Association of the United States. The reason why the millers passed a resolution asking that the duty be removed from wheat coming into the United States, is not hard to discover. The millers recognize the high quality of Manitoba wheat, and they are anxious to obtain it. They also note the rapidly increasing production of wheat in this country, in comparison with the shrinkage in production at home. Indeed, the millers did not disguise their reasons for asking for free wheat. It was plainly stated at their convention "that the Manitoba wheat is of the finest quality known in the world." British millers, who are agitating a scheme for the purchase from first hands of supplies of Minnesota and Dakota wheat, should make a note of this move on the part of the United States millers to obtain access to the Manitoba wheat markets, from which their tariff now shuts them out.

An Ottawa correspondent of a daily paper writes: The Manitoba Milling and Brewing Company contracted in October last to supply Messrs. Perley & Pattee, lumbermen, with oats at any point demanded by the latter at the rate of 10 cents a bushel. The first instalment of the contract was ordered to be delivered at Mattawa, at Christmas. At that time oats had risen to 15 cents a bushel, and the company failed to deliver the oats, and moreover they notified Messrs. Perley & Pattee, that they did not intend to fill their contract. The lumber firm took action, and after thwarting the milling company in their effort to have the action removed from Ottawa to Winnipeg, got judgment for \$1,200. The defendant still held fast and refused to pay the verdict, and the difficulty of serving an execution in Manitoba favoured their tactics. The plaintiffs, however, were on the watch, and on July 26th, having been previously apprised that a car of flour and another of oats were on their way east, they succeeded in attaching them. The sale of them was to have taken place to-day, but in the meantime the Manitobans had surrendered and settled by the payment of \$2,000.

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(Signed)

Per Wm. Northwood, Sec.

DETROIT, MICH., Dec. 16, 1887.

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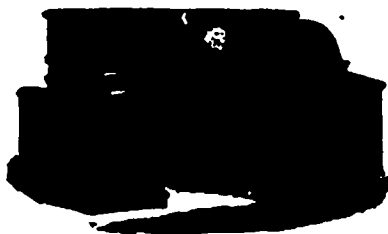
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- 30 1/2 inch Lffel wheel, left hand.
- 30 inch Burnham wheel—a fine wheel.
- 26 inch Lffel, runs against the sun.
- 20 inch Lffel wheel, with the sun.
- 17 1/2 inch Lffel, runs with the sun.
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PLANNING NEW ESTABLISHMENTS.

IN the making of plans for the arrangement of mills, says a writer in the *Woodworker*, it frequently happens that little things of seemingly small importance, which in the beginning of a job are not carefully considered, sometimes prove themselves hindrances of a very serious nature, causing a re-arrangement of a part or perhaps the entire plan, at quite a great deal of trouble and expense. For instance, the proper, best and handiest way for locating the machinery, that it will be most economical for the driving of the same, and the handling of the crude material in its various stages of progression towards its finished state, as well as the proper place for storing the crude or rough stock, and the finished product, where it requires the least amount of labor to give the greatest results; or in the placing of machinery, some seemingly insignificant detail of the mill, such as the best place for the line shaft, and the intermediate line shaft, the proper place and the best mode of communicating power from one of these shafts to another, or perchance from one floor to another and higher floor line shaft and its intermediate, the proper kind of an exhaust fan and where and how best to locate it, and connect all machines for the very best results, and again the best place for the shavings-house and dust-room, or some other small detail in the driving mechanism, such as the best place to put that large pair of bevel-mortise wheels through which the power is conveyed from the water wheel to the line, or intermediate line shaft, the direction a shaft rotates, the proper length of belts, or sizes of pulleys to safely transmit the required load, or rather power, the correct lengths of shafting, its proper size, and just the best place to put your bearings, and how many, and where to space your bearings that the couplings come in the strongest and best place for them. Or perhaps the locating of countershafts is left an open question, as it many times, yes, nearly always, is, with never an end plan, or cross section, to show if it really can be placed where it might be desired to have it, for it is only a countershaft, you know, and don't amount to anything, yet when we come to place it and stretch a line for the belts, or perhaps go so far as to cut the belts and lace them, we find that we do not give the same attention we should have done because of its unseemingly smallness or unimportance, yet after we have placed it we see it cannot possibly be put there, for the belt comes right in the way of that other belt, and thus would, when running, rub one another hard, and this would never do, or perhaps the belt comes right in the way of that shaft, or pulley, or passage way, or saw, or what not?

Who has not made a blunder like this, or a similar one in perhaps a little different shape? all of which could easily have been avoided and money and time saved by just a little foresight, and taking time enough when making our plan to finish drawing it out in every detail. I freely confess that in my haste I have not only once, but dozens of times, made just such or similar errors, just because I did not give the little things the attention which they should have had in the beginning. Yes, Mr. Editor, I am willing to show up some of my mistakes, if by their means some others may save some trouble and expense. Talking about these small oversights, reminds me of some other incidents of my own experience where little things overlooked, or not considered, gave trouble, of all of which I will speak further on.

Now right here perhaps many will ask what is the proper way to proceed in case one desires to start a new mill. How should one begin, and what should be the first thing which one should do, to start right? for if one desires to end right, it is necessary to start upon the right track from the beginning; especially is this true in new enterprises of any kind. Now let me put a question, and one which wood-workers are well qualified to answer: How would you proceed if you were going to expend, say, \$50,000 in the erection of a dwelling? You certainly wouldn't go to an uneducated carpenter, whose ablest ability consisted in nailing shingles, or weather-board, or flooring to their respective places, and expect of him to economically build you a stylish building, well made, convenient, and one which is now and will be up to the standard of architecture for years to come? Not much, but in my mind's eye I can see each mother's son of you trotting off to some architect of note and ability, one whom you know is capable to make your plans so that there will be no costly mistakes to remedy when the structure is half finished, and one who will work out the *little things* of seemingly small importance, which nine times out of ten will wipe out almost all the extras which usually creep in, if they are not given proper attention in the start. Such a course you know to be wise, for in addition to the advantages already cited, such a man can elaborate upon any plans you may have, work in any ideas of your own, and make them harmonize with the times, and get up a structure just to your own mind, and

make such changes before work begins that may be necessary to suit you.

Now let me say, that in starting manufacturing enterprises of any kind, a somewhat similar course ought to be pursued. But do not make the mistake that ninety-nine out of every hundred make, and that is to first settle upon the size of your room and the kind of a building you are going to build before you know how much and what kind of machinery are to go into these buildings. About the first thing one ought to do is to secure a suitable site where plenty of room can be had and where expansion can be made without too much cost: this all must be determined by the circumstances, and upon which each individual case deserves an opinion of its own based upon the surroundings which control to a certain extent each decision.

The next step should be to secure the machinery which you expect to operate, buying your engine, boiler or water wheels of such capacity that they will not be too small if an additional load in the future were hitched to them. Secure the service of a competent mechanical engineer and draughtsman to make plans of the inside of the factory, drawing every shaft, wheel, bearing, coupling, pulley, fan, pipe, machine, bench, in fact everything which has to be placed inside the factory, just where it belongs, and stay right with him, giving him all the necessary information, about how much room you desire here or there, around this or that machine, this or that elevator or passage way, &c. Go to a man who has the ability, and will arrange the driving machines, give the proportions to your driving apparatus that will give you satisfaction when in operation, and do not trust to luck and go blindly at the thing as is now mostly done. If you employ the proper man he will furnish you with a list of all gears, wheels, pulleys, pipes, &c. He will tell you how much and what sized shafts you need and give you drawings of them if necessary. He will furnish you with a plan of your shop fitted as it ought to be, and you can then go and get your estimates and know just where you will stand; besides, when you come to place your machinery there will be no delays your men need not stand around and wait to be told, or you need not get half your machinery in place and then have to tear all out again and replace, for there is your plan, every shaft, machine and belt has been placed; there are the figures, just move right along, and I can give you my words based upon a long experience in this class of work, that you will not only save the fee paid your engineer and draughtsman, but will save money besides in the operation.

After you have had your plans thus drawn, I would say that you are now ready to start to talk about hiring an architect and completing your buildings. I you are a builder yourself and have an architect in your employ, I would say take him with you and let the mechanical engineer who drew your motive power apparatus and floor plans, explain to your architect everything about the plant that requires changes in the buildings different from ordinary, and where the most strains and weights will come, taking care to explain that all machines must have strong foundations, and give the space in figures which the buildings should be on the inside to successfully operate the machinery, and have your building thus made with a view toward accommodating the machinery and stock, which is the true purpose of the same, and I believe you will have got started aright, and, as I really hope, will prosper.

Many days ago, and before I began to follow out this last plan, I became associated with a millwright who often had mills to overhaul, and remodel many others, and other jobs of a like nature. I remember one instance in particular. We had a large mill to overhaul and remodel, and our directions were to overhaul, remodel and re-set the machinery, with especial directions to set the machinery that all belts would be straight; there must not be a twist belt in the establishment. We set about the work as usual, old Steve, as we called him, giving the directions as we went along from day to day. One machine after another came out and went in again, the building and foundations were strengthened, and a lot of new machinery also were set and gotten in position all ready for operation, only awaiting the arrival of the turbine water wheel which was soon to arrive, and was finally set all ready for operation, when we pulled up and left for home. Imagine our surprise when, a few days later, a messenger came in and said we were wanted at Lockdale again, as the entire mill run backward. What is to be done? It all came from a small oversight of Steve's in assuming that the builder would make the wheel run in the same direction as the old one did, and failed to specify just which way he wanted it to go, and thus caused the trouble; and, what was worse still, the bevel gears of the wheel were in a place where their position could not be changed to produce the re-

quired direction of rotation, and every day the mill stood idle was a deep loss to its owners, so it would never do to send the wheel back and await the building of a new one, neither would it do to run a 14-inch belt twist, especially as our directions were to avoid all twists in the entire mill; nor would it do for old Steve to come boldly out and acknowledge that the exceedingly small oversight on his part had caused this trouble, for this would have a tendency to kill his reputation as a millwright.

But Steve was equal to the emergency. The bevel gears that led from the water wheel to the line shaft geared to the latter through a pair of large mortise bevel wheels. Steve looked the mill over and look surprised, and muttered something about men that couldn't be trusted, that they had placed the driven bevel wheel on the line shaft on the wrong side of the driver, which indeed was about the only way out of the trouble, which in the course of a few days was remedied; but it was just one of those *little* and seemingly *insignificant* things, too small to be of any consequence, that caused the trouble.

WELDING MACHINES.

A COMPANY has been formed, mainly by Boston capitalists, with a capital stock of half a million dollars, which will turn out welding machines. Their experimental factory at Lynn, Mass., is too small for their business and they are about to build a new one in the same city. The machines will be sold to the various machine shops requiring such apparatus but the company has a royalty on every weld made by their machines. To make this practical a meter is set upon them all. The meter has upon it three dials resembling those on a gas meter. By its peculiar construction it is claimed that it will not register unless a perfect weld is made. The new company is backed by considerable capital, by which it is enabled to buy up all the experimental electrical welding methods in the country. These machines will weld anything in the shape of metal. They do not require that both metals shall be of the same material, as iron has been welded to brass in the experiments made. The machines as they are now built will weld an iron cable or a watch spring with equal readiness. Negotiations are now pending with a large locomotive works for several of the machines.

THE EVOLUTION OF THE SAW.

EVERY instrument which the mechanic uses has its history. Some of them were brought into being by inventive genius, and required days and nights of weary thought to complete the conception and to overcome imperfections. The simpler tools have been in use for centuries under one form or another—at first only rude suggestions of what they afterwards came to be. Perhaps no tool has a more interesting history than the saw. According to a recent writer, saws have been discovered in Germany and Denmark which belong to the bronze age. The metal of which they were composed was cast into a thin shaft and serrated by breaking the edge. Equally interesting discoveries have been made in this country. It has been found that saws made of obsidian, which is a kind of glass produced by volcanoes, were used during the stone age in Mexico, and saws and knives of the same material have been found in the alluvial deposits of New Jersey, thought to have been sent thither from Mexico by the action of the water. The Phoenicians are among the earliest nations which are thought to have used the saw. The scholar is not surprised to find a very pretty story accounting for the discovery of the saw in Grecian mythology. Here the inventor is said to have found the jaw bone of a snake which he imitated by jaggung an iron plate. One day the uncle of the inventor murdered him in a fit of jealousy, so the story goes, and if the liberty may be taken of filling out this little romance, by plunging one of the poor young man's own saws through his heart. The lacustine and other early inhabitants of Europe are credited with having saws made of flint, and the natives of the West India islands had saws made of notched shells. The Japanese saw is a curiosity. It is shaped something like a butcher's cleaver. The shank is drawn into the handle, which is flat, where it is secured by being wrapped with split cane. The teeth are described as being narrow and pointed toward the handle. Some of the saws used by the ancient Egyptians are exceedingly rude and imperfect, consisting of long, thin blades, ragged at the edges and driven into rough pieces of wood. It is from such crude and inefficient implements as these that the modern saw has been developed. The law of evolution has been operative here, as the philosopher might say, as it has been elsewhere.

To Mill Owners and Manufacturers.

USE

Phoenix :- Belt :- Oil,

THE ONLY PERFECT BELT DRESSING.

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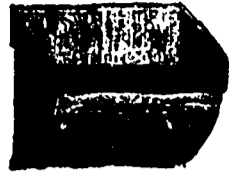
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PAT. LAP-JOINT LEATHER BELTING STARRIVET

Send for Price List and Circulars and our latest Pamphlet on Belting.

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Manufactured in all sizes and qualities

NEW FACTORY ON BAY STREET now in full operation.

THE ONLY FACTORY IN CANADA PRINTING JUTE AND COTTON BAGS IN THEIR OWN PREMISES.

ORIGINAL DESIGNS for Brands prepared FREE OF COST.

Send for Price List and Pamphlet, giving full information,

DICK, RIDOUT & CO., Proprietors,

11 & 13 FRONT STREET EAST

TORONTO.

Hurford Reels and Scalpers are furnished in one, two, and four reel chests, 6 feet, 8 feet, 10 feet, 12 feet and 14 feet lengths.

Are also extensively used to replace six sided reels in old chests, doubling the capacity and greatly improving the quality.

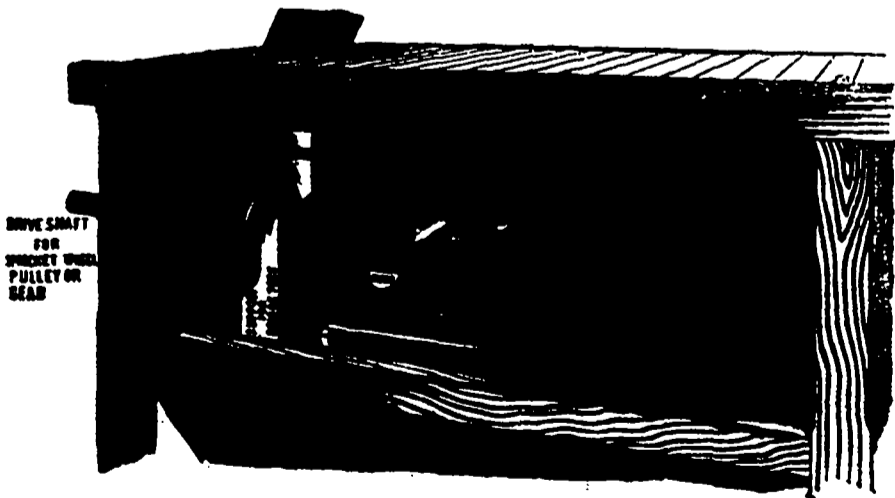
No change of driving gear necessary.

Pillsbury has 30 Hurford Reels doing the work of 60 six sided reels in the "A" mill at Minneapolis.

We contract for mills complete on our improved system of rolls and bolting, and guarantee the same the best in Canada.

HURFORD BOLT AND SCALPER

The only Round Reel with inside brush, and no Round Reel will do satisfactory work without it.



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Mill Builders and Mill Furnishers

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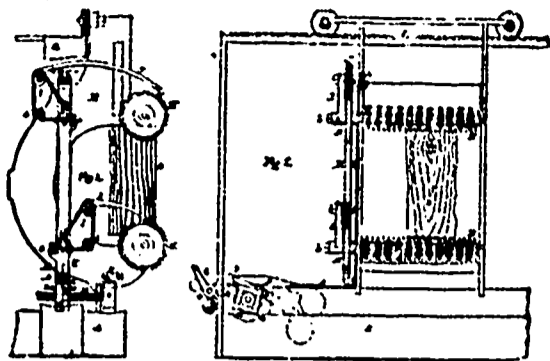
In a recent test of the most approved modern round reels, made at the Galaxy mill in Minneapolis under the exclusive auspices of the proprietors of the mill, the Hurford Reel scored an unqualified victory, showing more than double the capacity and far better results than any of its competitors.

We have made arrangements with the manufacturers of the Cochrane Roller Mill Supply Co. as special agents for the sale of their train roller mills. Parties wishing information as to purchase will do well to write us for prices and other information.

Latest Canadian Patents.

Shingle Machine.

No. 29,180. The Waterloo Engine Works Company, (assignee of James N. Peel,) Brantford, Ont., dated 19th May, 1888.



Claim.—1st. On a shingle machine, the set bars K, K, provided with adjustable bearings r, r, as shown, substantially as and for the purpose hereinbefore set forth. 2nd. On a shingle machine, the set bars K, K, with adjustable bearings r, r, in combination with the bell cranks I, I, as shown, substantially as and for the purposes hereinbefore set forth. 3rd. On a shingle machine, the set bars K, K with adjustable bearings r, r in combination with the bell cranks I, I and bevelled bars L, L, as shown, substantially as and for the purposes hereinbefore set forth. 4th. On a shingle machine, the combination of the set bars K, K with adjustable bearings r, r, bell cranks I, I, bevelled bars L, L, cams M, M, shaft N, pawl wheel O, pawl P, Q and J, J, as shown, substantially as and for the purposes hereinbefore set forth.

Machine for Moulding or Running Cornices.

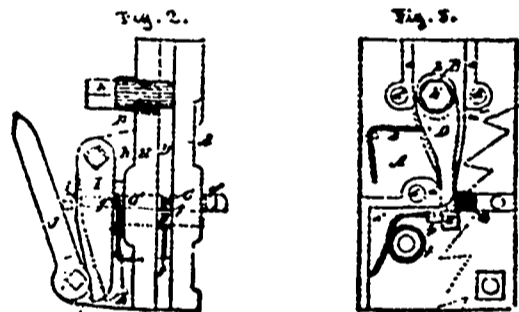
No. 29,156. Robert F. Mould, Stouffville, Ont., dated 12th May, 1888.



Claim.—1st. The combination of the mitred ends of moulder, and the straight face of moulder, substantially as and for the purpose hereinbefore set forth. 2nd. The combination of the mitred ends of moulder or fashioner, and the longitudinally hinged members attached thereto, substantially as and for the purpose hereinbefore set forth.

Saw Swage.

No. 29,047. Isaac M. House, Gravenhurst, Ont., dated 1st May, 1888.

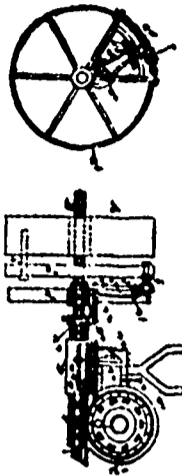


Claim.—1st. In a saw-swage, the combination of two plates firmly connected and having ribs to keep them apart, and forming a recess for the insertion of the saw blade and for operating the die, a stud journaled in the rear plate and projecting through, and bearing in the front plate; and provided with an eccentric to operate the swaging die, and with an angular head for the application of a wrench, a swaging die bedded in a recess and fitted and bearing against the eccentric on said stud, and held thereon by a spring, and guided at its lower end by a projection or rib, and its working face butting against an anvil, an anvil having a lateral angular notch adapted to receive a sliding gauge, a spring gauge or guide having an inclined face entering and moving in a notch in the anvil, and pressed therein and against a guide rib by a spring, a fast clamp dog secured in said back plate for the saw tooth to butt against, a dog placed opposite the fast dog and adapted to slide transversely in the front plate and retracted by a spring, a lever pivoted to the front plate and adapted to bear against the end of the moveable dog, a cam ended hand-lever pivoted to the front plate and its eccentric or cam-end adapted to bear against and operating the pressure lever, substantially as set forth. 2nd. In a saw-swage, the combination of the plate A having a rim a, a1, facing a11 and recess a111, stud B, journaled in said plate and bearing in the plate H, provided with an eccentric b and adapted to be operated by a wrench C, swaging die D, adapted to be operated by the eccentric b and spring d1, anvil E, having a notch c adapted to receive a sliding gauge, a sliding gauge F, having an angular face adapted to slide in the notch c and operated by a spring f, a dog G secured firmly in the back plate, a moveable dog G1 adapted to slide in the front plate and operated by a lever and a spring G11, the front plate H adapted to bolt against the facings a, a1, a11, of the back plate and provided with lugs h, h1, bearing for the stud B, and slot for the dog G1, a pressure lever I, pivoted to the lug h and adapted to bear against the end of the dog G1, and to be operated by a hand lever J, and provided with a set-screw i, and a hand-lever J having an eccentric or cam-shaped end pivoted to the lug h1, and adapted to bear against and operate the lever I, substantially as set forth. 3rd. In a saw-swage, the front plate H and back plate A, firmly connected by bolts, and having formed between them suitable cavities or recesses for the swaging die and the reception of a saw blade, a stud B journaled in said back plate and bearing in said front plate, and provided with an eccentric b, and with means of oper-

ating said stud, a swaging die D, fitted to the eccentric b and held thereon by a spring d1, substantially as set forth. 4th. In a saw-swage, a plate H having lugs h, h1, and a transverse slot to receive a sliding dog G1, the depending pressure lever I, pivoted to the lug h and bearing on the end of the said dog, and provided with a set-screw i, a cam-ended hand-lever J, pivoted at its cam-shaped end to the lug h1, and adapted to bear upon the end of the pressure lever I, substantially as set forth.

Power Indicator.

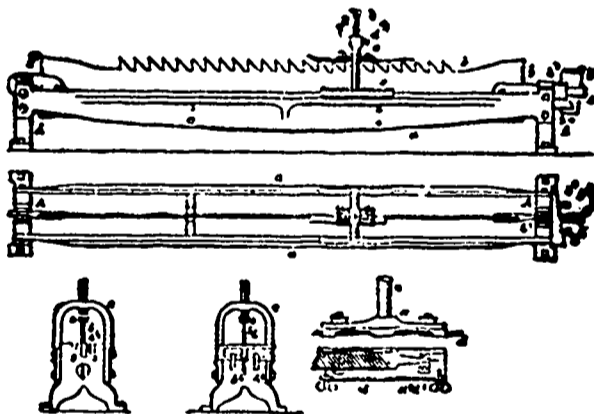
No. 29,231. Emery Nixon, Toronto, Ont., dated 28th May, 1888.



Claim.—1st. A power indicator composed of three pulleys of about equal diameter, the first being the driven pulley from the factory pulley and is loose on the shaft, the second pulley having two driving bolts, one of them projecting sidewise and between two arms of the first pulley from which it receives its motion, the other bolt projecting from the other side and going behind the outer end of a journalled arm in the third pulley, which bears upon the rear end of a compression spring secured on the circumference of the said third pulley, the vibrations of which spring being utilized to operate by means of racks and pinions, a pointer and scale denoting the pressure in lbs. on the surface of the first driven pulley, substantially as shown and described. 2nd. In a power indicator composed of three pulleys of about the same diameter, the pulleys A and a2, loose in the shaft B, the pulley a3 rigidly secured to the shaft B, the bolts a1 and b in pulley a2, the journalled arm a4 in pulley a3, and compression spring a5 on the circumference thereof, the combination of the rack a7, pinion a3, spindle a0, lower pinion a10, and sack with tongue a11, as shown and described. 3rd. The combination, with the rack and tongue a11, the sliding thimble a12, sliding frame a13, sliding pointer a14, the stationary thimble D, with groove d1 and scale d2, substantially as shown and described.

Machine for Truing the Teeth of Saws.

No. 29,720. Robert Gaskin, jr., Portland, New Brunswick, Canada, dated May 29 1888.



Claim. 1. In a machine for truing saw-teeth, the rectangular open frame adapted to suspend the saw-blade, straining devices for subjecting the blade to a suitable tension, combined with a file-carrier adapted to move lengthwise upon the side bars of the frame to true the teeth of the saw. 2. The frame-work adapted to receive and suspend the saw, and means for holding the same under tension, combined with a universally-adjustable file-carrier moving upon the frame. 3. The frame adapted to hold the saw, combined with the yoke, and a vertically-adjustable file-carrier moveable longitudinally upon the frame. 4. The frame to hold and suspend the saw, combined with a file-carrier made vertically and transversely adjustable, and the yoke to which the file-carrier is attached, moveable upon the frame longitudinally. 5. The frame recessed at each end to receive the saw, combined with means, as the key b4, and wedge-block interposed between the key b4, and frame to subject the saw to longitudinal tension. 6. The frame recessed at each end to receive the saw, combined with means as the key b4 stepped wedge-block b5, and the supports c6, to regulate the tension of the suspended saw. 7. The frame provided at each end with notches or recesses of different depths to receive saws of different widths. 8. The frame, and straining devices adapted to hold and suspend the saw under a given tension, combined with a transversely-adjustable slotted file-carrier. 9. A file-carrier for truing saw teeth, consisting of a clamp, d4, adjustably attached to a place fixed to a spindle, and fasteners, as set-screws 7, to hold the file in position transversely in said clamp.

Mr. Geo. Thompson's steam saw mill, near Wingham, was destroyed by fire on July 24th, together with about eight hundred cords of wood. Insurance on mill, about \$1,000; loss, about \$3,000.

PERSONAL.

Mr. Robert Buchanan, a Liverpool miller, is at present on a visit to Canada.

Richard Parnell had his hand lacerated by a shaper in Baptiste's planing mill at Peterboro' recently.

D. W. Patton had his hand caught between the belt and pulley of a roller mill at Stratford recently, and severely crushed.

Mr. Stephen Nairn, formerly of Toronto, has been elected permanent chairman of the Board of Grain Examiners at Winnipeg.

Mr. Louis Fuzz, a delegate from St. Louis to the Buffalo millers' convention, after the close of the meeting visited Montreal and Quebec.

Mr. L. Gilbert was so seriously injured by a board thrown from a saw in J. & J. Kerr's planing mill at Petrolia, Ont., that his recovery is doubtful.

Mr. W. W. Willis, who has been for some time employed in Ogilvie & Co.'s "Glenora" mills, Montreal, has resigned his position and returned to England.

Charles Kerr, aged 17, son of Mr. Samuel Kerr, of Cannington, Ont., had his right arm torn off close to the shoulder by being caught in a belt in a planing mill.

Mr. J. W. Baker, head miller of the Cold stream mills, Kalamazoo, Mich., has been spending a few days with his parents, Mr. and Mrs. B. Baker, Deseronto, Ont.

Mr. W. Gow had three fingers severed by a saw in Perry & Beach's saw mill at Fergus, Ont. This mill is said to have been the scene of several serious accidents this season.

Geo. Williams had three fingers severely lacerated in a crushing machine and George Hogskins had his hand seriously injured in another machine at the Patterson Works, Woodstock, the other day.

George Whitely was running an emery wheel at Crummer's saw mill, near Tara, Ont., when it burst, striking him on the side of the head near the eye, putting one eye out and laying the skull bare.

Mr. Joseph C. King, on the eve of his departure from Port Hope to accept the position of treasurer of the Lake of the Woods Milling Co., Keewatin, Ont., was presented with a valuable piece of plate by his fellow townsmen, and a gold watch and chain by political associates of the Conservative party.

Mr. John Ogilvie, a partner in the well-known milling firm of A. W. Ogilvie & Co., was found dead in bed at his residence in Montreal, on the morning of July 23rd. The deceased had not enjoyed good health for some time, and had but recently returned from a tour to California, Mexico and British Columbia. For a few days previous to his death, however, he appeared to be feeling comparatively well. The deceased was born in the city of Montreal fifty-three years ago, and after graduating from the High School engaged with his brothers, Alexander and William, in the milling business. Alexander, (now Senator) Ogilvie, retired from the firm some years ago. The business of the firm which, when John Ogilvie entered as a partner consisted only of the small "Glenora" mill, has extended to all parts of the Dominion, and includes five mills and numerous elevators. The deceased was well known in Ontario where he spent much of his time in superintending the construction of buildings. He leaves a wife and seven children to mourn his loss. His eldest son, Alexander, has for some time been associated with him in business. The funeral was one of the largest and most representative ever seen in Montreal. The business community was very largely represented, and there was a full turn out of the employes and officials of the mills.

DESTRUCTION OF CAPITAL BY INVENTIONS.

THE readiness with which society comprehends the suffering contingent on the relentless displacement of labor by more economical and effective methods of production and distribution, and the overmastering feeling of sympathy for individual distress thereby occasioned, causes it to generally overlook another exceedingly interesting and important involved factor, and that is the relentless impartiality with which the destructive influences of material progress coincidentally affect capital (property) as well as labor. It seems to be in the nature of a natural law that no advanced stage of civilization can be reached except at the expense of destroying in a greater or less degree the value of the instrumentalities by which all previous attainments have been effected. Society proffers its highest honors and rewards to its inventors and discoverers; but, as a matter of fact, what each inventor or discoverer is unconsciously trying to do is to destroy property, and his measure of success and reward is always in proportion to the degree to which he effects such destruction. If to-morrow it should be announced that some one had so improved the machinery of cotton manufacture that ten per cent. more of fibre could be spun and woven in a given time, with no greater, or a less, expenditure of labor and capital than heretofore, all the existing machinery in all the cotton mills in the world, representing an investment of millions upon millions of dollars, would be worth little more than so much old iron, steel and copper; and the man who should endeavor to resist that change, would, in face of the fierce competition of the world, soon find himself bankrupt and without capital. In short, all material progress is effected by a displacement of capital equally with that of labor; and nothing marks the rate of such progress more clearly than the rapidity with which such displacements occur. There is, however, this difference between the two factors involved. Labor displaced, as a condition of progress, will be eventually absorbed in other occupations: but capital displaced, in the sense of substituting the new for what is old, is practically destroyed.—David Wells, in the *Manufacturer and Builder*.

The surface of cast iron can be made very hard by using the prussiate of potash, heating and cooling three or four times, using potash each time.

JONES' -:- SHORT -:- SYSTEM

THE LATEST AND BEST

FOR MERCHANT AND CUSTOM MILLS.

In our Short System of milling we are using new and improved methods of bolting and purifying which are our own inventions.

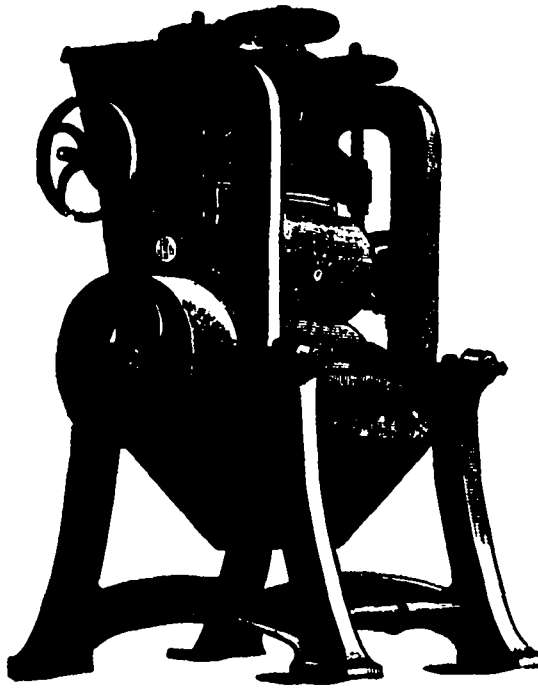
Our Purifier and Aspirator combined is the best machine we know of for the proper handling of middlings.

The middlings are graded before the blast is applied to them, each grade treated separately on the same machine.

Our Bolting and Scalping Reels are round, running at a slow motion, the cloth being covered the whole length of the reel, no matter how slow the bolt is fed. This we consider one of the most important points in the manufacture of flour.

Old style reels can be changed to this same principle, producing the same results.

Millers who desire to improve their flour would do well to look into the merits of these machines before purchasing.



JONES' SHORT SYSTEM FOR CUSTOM MILLS.

Is the simplest and best in the market. The results are equal to any long system, and the cost less. Grist can be ground as brought in if desired, and can be handled as conveniently as if ground in mill stones. One Roller Disc machine, two corrugated rolls, one smooth roll one stone roll, one bran duster, two flour-dressers and one purifier, with proper cleaning machinery and elevators, is all the machinery necessary in this system to make a straight grade of flour equal to the straight grades made in any long system.

CAPACITY—50 Barrels per Day from Fall Wheat.

TESTIMONIAL

IN FAVOR OF THE SHORT SYSTEM, USING FIVE SINGLE ROLLS TO COMPLETE THE WORK.

JAMES JONES, ESQ., Thorold, Ont.

ABINGDON, September 18th, 1887

Dear Sir: Our mill has now been run long enough to give us an opportunity to test it thoroughly, and we are satisfied with it, the yield and quality are excellent. It takes all the flour out of the wheat, and for capacity, instead of making sixty (60) barrels, as the contract called for, we are running from 85 to 100 barrels, and clean it up in good shape. The stone roll, on which nearly all the best flour is made, works with less attention than any other machine in the mill, and does its work well. We feel ourselves indebted to you for the prompt manner in which you carried out your contract.

Yours truly,

R. A. SHEPHERD.

For further particulars, apply to **JAMES JONES & SON,**
THOROLD, ONT.

UNEXCELLED!

UNEQUALED!

UNRIVALED!

THE HERCULES Automatic Wheat Scourer and Separator

THE ONLY WHEAT SCOURER
EVER AWARDED A GOLD MEDAL.

THE ONLY AUTOMATIC WHEAT SCOURER
EVER INVENTED.



THE ONLY WHEAT SCOURER

That Needs No Attention Whatever.



THE HANDSOMEST AND MOST DURABLE MACHINE ON THE MARKET.

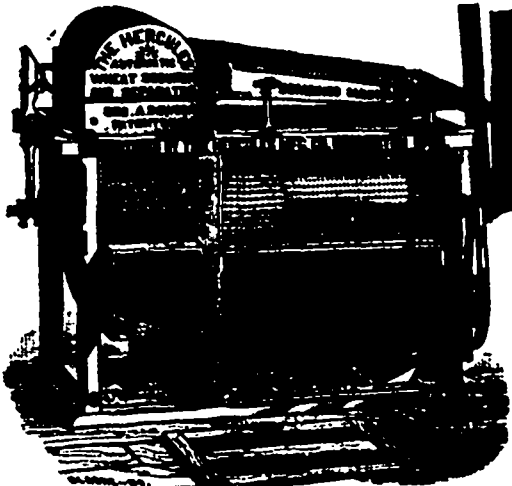
DUSTLESS

THE HERCULES

— HAS THE —
MAGNETIC ATTACHMENT

— FOR REMOVING —
METALLIC SUBSTANCES.

NO EXTRA CHARGE FOR SAME.



FIREPROOF

THE HERCULES

— IS —

WARRANTED

*To Improve the Color of the Flour
in any Mill.*

IT WILL REMOVE
FOUR TIMES MORE FUZZ

THAN
ANY OTHER WHEAT SCOURER

WE ARE NOW READY, AFTER EXHAUSTIVE TESTS, TO PLACE UPON THE MARKET.
THE HERCULES DUSTLESS RECEIVING SEPARATOR,
THE HERCULES AUTOMATIC BUCKWHEAT SCOURER,
THE HERCULES AUTOMATIC CORN SCOURER.
SATISFACTION GIVEN OR NO PAY.

Write for Circulars, Prices and Guarantee on all the above machines. Address

THE HERCULES MFG. COMPANY,
PETROLIA - ONTARIO.

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THE USE OF GAS FOR HEATING LOCOMOTIVES AND STEAM BOILERS.

TAKING advantage of your notice to correspondents, I wish to say a few words on the use of natural gas and fuel gas for heating steam boilers and locomotives. I have watched your columns closely ever since your first notice of the attempt of the Ft. Wayne, Cincinnati & Louisville Railroad Company, to generate steam by use of natural gas as fuel, and while I hope your report of their success may prove true, yet I have serious doubts as to the ultimate success of heating the ordinary flue boiler by the use of gas as fuel. Provided the gas as fuel. Provided the gas is furnished at a price next to nothing, it may be possible to burn enough of it in the ordinary fire box of a locomotive or other steam boiler to generate the necessary steam, but when the gas is manufactured and sold at a price to compensate the makers I do not believe it can be successfully so used. My belief on this subject is not founded entirely upon theory as I have, for the past four years, made many and costly experiments in generating steam by use of gas as fuel, and while I do not hold myself out as a gas expert by any means, I believe I have seen enough and tried experiments enough to have a reasonable ground for my belief, as above stated. When we substitute gaseous fuel for coal or other solid fuels, we meet the first difficulty.

The draft or air supply must be changed, the force of it must be diminished, and as gaseous fuel gives off flame entirely and leaves no solid body of incandescent substance to furnish heat, the flame and the heat it produces are all we have to rely upon for heating purposes. The question then is, how should the flame be applied to obtain its greatest heating effect or power. Those fairly conversant with flame heating and the action of flames in the action of fire boxes and tubes of the ordinary tubular boiler and its action among the pipes or water tubes of that type of steam boiler known as the water tube boiler, know that it is next to impossible to force flame *as flame* through boiler tubes or to force it *as flame* among the closely packed pipes of the water tube boiler. I am aware that some contend that flame *as flame* does pass through the ordinary boiler flue and also that flame *as flame* can be made and is made to exist among the tubes of water tube boilers, but in fact no flame whatever passes through boiler flues nor will it exist among a mass of closely packed water tubes. All that ever passes through such tubes, or if the water tube boiler is used, all that passes between or among them is the hot, but unignited products of combustion, which, when they come to the air again, may be, and many times are, again ignited and burst into flame. If the above proposition is correct, then flame heat when applied to the ordinary tubular boiler, simply heats the fire box and a very small portion of the ends of the boiler tubes, and all that passes into the tubes and heats their inside surfaces is heated but unignited products of combustion, which are not as hot as the flame itself, and the same is true of its action among the pipes of a water tube boiler, and thus we meet with the first and greatest loss in flame heating a boiler. In the spring of 1886 I made many experiments in attempting to make gas flames burn inside of tubes of various diameters. If a gas pipe having numerous perforations be inserted in an upright three-inch boiler tube, six feet long, and the gas lighted at the lower end of the boiler tube, the gas will be forced to burn but a few inches in the lower end of the tube, but will not burn throughout the length of the tube. Sufficient atmosphere will not pass into the tube to sustain combustion, but apply a lighted match to the upper end of the tube and it will throw a flame upwards in height proportioned to the amount of gas escaping from the perforations in the gas pipe. In order to apply sufficient atmosphere to the inside I tried the experiment of using a compound pipe, *i. e.*, an air pipe inserted in the gas pipe, having passage ways or small pipes passing from the air pipe through the gas pipe, and the gas pipe was perforated so that a ring of gas perforations was followed by a ring of air perforations; the air perforations being of a size to theoretically supply sufficient air for the consumption of the gas escaping from the ring of gas perforations above it. The compound pipe being inserted in the upright three-inch boiler tube as before, and air being forced into the air pipe by a blower with a steady pressure of gas was ignited as before, but the result was not materially better than in the first experiment. It would occupy too much space to describe the various experiments I made in attempting to make flame exist *as flame* inside of tubes of various diameters and held in various positions, suffice it to say I failed in every instance. I briefly state the above experiments tried because they were made in conformity with the specifications and drawings of an English patent, showing that patentees do not always hit the mark, especially

in that patent. If flame *as flame* could be made to exist inside of tubes it would do little more than skim the inside surfaces as the draft of the boiler would draw it through the tubes with too great velocity and much of the heating power would be therefore lost. Again, if we take a water tube steam boiler, as ordinarily constructed, and burn gas as fuel in the furnace, we find that the flame rises until it strikes the lower tier of tubes and is then extinguished and nothing but the hot but unignited products of combustion pass through or among the tubes. If we take water gas as fuel it will be found, first, to contain too few units of heat per 1,000 cubic feet to allow of much waste, and second, its cost, considering its heating power, is quite too high to sanction much waste. To raise the heating power of the gas seems at present impossible, and if the necessary advance cannot be made at this end of the problem then it becomes necessary to make the advance from the other *i. e.*, alter the construction of the boiler to suit the peculiar conditions and requirements of the fuel. A long line of experiments led me to believe that the water tube type of boiler is the best yet invented for the use of gas as fuel, but changes in its construction must be made. I constructed a boiler of that type but spread the water tubes apart 10", surface to surface. Over each water tube I placed a hood or bonnet in form of an inverted trough, the under side of the crown of the hood being sustained about 1½" above the top surface of the water tube. Under each water tube I ran a gas pipe with perforations and from the top of each hood I ran a conduit whose exit end terminated beyond and above the top layer of water tubes and hoods, and in a chamber formed by laying a partition or flaffle plate between the steam and water drums and the water and heating tubes. When the gas was turned on and lighted each water tube was impinged upon from end to end by the gas flame burning under it, and as the flame passed up and around the lower half of each tube it was caught by the wings of the hoods and compelled to completely encircle each water tube. Each water tube was therefore introduced from end to end in a perfect cylinder of flame. The products of combustion, had no provision been made for their control, would have intermixed with the flames burning at the several burners, but as conduits had been provided rising from the top of each hood they were carried away and discharged into the chamber in which lay the water and steam drums. Each water heating tube therefore had its own separate furnace and was heated from end to end absolutely alike, or with absolute uniformity and the products of combustion after they had yielded as much of their heat to the water tubes as possible were discharged against and among the water and steam drums, materially assisting in heating them.

I used atmospheric gas burners and tried forced combustion or blow-pipe burners with increased effect and saving of gas.

My experiments lead me to believe that with such a boiler a saving of fully fifty per cent. of gas can be made over any other form of boiler now constructed for using gas as fuel. Every square inch of tube surface is absolute fire box surface, and unequal expansion and contraction is done away with. Nothing rests in the spaces between the tubes. With such a boiler mounted on the running gear of a locomotive, and properly attached thereto so as to take the strains incident to all locomotives, fuel gas, at as high a price as thirty cents per 1,000 cubic feet, can be successfully used, and more power got out of a boiler of given size than by the use of coal or gas as now applied.

We all know that theoretically the gas engine should give the greatest effect of power with the use of the least gas, but we also know that the practice of gas engines as now constructed is away behind the theoretical figures, and this arises partly at least from the burning or exploding of the gas in a closed cylinder when the proper amount of air does not exist to properly explode and consume the gas, and mechanical appliances of sufficient delicacy and exact action have not yet been constructed to furnish it.

It is a question to be yet determined, how far behind the gas engine, as now constructed, such a steam boiler would rate in efficiency and economy. It will at least come nearer to it than any boiler now constructed using gas as fuel. Believing that fuel gas will soon force itself to the front and successfully compete with all other fuels now known, and believing less in the gas engine than some seem to as a source of successful and economical power, I offer the above brief and imperfect observations on the construction of a gas burning boiler, believing that the general plan as above indicated is entirely new and nearer the goal of perfection than any yet generally known or tried.—W. M. Brown, in the *Progressive Age*.

EXPORTING LOGS AND LUMBER.

THE successful exporter is the exception—the man who loses is in the great majority. There is no regularity in the foreign market, the price obtained is governed not by the quality so much as by the quantity. When good prices are obtained the report encourages many new men to try a shipment, and the supply being drawn from so large a field, the late good market is at once crowded, and as usually is the case with the new shipper, he has put no price on his stock, but has merely instructed his consignee to "get the best price you can ex quay," trusting to luck that he will get the late quoted high price. If it be his first shipment his commission dealer may "save him for next time," as it does not do to scare a new man off at the start, and the "best price" may be good enough to encourage the novice to try another and larger shipment with the same instruction as before. If the market is good, it is well, but if bad, the first profit does not nearly make good the loss. It seems that a foreign commission dealer is lacking in discretion above everything else. He will often sell stock for less money than it is worth here at home, and will step out of all responsibility by: "You told me to get the best price I could!" If he had used his discretion and held the stock, submitting the best price obtainable, and waited instruction, he would not only have protected his shipper, but would have maintained prices; for, so long as the foreign buyer can purchase his stock there as he could were he here, he is going to save all the expense of the ocean freights and the hundred and one petty charges which are tacked on in every foreign port.

Our advice to the shipper is to go slow, know to whom you consign your stock, and, moreover, put a price limit on what you send. In many of the markets the expenses of holding stock are but little more for three months than for the first landing in store. Again, each shipper should bear in mind that what he may lose in storage he will make up in price, and a steady market thereby be maintained. The successful exporter is not the one who consigns his stock to this or that market simply because he has heard that it is a good one. He first knows that it is good and how long it will be likely to remain so. He instructs his commission dealer to get a certain price or not sell it. He is the exporter who will not only make money for himself, but will maintain prices for his brother shippers.—*Lumber Trade Journal*.

SUPPRESSION OF GRAIN GAMBLING.

THE best means for suppressing gambling in stocks and merchandise is a subject which has for some time engaged the attention of legislators in Canada. They have arrived at the conclusion that legislation directed in specific terms against the acts complained of, and bringing them by express legislative interpretation within the provisions of the laws against gambling, is necessary. In pursuance of this plan the Canadian legislature has lately passed an act declaring a misdemeanor, punishable by imprisonment and fine, to make a contract for the sale or purchase of stock in any company or undertaking in Canada or elsewhere, or of merchandise, with the intent to make profit by the rise and fall in price, and without the intention of acquiring such stock or merchandise or of giving or receiving delivery of the same. The act further makes it a misdemeanor to habitually frequent any office or place where such contracts are made, signed or negotiated, and declares persons keeping or maintaining such places keepers of common gaming houses, and the tablet and blackboards used in recording prices and fluctuations therein gaming implements within the meaning of the law against gambling. The great difficulty about legislation of this kind, good as it may be in intention, is the danger of injury to the interests of legitimate trade. The act referred to contains one provision which is open to serious criticism from this point of view, as well as from the standpoint of the liberty of the individual. This is a provision imposing upon the person charged with violating the act the burden of proving *bona fide* intention in the making of contracts. The provision reversing the settled rule of criminal jurisprudence fixes the character of guilt upon transactions until they are proven innocent. Its dangerous character will be perceived when regard is had to the confusion which still widely prevails regarding the distinction between "bucket-shop," gambling and legitimate purchases and sales for future delivery.—*Bradstreet's*.

Over 20,000,000 feet of logs have been swept from the booms on Rainy River by the high water, and carried down into the Lake of the Woods. This will be a great loss to the lumber firms on the lake, among whom are the Keewatin Lumbering and Manufacturing Co., Dick & Banning, H. & P. Holmes, Minnesota & Ontario Lumber Co., Rainy Lake Co., Hughes & Kennedy.



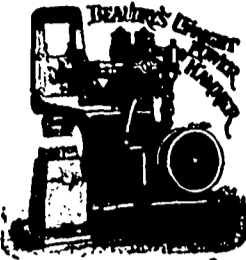
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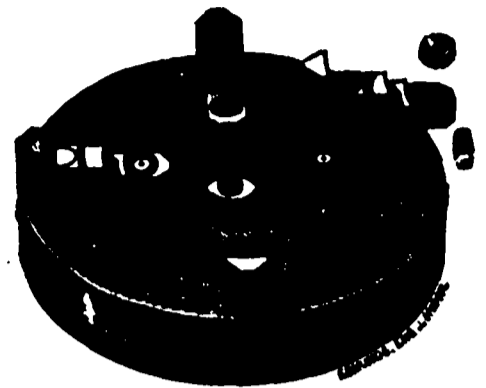
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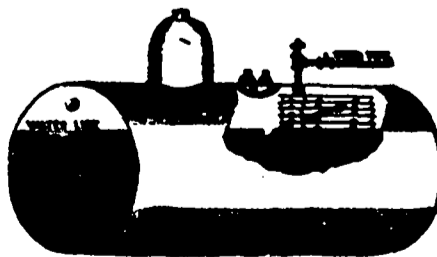
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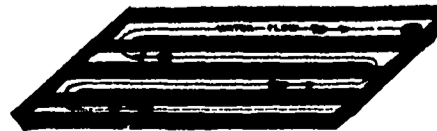


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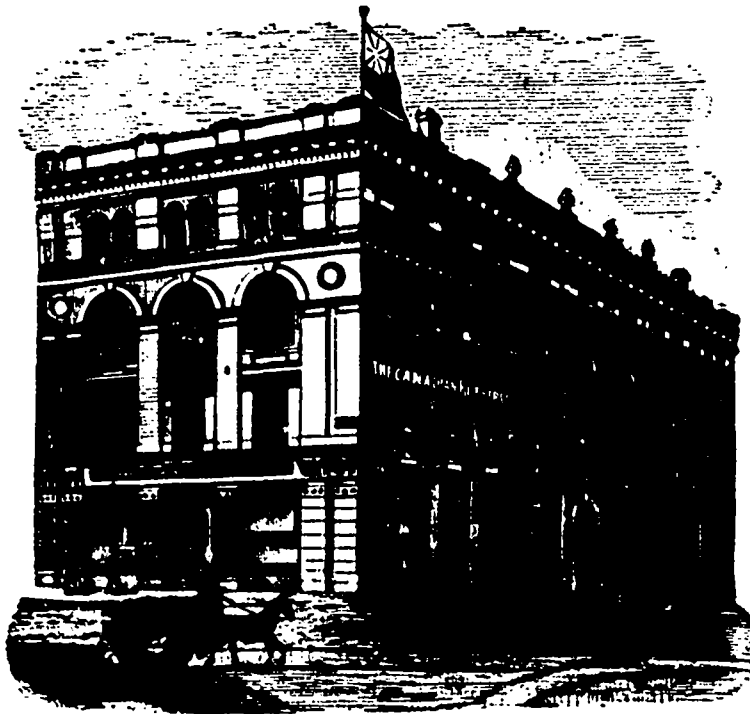
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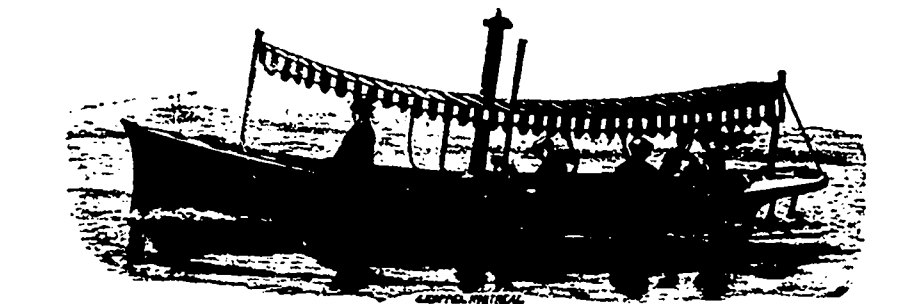
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