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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. X.—No. V.

TORONTO, ONTARIO, MAY, 1888.

Price, 10 Cents
\$1.00 PER YEAR.

NEW WORKS OF THE CANADA JUTE COMPANY, MONTREAL.

WE present to our readers this month an illustration of the new factory of the Canada Jute Co., of Montreal, just erected on St. Martin street, and occupying the block between William and Basin streets. This company were the pioneers in the manufacture of bags in Canada, and commenced business in 1882 in a rather small way in the buildings 62 and 64 College street, Montreal, but within the last two or three years the demand for their goods has been so great that it has only been by steady continuous night-work that they have been able to fill their orders, and the premises have been found far too small for the needs of the business. Accordingly they last year purchased the block of land above mentioned, and have put up and now just occupied one of the finest and most artistic factories in the city. The building has been specially laid out and fitted to meet the wants of the industry, and no detail or appliance is wanting to make the works one of the most complete in America.

On entering, one notices that the whole of the ground floor is devoted to the finishing of the rough cloth, removing all fluff and hairs, bringing the fabric to a high polish, and effectually spreading the fibres into a close and firm web. Another flat is given over entirely to the cutting and sewing of the finished cloth into bags of all sorts and sizes, and the whole space appears to the visitor a medley of sewing machines, cutting frames and bags in all stages of manufacture, but, on close inspection, the apparent confusion resolves itself into the utmost amount of work possible to the area of the flat. Great dexterity is displayed by most of the young women operating the sewing machines—the average daily number of bags made being from 25,000 to 30,000—sizes and qualities varying from the small salt bags, made of bleached cotton to the large receptacles for wool, and other similar goods; but the medium-sized sacks of jute or cotton to hold 100 and 140 lbs. flour, etc., constitute the bulk of the output. On the next flat we are shown the steam presses for printing the bags in black or in colors, the latter, in bold and striking tints, being principally in demand; and adjoining this is the machinery for doubling and rolling hessian cloth, giving it a finish fully equal to that of the best Dundee makers. A large trade is now being done by the Company in this line of goods, and many firms who formerly imported from Scotland all their Hessians and burlaps, now procure their supplies from this factory, as by this new machinery any quality and width of jute cloth can be finished, rolled and shipped within an hour or two from receipt of order. The top flat of the factory is devoted to twines, tailors' canvas, black paddings, buckrams, hopsackings, finished Hessians, (both plain and striped,) and other classes of manufactured goods, in all of which lines a very large and varied stock is always carried.

Adjoining the factory is a large warehouse of four stories, which is filled with the raw material from which the bags are made. It has communication with the factory by large doors on each flat, so that no loss of time or labor occurs in bringing the stuff into the factory for

manufacture. This will especially facilitate delivery of orders for usual sizes of bags.

Messrs. Taylor & Gordon, of Montreal and Glasgow, were the architects of the building, the plans and erection of which have had the close personal supervision of Mr. George A. Drummond, the President of the Company.

A DIFFERENCE IN MILLERS.

AT one time grinding middlings properly was universally considered the most difficult thing in the business. And well posted millers still view it in the same light. But the idea prevails to an alarming

grade because in every grinding operation he had an eye to the finish.

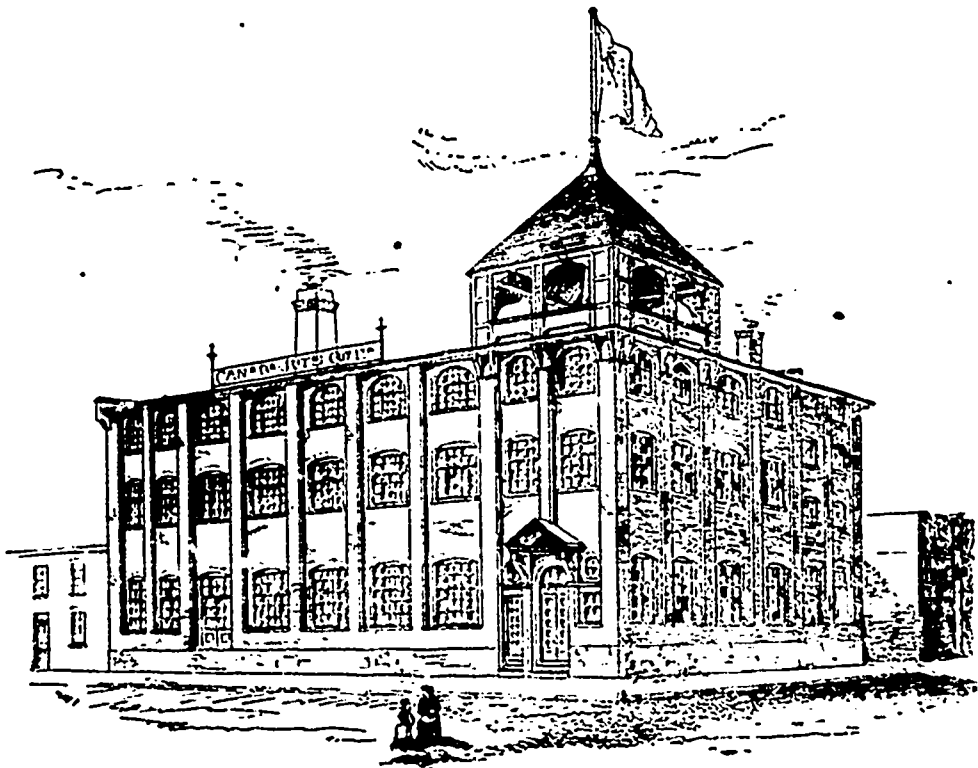
His smooth rolls, particularly, were in excellent condition and when properly adjusted at one point were equivalent at all others. Never *chewing up*, a portion of any stock in such a manner as to render the making of pure flour from it up to a finish impossible. Returning to the other mill we found things entirely different, especially with the smooth or middlings rolls; some were out of tram, and when set to grinding at the ends, the central parts were pulverizing both flour and feed material into powder, inseparable. Some were loose in their bearings—held in position by their weight, and

being irregularly fed, when the feed was heavy they were pressed apart, letting much material pass untouched, and when the feed was light the entire mass was powdered. The grinding faces of some were not true with the bearing faces of journals carrying them, and at some parts of a revolution the faces would contact, ruining the stock, while at other points the stock escaped untouched. The trouble was in neglect of business by the one miller. He owned up and quietly sent his rolls to the machine shop. And his mill is now striking a different lick.—*Exchange*

A CHANCE TO MAKE MONEY.

PERSONS who are looking for a short cut to fortune and who find their running expenses heavy, might, to their great advantage, go out into their works of whatever character, and see the money they are losing in the want of system and the waste which prevails in most places. This seems, on the fact of it, a very strong statement, yet it is true. When we reflect that good

managers are as scarce as money-makers, it is not hard to realize that a great deal of money is actually thrown away for want of knowing how to keep it. Instance the first: How many lines of shafting are there in a shop, say 100 feet long, that one man can turn with the belts off? How many are there that twenty men can turn? Few, if any, and yet there is no reason why every line of common shafting in a shop 100 feet long should not be revolved readily by one man taking hold of the rim of a 24 inch pulley. Now, this is a single instance only, and it is perfectly safe to say that useless friction eats up more money than any other single loss. What is true of the shafting is true of the machines in the same sense; it is true of the engine also as the steam gauge shows if anyone will try the simple experiment of either indicating the engine in the usual way for friction, or taking the steam gauge for a guide and observing how much pressure it takes to run the shop without any work on. All lay much stress on this point because it is an important one in economical management. Fuel and labor are the two heaviest items of expense, and it takes 25 per cent. of the power of the engine, as it does on the average, to move the shafting and engine, such concerns are simply throwing away their profits. A careful engineer can save employers many dollars in the direction indicated, and they should be encouraged to do so by premiums or a certain percentage upon the amount saved.



CANADA JUTE COMPANY'S NEW BUILDING, MONTREAL.

extent that ability to grind middlings took its departure as an essential to the good miller when smooth rolls took the place of mill-stones for the purpose. That such is a mistaken idea we are prepared to offer some proof from recent practical experience. A short time ago in Iowa, we visited a town having two mills which were waging a bitter competitive warfare. One concern was being worsted badly. And their head miller took us into his confidence plainly stating the case, winding up with—"perhaps you can tell me where the trouble is?" Said he: "The mills—this and the other fellow's—are almost exactly alike in bolting, programme and grinding equipment. In fact they were built by the same company—and our stock is similar. Our break-flour is as much alike as one black eyed pea is like another. Our bran and shipstuff is as clean as theirs. But the trouble is they beat us bad in quality and quantity of high grade middlings flours, and while they make only half as much low grade as we do, their's brings fifty cents a barrel more than ours." As it was a matter in which we expected to aid one without injuring another we told our questioner that we would visit the other mill before we looked his over and undertook to offer any advice. So we went to the other mill. And there we found a first-class man in charge of a good mill. Sure enough! in the middlings department was where he was getting in his work on the "other fellows" and his manner of grinding was the sole secret of success. And he wound up with clean offal and a small per cent of good low

MILLING IN WESTERN CANADA.

By D. WYLIE BUCHANAN.

IN last month's issue of the DOMINION MECHANICAL AND MILLING NEWS I gave a brief sketch of milling in Winnipeg up to the date of the establishing of the first roller mills in the country. As previously noted the first roller milling in this western country was done in the year 1882, during which year McMillan's stone mill was changed to the roller process, with a capacity of 300 barrels, and Ogilvie's 1,000 barrel mill was also completed and put in operation. Two years later the Hudson Bay Co.'s mill at Winnipeg was changed to the roller process, with a capacity of 200 barrels per day. These city mills have already been fully described.

The largest and most important mill in the West, and also the oldest roller mill, outside of Winnipeg, is the fine mill of the Portage Milling Company, located at the prosperous and rising town of Portage la Prairie, fifty-six miles west of Winnipeg. The mill is known by the name of the Assiniboine mill, and is operated by a joint stock company, of which H. M. Campbell is president, B. S. Thompson secretary, and J. McLenaghan manager. This mill was erected with the best machinery and in a substantial manner at the start, and has accordingly been able to work to the best advantage. The mill has been kept running steadily, and a large trade has been done. Last season it was found necessary to increase the capacity of the mill, for which the building afforded ample room, and now about 300 barrels per day can be turned out. The flour is largely shipped direct to Montreal. The company also has a branch warehouse at Winnipeg for the sale of its goods. One great advantage with milling at Portage la Prairie is the fact that the bulk of the wheat required for grinding can be purchased at the mill door. The famous Portage Plains, now known all over Canada, form a wheat-growing region second to none in the world. Here wheat fairly luxuriates in the rich prairie soil, with its deep black loam. The Ontario farmers who visited Manitoba last season were loud in their praise of this region. One of them could hardly find words to express to the writer his wonder on seeing two teams of heavy horses attached to a binder get stuck fast in cutting a swath only half the width of the knife. This was on a Portage Plains farm. But to return to our subject, as intimated most of the wheat ground at this mill is purchased from farmers at the mill door. In connection with the mill is an elevator, with a capacity of 115,000 bushels. There is a second mill at Portage, which is worked partially on the roller principle. This is the Marquette mill, operated by G. W. Bourne. The town also boasts of the Pioneer oatmeal mill, owned and operated by Johnson & Barclay, both old mill men. Mr. Johnson founded the roller flour mill at Fort Qu'Appelle, which he sold out to engage in the present enterprise. Mr. Barclay lately operated one of the oldest flour mills of Western Manitoba, located at Birtle. As it was, of course, a stone mill, it had to be abandoned when the railway arrived at Birtle. He then went into partnership with Mr. Johnson in the Pioneer oatmeal mill at Portage la Prairie. As in the case of the flour mills, the oats are purchased at the mill door. The manufactures of the mill are standard, granulated and rolled oatmeal and rolled oats, pot and pearl barley. The trade of the firm extends to the Pacific coast of British Columbia to the west, and occasional shipments of oatmeal are made to Eastern Canada. An elevator was erected in connection with this mill last season. In addition to these mills, Portage la Prairie has two grain shipping elevators of 50,000 bushels capacity each, owned respectively by the Ogilvie Company and the Farmers' Elevator Company. In season a number of grain dealers are in the market, and considerable quantities of grain are shipped out, in addition to what is ground at home. This will show the importance of the place as a grain market.

Going westward from Portage la Prairie on the main line of the C. P. R., the next milling point is the busy little town of Carberry, 105 miles west of Winnipeg. Unlike Portage, which is one of the oldest settled districts of Manitoba, this is a new town, and has grown up since 1882. It is one of the leading grain markets of the west nevertheless, and a recent return shows that up to the time of writing \$81,000 bushels of grain (wheat, oats and barley,) have been marketed from the crop of 1887. There is a roller mill here of about 150 barrels capacity, operated by the Manitoba Milling and Brewing Company, a limited liability joint stock concern, of which W. L. Boyle is president, and R. T. Rokely manager. There are also several grain elevators and grain shippers.

Continuing on westward on the main line of the C. P. R., the next milling point is the prosperous city of Brandon, the second largest place in Manitoba, and the largest primary grain market in Canada. Brandon has

already taken in from the crop of 1887 considerably over 1,000,000 bushels of wheat alone, and a considerable quantity will yet be marketed. Brandon has one milling establishment, operated by Alexander, Kelly & Co. The mill was established almost with the commencement of the town, in 1882. It was first established on the stone process, but has since been changed to a complete and improved roller process. The capacity of the mill is 150 barrels daily. A large export trade is done, principally to Montreal, in addition to local business. The mill is kept going steadily, and has done a very successful business. Oatmeal is also manufactured at this mill, for which there is a capacity of about 200 sacks in a full day of 24 hours. There is an elevator in connection with the mill, with a capacity of about 35,000 bushels. Here also all the wheat required can be purchased at the mill door, and Brandon wheat is well known for its quality. There are four shipping elevators at Brandon in addition to the mill elevator, with a capacity of from 35,000 to 40,000 bushels each; also one smaller elevator of about 17,000 bushels capacity, and several flat warehouses. The following figures will show the growth of Brandon as a grain market: The year 1882 was the first year which there was a grain market at the place, when about 250,000 bushels of wheat were delivered. In 1883 the quantity of wheat marketed by farmers reached 450,000 bushels. In 1884 about 560,000 bushels were marketed, and in 1885 the amount had reached 900,000 bushels. In 1886 there was some falling off on account of the drought, and the figures from the crop of the year fell to about the same amount as in 1884. The wheat crop of 1887 has not yet been fully delivered, but when in will pull up pretty well toward 1,500,000 bushels. At one time during the present grain season there were seventeen buyers on the market, which will convey some idea of the importance of this place as a farmers' grain market.

The fourth station westward from Brandon, still on the main line of the C. P. R., is the little town of Oak Lake. This is a grain market of considerable importance. Here a 100 barrel roller mill was erected in 1885 by D. Moore & Son. Some time ago the mill was purchased by Leitch Bros., general merchants, of Oak Lake, who took hold and pushed the business vigorously. Late last fall the mill was destroyed by fire, but the elevator was saved. Messrs. Leitch decided to continue the milling business in Manitoba, and after investigating several districts, they decided to rebuild at Oak Lake again. The mill is now in course of construction, and will be ready for operation in the fall. It will be given increased capacity over the burned mill, and erected on the most improved plan. The capacity will be about 200 barrels. Messrs. Leitch have leased the new mill at Moosomin, which they are operating with the object of supplying their customers until their new mill is ready.

The next station west of Oak Lake is also a milling point. This is the town of Virden, situated 180 miles west of Winnipeg. Here a roller mill was erected in 1885, and is now operated by Hoster, Craig & Co. The mill has a capacity of about 150 barrels daily. The proprietors contemplate erecting an elevator this season. The mill was supplied with \$2,000 worth of new machinery last fall. Flour is shipped westward to British Columbia and eastward to Montreal. Virden is a grain market of considerable importance. The estimated receipts from the crop of 1887 amount to about 600,000 bushels of wheat alone. Virden is the last milling station on the main line of the C. P. R., within the Province of Manitoba. The next station westward where a roller flour mill is located is the prosperous town of Moosomin, in the territory of Assiniboia. This mill was commenced in the summer of 1886, but the project hung fire for a considerable time owing to certain financial and legal difficulties. Work, however, was resumed and the mill was completed last fall by T. Fletcher. The mill has a capacity of 150 barrels, and was built by E. P. Allis & Co., of Milwaukee, Wis. There is a small elevator in connection. Shortly after being completed, the mill was leased to Leitch Bros., of Oak Lake. Moosomin is the most important farmers' market in the Territory, and it is estimated that wheat deliveries from the crop of 1887 will amount to 300,000 bushels. There are two grain elevators of about 35,000 bushels capacity each.

The next point westward which boasts a roller flour mill is Wolesey. This mill was established by W. D. Cook and G. E. Cole, and is now operated by the firm of Cook & Cole. The mill has a capacity of about 125 barrels, and was completed in the summer of 1887. A 20,000 bushel elevator has also been erected. Messrs. Cook & Cole are practical millers, who have views of their own. The mill was built under their supervision, and the machinery was selected from several manufacturers, according to their views of the various branches of milling machinery. Wheat growing in this district

has not yet attained the magnitude which it has through Manitoba, but the quality of the grain marketed this season was very high.

At Indian Head station, 312 miles west of Winnipeg, and the second station west of Wolesey, is a roller flour mill of about 100 barrels capacity, together with an elevator. These were built some few years ago by the Bell Farming Company, but owing to the financial difficulties of the company the mill has not been operated for a year or two back.

The next station westward is Qu'Appelle. Here is located the mill of McMillan & Co., of Winnipeg. Messrs. McMillan were doing a large trade with British Columbia from their Winnipeg mill, and on this account they conceived the idea of building a mill in the western portion of the wheat-growing country, which would be considerably closer than Winnipeg to their British Columbia market. Consequently they erected a mill at Qu'Appelle in 1885. It has a capacity of 300 barrels, and is one of the most complete and successful mills for its size, in the country. As yet, there has not been sufficient wheat grown in the district to keep the mill running, but the difficulty will be obviated in time. In the meantime, wheat is brought to some extent from points in Manitoba. The mill is kept busy supplying the British Columbia and local trade, and also Indian contracts at times.

The last and furthest western mill on the main line of the C. P. R. is located at Regina, 356 miles west of Winnipeg. It is owned and operated by the Regina Milling Company, composed of J. A. McCaul, M. McNicol and J. R. Reilly. The mill was erected in 1885, and has a capacity of 100 barrels daily. Wheat has been shipped from this mill eastward to Montreal, but at present there is not enough grown in the district to keep the mill going steadily without bringing grain from stations eastward. For the local and territorial trade, grain can be brought from points eastward and ground to advantage, but this cannot be done successfully when it is desired to ship the flour oack eastward again. This difficulty, however, will be quickly obviated by increasing settlement and extended cultivation.

So much for the roller flour mills on the main line of the C. P. R. west of Winnipeg. Mills in other parts of the country will be dealt with in a following issue of this journal.



Messrs. James Jones & Son, the well-known mill furnishers, of Thorold, Ont., have made some changes in their advertisement this month that millers would do well to note.

Mr. James Thurston, of Canington, Ont., has engaged Mr. E. P. Cave, Thistleton, to remodel his mill, and readjust his programme, in consequence of which the mill will be shut down for some time.

Messrs. Stahlshmidt & Co., manufacturers of office and school furniture, Preston, Ont., have appointed Messrs. F. A. Wheeler & Co., of New York, as their Australian agents, with headquarters at Sydney.

Messrs. Geo. Wright & Bro., of Wareham, Ont., are putting up a 3 storey building for a new roller mill. They will still retain their stone mill, so as to furnish either stone or roller flour. The contract for the supply of all machinery and millwright work complete is let to Mr. E. P. Cave, of Thistleton.

Messrs. Kennedy & Son, Son, Owen Sound, Ont., have been awarded the contract for building two duplex power pumps for the waterworks of Welland, Ont. One of these pumps will have a capacity to raise 1,500,000 gallons of water, and the other 750,000 gallons every twenty-four hours; the price being \$2,675 at Welland.

The new mill at Durham, Ont., for which the town recently granted a bonus of \$3,000 to Mr. Robert McGowan, of Priceville, Ont., is now in course of construction. The size of the building will be 32x52, and will consist of stone basement, 10 feet high, and 3 storeys 12 feet high, solid brick. The mill will have a capacity of 100 to 125 barrels per day. The contract for the furnishing of all machinery and supplies, and putting the same in operation, has been let to Mr. E. P. Cave, of Thistleton, Ont.

Barrie, Ont., has granted a bonus of \$7,000 to Henry Sewrey to assist him in establishing a stove foundry in connection with his present steam engine and mill works.

The *Canadian Gazette* says the Dominion Government has decided not to take part in the coming Paris Exhibition, but care is being taken to insure that every publicity is given in the Dominion to the opportunities afforded by the Exhibition for the display of Canadian products and manufactures.

Snider & Steckel, millers, Plattsville, Ont., have compromised at 30c. on the dollar. Snider & Wismer, millers, Dooa, Ont., are offering to compromise at 8c., and T. & A. B. Salder, millers, German Mills, Ont., are offering to compromise at 10c.



THE LITTLE OLD MILL.

There's a little mill
At the foot of the hill,
And a little dam,
And a little old mill,
Shabby and still;
And the little old miller who once was there,
With snow-white clothes and powdered hair,
Who measured the grain,
And who took the toll,
He is now as silent and still
As the moveless wheels in the little old mill;
And he sleeps in the churchyard cold and 'lorn,
Near the little mill where he ground the corn.

Long years ago
In the Summer's glow,
And the Autumn's blow,
And the Winter's snow,
It was full of life;
The waters rushed through the narrow bay,
And the tick-tack song was heard all day,
Grinding the grain
That daily came
Down the crooked lane
To the old mill's door.
Poys and men—men and boys
Chatted amidst the old mill's noise,
Related their sorrows, spoke of their joys,
Joked and laughed for many an hour
While the miller turned the grists to flour.

Where are they
To be found to-day?
They silent are and still
Like the miller and the mill.
All their grists of life have been ground;
All of them sleep beneath the mound;
For like the mill
At the foot of the hill
They had their day
And passed away.
Some were weak and others were strong;
Some died young, while others lived long—
One by one they dropped by the way,
And not a survivor lives to-day.

But the mill runs along
With the same old song
And the same fresh glow
Of years ago.

Warm and cold, it never grows old;
And its banks still bloom with crimson and gold,
Just as it did when the miller was there
With snowy garb and powdered hair;
And the life stream flows
Through joys and woes;
And others now ride
On the life-long tide,
Just as those did who went to that mill,
Just as those to follow us will,
Till the wheels of Time shall stand as still
As the rattling wheels of that old mill.

—West Chester Local News.

The Ogilvie Company will convert their grain warehouse at Neepawa into a 40,000 bushel elevator.

H. W. Hansell, of Pense, Assa., has purchased the interest of I. R. Reilly in the Regina Milling Company.

Mr. James Carnegie has purchased the Port Perry grist mill, planing, door, sash, etc. factory and saw mill.

Adam Nelson, of Mountain City, Man., has leased the mill at that place lately operated by Frank Belford.

The McFarlane Milling Company, Sherbrooke, Que., have recently introduced roller machinery into their mills.

In Canada and the United States the loss of mill property through fires during March amounted to \$350,000.

Mr. W. C. Caldwell, of Lanark, Ont., will add the necessary machinery to his mill for manufacturing rolled oatmeal.

The town of Neepawa, Man., will grant Messrs. Timewell & Son, of Winnipeg, \$500 towards the erection of an elevator at that point.

The Limerick Harbor Commissioners have reduced the tax on foreign flour imports entering that port from two shillings to one shilling.

Messrs. Dobson & Campbell have made arrangements to take possession of the grist mill at Woodville, and will put in the roller process.

Mr. S. A. Milligan, formerly miller at the Huron Roller Mills, Penetanguishene, has taken charge of the Simcoe Mills, Tottenham, Ont.

Assignments of flour mill operators in Ontario are reported as follows: Thomas and Isabella Holmes, Chatham; Stephen Harvie, Glenmorris.

Joseph Savage was sentenced to twelve months in the Central Prison recently for tampering with the machinery in May Bros' flour mill at St. Thomas, Ont.

The farmers of Gladstone, Man., express a strong desire for a 75-barrel roller mill, but it is not likely they will undertake the work without outside assistance.

The Lyan Valley mills, near Simcoe, Ont., have been sold by auction to Mr. Wm. F. Sinden, formerly head miller for Mr. N. C. Ford, for the sum of \$5,400.

The decision of the Grand Trunk Railway Co. to close the elevators at Dalhousie and Port Colborne has been changed. The elevators will be run this season as usual.

Mr. Priner, owner of the flour mill at Battleford, N. W. T., has contracted with the Dominion Government to do the grinding for the Indians of that locality for a period of six years.

The Belle River grist mill owned by W. & J. G. Greer, Toronto, was burned to the ground recently. Loss, \$10,000; insurance about \$2,000. This is the third mill burned on the same site.

An esteemed contemporary gravely asserts that Mr. Denne, of Newmarket, has shut down his planing mill for the purpose of putting in the Cochrane system of rolls. This is funny enough for Grip.

Mr. Judson computes that by the proposed Niagara Ship Canal which is intended to bring large steamers of 3,000 tons or 100,000 bushels 141 miles nearer New York than they can now come, there will be a saving of freight charges of not less than three-quarters of a cent per bushel.

A by-law for the purpose of issuing debentures to the amount of \$3,000 to be offered as a bonus to secure the erection of a roller process flour and grist mill in the town of Glenboro, will be submitted to the ratepayers of South Cypress, Man.

Mr. J. B. Pierce, who had intended to erect a new flour and saw mill at the village of Blairton, Ont., will select Marmora village instead unless the citizens of Blairton will bonus liberally a four mile line of railway to connect the village with the C. P. R. and C. O. R.

The Dickson Co., intend making considerable improvements at the old Otonabee flour mill, Ashburnham, Ont. The capacity of the mill will be increased from about 125 barrels to 200 barrels per day. They will also erect an elevator with a capacity of 30,000 bushels.

The sales of oatmeal by the Oatmeal Combine last month are said to have been nearly 50 per cent less than during the previous month. Considerable oatmeal is said to have been imported into Ontario from Manitoba, and to this is attributed the decreased sales.

The Oatmeal Millers' Combine doesn't appear to be working satisfactorily. Only twenty out of a total of about sixty mill owners have joined the organization, while several prominent manufacturers have entered into open competition with it. It is the inability of the minority to regulate the action of the majority that necessitates so many meetings and prolonged discussions on the part of the combine. We should not be surprised to hear of its early dissolution.

The Joint Stock Company's grain storehouse and contents at Chatsworth, Ont., were recently destroyed by fire. About 5000 bushels of grain, the property of G. Goods, of Toronto, and fifty cords of wood were consumed. The storehouse was built in 1882, at a cost of \$2,300, and had a capacity of about 40,000 bushels. It was insured in the Queen Insurance Co. for \$1,333.

A representative meeting of millers belonging to the Dominion Millers' Association was held in the Board of Trade rooms in this city on Thursday, April 19th, to consider the proposed amendments to the Grain Inspection Act. The changes suggested by the various Boards of Trade and by the grain and flour merchants of the country were fully discussed and their adoption will be recommended to the Government.

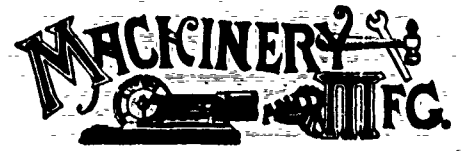
The present tariff act enumerates a list of articles which the Canadian Government are willing to place on the free list as soon as the United States Government removes the duty from similar articles imported into that country from Canada. This list includes wheat, flour and bran. Sir Charles Tupper has introduced a motion to strike wheat and bran and also Indian corn, and Indian meal from this list. In other words it is his intention that

these articles when imported into this country should be subject to duty irrespective of any action of the United States Government in the direction of altering the American tariff.

It is extremely difficult, says the *Millstone*, to finish red-dog on rolls, and we believe that the mill can be operated more profitably and satisfactorily in every way if the last reduction is made on buhrs. This applies more particularly to stock from soft wheat—such wheat as grows in the winter-wheat section and the soft spring wheat. If wheat be very hard it may be possible to carry out the full roller idea, but even then it is better to use buhrs because it takes less machinery when rolls are used than where buhrs are used judiciously. The sentiment which dictated the use of full rolls, which brought about the full roller mill idea, is giving away to common sense and buhrs are now used where it is advantageous.

PUBLICATIONS.

THE thirteenth annual report of the Ontario Agricultural College and Experimental Farm has reached our table through the courtesy of the Minister of Agriculture for Ontario. From the report of the President we learn that the attendance at this institution of purely Agricultural students, is as large as any other college on this continent, except two.



The Whitty foundry is to be operated by the Mowat Manufacturing Company, of Toronto.

Vancouver City Iron Works, at Vancouver, B. C., are expected to begin operations on May 1st.

All the mills and factories along the Welland Canal were lately closed in consequence of the water being drawn off.

It is reported that the Canadian Pacific Railway Company intend to put up extensive workshops at Lachine, Que.

Mr. Russell, of Millbrook, is trying to make arrangements to manufacture at Port Hope a new patent non-exhaust steam engine.

The Government has given the Kingston locomotive works the contract to construct fourteen locomotives for the Intercolonial railway.

The Standard Oil Co., of the United States, is said to have obtained control with a view to operating the Alpha oil refinery at Sarnia, Ont.

The citizens of St. Mary's, Ont., have carried a by-law to grant a bonus of \$30,000 to the Maxwell Manufacturing Co. to remove their works from Paris, Ont., to that town.

Messrs. Keough & Protter's foundry and machine shops at Chatham, Ont., which were recently destroyed by fire have been rebuilt on a larger scale, and are once more in operation.

It is said Messrs. Walker & Son, of Walkerville, have offered the Barium Wire & Iron works Company, of Windsor, a free site, free dock and coal at wholesale prices if the company will remove to that place. They also offer to subscribe for a certain amount of the company's stock.

The estimate of an English chemist, recently published, credits a ton of ordinary gas coal with containing 1500 pounds of coke, 20 gallons of ammonia water and 140 pounds of coal, resolvable further into 70 pounds of pitch, 18 pounds of creosote, 15 pounds of heavy oils and other amounts of naphtha, yellow naphthaline, alizarine, aurine, aniline, toluidine anthracine and toluene.

The use of gasoline as a fuel for small motors is taken advantage of in a recent invention of a small engine to be attached to bicycles and tricycles. With this it is claimed a maximum speed of ten miles an hour can be attained upon level ground. Sufficient fuel and water can be carried for a tour of twenty-five miles, and the weight of the whole plant, with tanks filled, is but 185 pounds.

Manufacturers who contemplate putting in the incandescent electric light, on representations that the amount of power required to drive the required dynamo or dynamos is quite insignificant, not worth considering, etc., are advised by the *Locomotive* to go slow. The lights are generally wanted at the precise time of the day and the year when the amount of steam required for other purposes, especially heating, is at a maximum, and a power required to furnish them is very considerable. Not more than ten incandescent lights worth having can be furnished continuously for one horse-power at the engine, and some of them require more power than this.

A Brockville, Ont., paper says: "Messrs. Boyd & Co. bought from Mr. Brown, of St. Chrysostom, Que., lately, the engine and boiler at one time used by the South brothers in their saw mill. On unscrewing the cylinder-head the other day, the workmen were astonished to find the interior filled with rubbish, which proved to be a squirrel's nest and the remains of its winter store of food. The little fellow had found an entrance by the steam pipe and following the sinuosities of the valve-box with the ease of a first-rate machinist had made its home in the cylinder, which it completely filled with its gathering food."

A Toledo paper says: "The stockholders in the Cochrane Manufacturing Company, after thorough investigation of the Cochrane patents, have decided not to put their money into the scheme unless they (the Toledo parties) are indemnified by Cochrane and Fuller against any loss which might fall upon them by reason of the alleged co-partnership in the patents by Geo. T. Smith, of Jackson, Mich. The facts in regard to Mr. Smith's claims have been published. Mr. Fuller, who represents Mr. Cochrane, has written the Toledo parties, refusing to guarantee any such indemnity."

The Ogilvie mill in Winnipeg is turning out 850 barrels a day. A grain elevator will be built at Louisville, Ont., by T. B. Jackson.

The new 1,250 barrel Keewatin mills will be started early in May.

A. K. McLeod, of Birtle, Man., has rented the High Bluff flour mill.

There is said to be a good opening for a flour mill at Manitou, Man.

The oatmeal combine has decided not to increase prices at present.

Over 1,500 car loads of flour have passed through the Sault during the past month.

Mr. James Pettenger, of Nostand, has purchased the grist mill at Fenelon Falls, Ont.

A new 54 inch turbine water wheel has just been put into Norris roller mill at St. Catharines.

The erection of large elevators, coal docks and mills is contemplated at Sault Ste. Marie.

The large Keewatin mill is converting wheat into flour at the rate of 1,200 barrels per day.

The northern elevator in this city is to be closed in a few days to allow of repairs being made.

The ratepayers of the municipality of Norfolk are advocating for a grist mill at Austin, Man.

A grain elevator will be built at Waterford, Ont., by Dr. Duncombe and Mr. R. Shannon.

The milling firm of Vassal & Niquette, Grantham, Que., has been succeeded by H. Vassal.

A joint stock company is being formed at Birtle, Man., for the purpose of erecting a flour mill.

J. M. Lowrie, grain dealer, Birtle, Man., will erect an elevator of twenty thousand bushels capacity there.

Steam Department.

INJURY TO BOILER PLATES.

By G. C. ROBE.

A VERY common trouble in the use of externally fired boilers, such as the ordinary horizontal tubular boiler, is that over the fire a bulge appears, generally at an unexpected time, and a time when it is very inconvenient to stop the boiler for repairs. It may prove not only of interest, but of practical service to consider the cause of this trouble, which is always an annoyance and loss, and may be a source of very great danger. The invariable cause is, that by some means the passage of the heat through that particular portion of plate to the water within the boiler, has been interfered with, and heat has accumulated in the plate instead of passing on into the water.

In a proper condition for work, the boiler plate would be such a good conductor of heat that the temperature of any part of the bottom, although exposed to the action of a hot fire, should only be slightly above that of the water. It should also be so uniformly heated that there are no points of sudden change. Changes there must be, but these should be gradual. Hence bridge walls and brick flues and such like, should always be so built as neither to cause abrupt turns in the current of flames, nor to make the flame impinge too severely in any limited space of the boiler surface. So long as clean water can be kept in contact with the inside of the plate, no amount or intensity of heat which can be produced in the boiler furnace and applied to the outside, can do any injury. It follows then, that there must be something which prevents the water taking the heat from the plate. This something is something in the iron itself, and when such is the case it is usually some impurity which had got into the iron during the process of the manufacture of the plate, and which really divides it into two or three thicknesses. The outer thickness becomes hotter than the inner one, and expands more, and consequently buckles out and separates further away from the inner thickness. There is then a portion of plate which has the heat on the one side and no water on the other, and it is rapidly destroyed. The "blister," as it is called, thus formed, may cover only a very small surface, or it may affect a whole plate.

No amount of care on the fireman's part can prevent "blistering" if the defect exists in the plate, and the defective part is exposed to sufficient heat. These defects or flaws cannot very well be discovered in a boiler, even by a skilled inspector, unless the separation of the thicknesses has actually begun, when one whose ear is trained can detect them by the change of sound when lightly tapped with a hammer. They can be detected in the plates before they have been worked at all. There are several ways of doing this, but the most certain is to heat the entire plate to a dull red in a suitable furnace, and then lay it flat in a bed of dry powdered ashes and watch it while cooling. If black spots appear while the surrounding parts are still red, the plate is not sound, and will blister.

These remarks apply to iron plates, and there is a certain comfort to boiler owners in knowing that steel boiler plates, which are now so much used, do not "blister," and cannot be made to do so. Steel plates may bulge out of shape, and do so to a greater extent than many kinds of iron—the reason being that the tougher the material, the larger the bulge may be, if the conditions for producing one are there.

Bulging out of shape is produced by the whole thickness of plate becoming overheated. If some poor conductor of heat cover the inner surface of the plate, or a portion of it, and so keep the water from contact with it, overheating and bulging will follow.

The process of producing a bulge is as follows: The heat is prevented from getting freely through the plate, and then accumulates in the metal. In a short time the heat is sufficient to soften the plate enough to permit it to yield to the pressure within, and the heated part blows out. Sometimes it is unable to withstand the drawing out, and cracks and opens at the point of the bulge, thereby causing a leak which again brings the water into contact, and prevents the further injury by heat for the time. In the case of select and of high class iron, such as Lowmoer, a very large bulge may be made without any crack, but the metal is thinned by being drawn out and strained, and sometimes is burnt, and so loses its strength, and is then a very positive danger.

This kind of mishap is nearly always a preventible one, and generally speaking, is an indication of ignorance or carelessness on the part of the man in charge. Scales gathering on the tubes and upper parts of the boiler, and becoming loosened and falling to the bottom often causes a "bulge" of this kind. The loosening is

sometimes caused by use of purger, and sometimes by efforts to remove the scale by hand labor.

Two men spent a whole day cleaning out a certain boiler which three days after gave out with a bulge and crack over the furnace. About a bucketful of small pieces of scale was found on the injured part when the boiler was opened.

Grease on the plates is another common cause. This may get into the boiler from the exhaust steam being used to heat the feed water. A coating of grease thinner than a coat of paint is sufficient to cause overheating. Feed water heaters in which the exhaust steam mingles with the feed water, should be avoided when oil is used as a lubricant in the cylinder.

Water containing much mud or sand, and liable to form a thick slush in the bottom of the boiler, will cause injury by overheating much more frequently than if a firm hard scale be formed.

The only safeguards are: use clean water, free from grease, and as free as possible from mineral deposits, and make sure that the boiler is regularly examined and thoroughly cleaned.

CHEAP ENGINES.

By ALIOMATH CUT-OFF.

THE question of cheap engines is one in which the whole of our manufacturing interests are vitally interested, and one which the great majority of proprietors understand the least. In a growing country such as Canada, where capital is scarce and the rate of interest high, one of the first things to be considered is first cost. Great care should be taken on this point, for very often the manufacturer, in trying to save money or expense in starting a plant, will cut it too fine, and put in a fuel-eater that will turn out to be a very dear engine in the end.

The cheapest engine is that which will give us the greatest power for the least expense of fuel, maintenance and space occupied. First cost of the engine should only be considered in conjunction with all the other requirements of the case. In the old country there are many engines of medium size, say from 75 h. p. to 200 h. p., that have been in use many years, and are running very cheaply both for fuel and repairs. These are beam engines with condensers, and are expensive. In fact, some of them are standing upon foundations that cost as much money as we in Canada want to put into the whole of the power, boiler and foundations all complete. The fact that the opportunities for small factories in this country are great, made a demand for something cheaper, and brought out a horizontal slide valve engine, with higher piston speed and higher steam pressure than was used in the old country. This naturally reduced the first cost, but the fuel bills and repair accounts went up, so that the advantage was not as great as it appeared. We then had the automatic cut-off engine introduced, and it is here in great variety first, with a releasing valve gear, then with a positive one, pressure and piston speed increasing all the time, and now the tendency is to compound condensing engines with very high pressure and fast piston speed. This array of mechanical merit is all here for the buyer to choose from, and in addition to all this the would-be purchaser has to run the gauntlets of agents and engine builders, all of them representing "the very best engine now built;" so it is rather a hard nut to crack. Mr. A has an old slide valve engine that suits him, claims it to be economical in fuel, and a perfect success. Mr. B has just discarded one of the same, and claims he has effected a large saving in fuel; but Mr. C also has a new high class automatic engine that does not do any better as far as fuel is concerned than his old discarded slide valve did. Now this kind of evidence is very confusing to the buyer, and it is only surprising that more mistakes are not made.

In buying a steam plant it will pay every time to consult a good practical engineer. Some time ago the writer was called into a large mill to see why their first-class automatic engine was so expensive to run. It was said there must be something wrong with the engine, as the fuel bills were abnormally high. About the time the new engine was put in, the mill was remodelled and some new machinery added. The machinery in this mill was computed to take about 55 h. p. to run, and when we put the indicator on that engine it was taking 40 per cent. more than 55 h. p., and the engine was blamed for what turned out to be a very bad arrangement of shafting and application of transmission of power. The remedy for all this, is for the purchaser to consult some disinterested party who has the mechanical ability to properly advise him. A few dollars expended in that way may save a very large sum before the engine purchased is worn out. Steam is still, and will be for some time to come, the great prime mover of

the mechanical world, and the science of steam engineering will steadily advance. Men who intend to follow the profession of steam engineering for a livelihood will perforce be obliged to study and work until they have attained the ability to advise with and help the employer in all matters pertaining to the steam plant. When this is accomplished, the employer will be saved many dollars, and much trouble and annoyance. A good piece of advice for employers is: Get a good engineer, and use him and his experience and advice in all things pertaining to his business, and we will have more cheap engines that are worthy the name than we now have.

A Bill has been introduced in the Dominion Parliament by Mr. Cook which provides for the examination and licensing of persons employed as engineers elsewhere than on steamboats, and requires that any person claiming to be qualified to perform the duties of an engineer in connection with a stationary engine shall be subject to an examination. If the Board of inspectors is satisfied with his character, habits of life, knowledge and experience, it may issue a license, which shall be renewable yearly. The cost of the first license shall be \$5, and of each renewal \$1. This license may be revoked for negligence, unskillfulness or drunkenness, or upon the finding of a coroner's inquest. A penalty of \$200 is prescribed for the offence of serving as an engineer without license or of employment as an engineer of a person who has no license.

MAKING ARTIFICIAL FUEL.

THE waste resulting from all sorts of products suggests to the *Chicago Journal of Commerce* that there is a considerable field for experiment and manufacture in utilizing these waste products for other useful purposes. It is stated that after being once started a garbage crematory will make fuel gas out of the garbage to run itself. If this be the case, there must be gases in the garbage which might be utilized in connection with other small supplies of fuel to furnish some valuable product for fuel or other use.

The large amounts of sawdust annually thrown away is also a suggestion of making a foundation for other products, either of fuel or for absorbing waste petroleum or to mix with culm in the preparation of fuel.

The waste coal and waste gas tar and very cheap crude petroleum are also suggestions for the production of some kind of economical fuel.

Crude petroleum in connection with fuel should be rather an ingredient to lead to utilizing other products than to be consumed directly.

In this connection, it comes to mind that the use of raw coal as at present practised, ought to be rather a means of producing supplies of fuel instead of being wasted by imperfect consumption as at present. Soft coal is cheap and dirty, and one-half its value is lost in the present unscientific practice. If the stove men will give the public a soft coal stove which will convert the coal into gas previous to consumption, they will do the world a favor.

NEW APPARATUS FOR TRANSMITTING FORCE.

A FRENCH engineering professor, M. Raymond Sayers, of the Louvain university, has invented an apparatus for transmitting force between bodies moving at greatly varying velocities without accompanying disadvantage of a violent collision. The method consists in furnishing the contact surface with steel brushes, which, by the entanglement of their "bristles," are enabled to grip one another. In this way the swiftest motion may be imparted gradually to a perfectly stationary body and a maximum of shock can be arranged for which can never be exceeded, be the impelling force and velocity what they may. The inventor has in view chiefly the requirements of quickly moving lifts, railway trains and the other bodies moving at high speed and with great momentum; and if it is possible to produce in this way an effective brake, or to obtain an automatic working of railway signals, much will be done to minimize some of the most serious perils which at present threaten life and limb to industrious occupations.

The *Times*, of Victoria, British Columbia, says there is now on the *lipis* a scheme for the erection of a gigantic sawmill and lumber manufacturing establishment on Esquimault harbor. The concern will be one of the largest on the coast, and equipped throughout with the best and most modern machines. It will be in close proximity to the railway. Truck cars for conveying logs to the mill from up the line will be utilized. They are now used largely on the Sound and in the lumbering districts in the east. It is claimed that the mill will effect a great saving in the towage of logs and vessels by being erected in the spot named. Several extensive lumber men are at present in the province looking up timber and selecting claims.



PUBLISHED MONTHLY,
 BY
CHAS. H. MORTIMER,
 Office, 31 King Street West,
TORONTO, - - ONTARIO.

ADVERTISEMENTS.
 Advertising rates sent promptly upon application. Orders for advertising would 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 third day of the month.
 Special advertisements under the headings "For Sale," "For Rent," etc., 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 letters, 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.

ANNOUNCEMENT.

IN view of the impression sought to be produced by interested parties that the MECHANICAL AND MILLING NEWS is published solely in the interests of the flour milling industry, we desire to make a brief statement regarding the character and purposes of this journal. It was never the intention of the founders of the paper, nor of its present publisher, to make it a medium of information solely for millers. The word "Milling" in its title heading was, and still is, designed to include saw mills and planing mills as well as flour mills. On the other hand, the word "Mechanical" was intended to indicate that the paper would treat of mechanical matters generally. Owing to the complete revolution which has taken place of late in the process of flour manufacture, and the desire on the part of millers to obtain all the information possible regarding the roller system, considerable space has been given to that subject, and this has perhaps lent color to the statements of those who from selfish motives would like to narrow the field of our enterprise. Upon consideration it has been decided that this journal will in future devote itself exclusively to the interests of owners and operators of flour mills, saw mills, planing mills and iron-working establishments. In order that there may be no room for further misrepresentation or doubt as to the classes among whom it circulates, and whose interests it seeks to serve, its scope will in future be conspicuously indicated on the title page. The MECHANICAL AND MILLING NEWS has for several years enjoyed a large circulation among saw and planing mills, machine shops, etc., as well as among flour mills. This circulation we feel confident will rapidly increase as a result of the greater attention which will in future be given to matters affecting the interests of those engaged in these three great branches of industry.

THE farmers who have been complaining that no protection is given to them by the tariff, will be pleased to learn that a motion is to be introduced in Parliament by Mr. Adam Brown, M. P. for Hamilton, which is designed to protect the farmer from the wiles

of the patent hay-fork man, the vendor of "superior" quality seed grain at fancy prices, and the other sharpers who have heretofore lived in luxury on the proceeds of promissory notes given to them by the unprotected, innocent-minded farmer.

IT is to be regretted that the Dominion Government cannot see its way clear to do away with tolls on vessels passing through the Canadian canals. The charge of 2 cents per ton which prevailed last season, has been fixed as the rate for this year also. Small as this charge is it places our water routes at a disadvantage as compared with the Erie canal.

EVERY Canadian who desires to see the resources of this country developed, and employment given thereby to our own people, will be pleased to hear of the substantial growth of the coal industry in Nova Scotia. Statistics to hand show that the total production of coal in Nova Scotia for the year 1887, was 1,670,836 tons, an increase of 318,635 tons over the previous year.

AN American contemporary tells how to make cheap hand grenades. Some of the hand grenades purchased by manufacturers in this country, and in which the fullest confidence was placed, proved to be, when a fire occurred, very "dear" articles, as owing to their inefficiency valuable property was destroyed. The cheap hand grenade is the one that will aid in putting fire out. This kind, however, appears to be scarce.

THE Patent Record for March which should have made its appearance five or six weeks ago, has not yet come to hand. The Government should see that the duty of punctuality is better observed on the part of those who have the management of this periodical, in order that the periods between each issue may be more regular. Perhaps when the new Government printing bureau takes the work in hand, it will regulate the irregularity.

THE European farmer who is thinking of trying his fortunes on this side of the Atlantic, and is endeavoring to make up his mind as to the best spot to locate, will be interested to know that Dakota farmers are buying their seed wheat from Manitoba farmers. Not only so, but they are paying 40 cents more per bushel for it than they could purchase Dakota wheat for. The Canadian Northwest has the soil and climate to grow the finest wheat in the world, and what is more, there is enough of such land to supply all the European farmers who may desire and who know how to cultivate it.

THE natural gas fever has attacked the Dominion with great vigor. Almost every city and town in Ontario now has its natural gas company, the earth is being bored full of holes, and if reports to hand are correct the country will shortly present the appearance of a vast volcano. It is a very regretful reflection that the people of this country have for years been paying a large part of their incomes to gas and coal companies, while heat and light in abundance might have been had for the mere trouble of boring a hole in the ground. Now that we have made the discovery, had we not better give the gas and coal monopolies notice to quit?

LAST year so many vessels found profitable employment carrying iron, that grain shippers could only charter vessels at high figures. In view of the profits made by vessel owners last season, a very decided impetus was given to ship building, and large sums of money were invested in new vessels in the expectation of receiving large profits out of the business. Unfortunately for those holding such opinions, the activity in the iron trade has subsided, most of the vessels engaged in that trade last season are this year on the lookout for cargoes, and the competition thus brought about is forcing rates down to very low figures. Those who put their money into ship-building are consequently not in an amiable frame of mind at present.

AFTER an exhaustive discussion of the question in all its bearings, Parliament has decided against unrestricted reciprocity with the United States by a majority of 57. At the same time, it has shown its desire for reciprocity in natural products by placing on the free list certain articles, the duty on which has recently been removed by the American Government. By this action the Canadian Government has shown itself ready to fulfil the promise made when the National Policy was adopted. While there appears to be a probability of reciprocity in natural products between the two countries in the near future, the advocates of unre-

stricted reciprocity seem further than ever from the goal of their desires.

EVERY person who desires the happiness and prosperity of his fellow-countrymen in all parts of the Dominion, will be glad to know that railway monopoly in the Northwest has been done away with. It could not be expected that the C. P. R. would give up its privileges without compensation. It is, however, satisfactory to know that the amount of the compensation agreed upon is not immoderate. The result of the recent negotiations has apparently infused new life into the people of the northwest. Discontent seems to have disappeared, and in its place a strong hope in the country's future has sprung up. This bit of experience with the C. P. R. should teach Canadian legislators of the future to be very careful about granting monopoly privileges to any individual or corporation.

THE news comes from Buffalo that efforts are being made to get the railroads carrying grain to that point to pay one-third of the storage rates on grain stored in Buffalo elevators. The elevator owners will allow a rebate of equal amount, leaving only one-fourth of a cent to be charged on the grain. By this means it is hoped to make Buffalo a great grain market. Following close on the heels of this despatch comes another which states that "Buffalo fears that the Canadian Pacific is scheming by means of the Schenectady & Ogdensburg railroad to drive the grain from that city." The last sentence seems to give us the key to the vituperative articles referring to the C. P. R. which have recently graced the columns of the *Milling World*, of Buffalo. We have been wondering all along whether our contemporary's assaults could be the result alone of righteous indignation for the "woes" of the down-trodden people of Canada. From the above extract the causes seem to lie nearer home. There is no man who prides himself so much upon his superior "cuteness" and ability to get the best of a bargain as the Yankee, and there is no man who shows himself so ill-natured when somebody a little sharper than himself gets the better of him.

WHEN roller milling was introduced into Canada, the more intelligent and progressive operative millers set themselves to the task of mastering the general theory as well as all the intricate details of the new system. In other words, they adapted themselves as speedily as possible by careful study to the changed circumstances in which they suddenly found themselves placed. These men are the successful roller millers of to-day, and few, if any of them, have found themselves without employment. The change from stone to roller milling affected another class of millers very differently. Instead of setting diligently to work to understand the new system, they professed to know all about it from the start, and sought to "pick up" the information they were supposed to already possess. Such men have naturally enough proved failures, and large numbers of them are constantly in search of situations. Occasionally they are put in charge of a mill, but after a few days or weeks of hap-hazard blundering, their incompetency is revealed, and they are discharged. This class of millers may confidently expect to meet with nothing but disappointment and trouble so long as they refuse to endeavor to master the principles underlying modern milling. In this connection we are pleased to hear of the success which has attended an Operative Millers' Association founded two or three years ago in Minneapolis, and which includes in its membership operative millers from all parts of the North Western States. The object of the association is the improvement of its members in the technical of milling. At its meetings millers give their opinions and compare notes on points regarding the methods most successful in the manufacture of flour. The nucleus of a library of standard, scientific and technical works has been formed, and rooms suitable for the use of the association have been procured. This organization, which has none of the features or purposes of a trade union, but aims simply at making every member a competent miller, is receiving every encouragement from the mill proprietors. We should like to suggest the formation of an operative millers' association in Ontario, with objects similar to those of the one above referred to. It might not be possible to get the members together as frequently as can be done in a milling centre like Minneapolis. Supposing, however, that a meeting or convention were held in this city every three months for the discussion of the principles and methods to be adopted by the successful miller, the result could not be other than highly beneficial to all concerned.

A TORONTO jury the other day awarded \$100 to a man who sought to obtain damages from his employer under the Ontario Factory Act for the loss of three fingers taken off by an improperly guarded buzz planer. This case should serve as a warning to manufacturers who refuse to provide necessary safeguards for the lives of their workmen. There are scores of manufacturing establishments in this country where exposed gears and other death traps stand awaiting their victims. We hope the provisions of the Factory Act which are designed to remedy this neglect on the part of proprietors of industrial establishments will be rigidly enforced. On the other hand, the number of accidents in such establishments would be very much lessened if employees therein would exercise ordinary caution in operating machinery. The carelessness displayed by employees in this respect is a matter of every-day observation and astonishment.



D. Sprague's saw mill at Winnipeg, will be in operation shortly.

Mr. Wm. Ramsay has lately refitted his saw mill at Sutton West.

The machinery has reached McLeod, Alberta, for McLaren's new saw mill.

Thornbury, Ont., is to have an extensive planing mill, and sash and door factory.

A new sash and door factory is being built at Schomberg, Ont., by Mr. A. Attridge.

Dr. Dierce will bore for natural gas in the rear of his planing mill at Fort Erie, Ont.

A Mr. Rodd is about to commence work on a shingle, saw and tie mill at Lindsay, Ont.

A quantity of new machinery has recently been placed in Shaw's saw mill at Bridgen, Ont.

Mr. Isaiah Ferr's shingle mill at Ferrville, Ont., recently destroyed by fire, will be rebuilt.

The failure is announced of D. J. McLaughlin, Jr., saw mill operator, Petitediac, Que.

The cut of logs on streams tributary to Rat Portage is estimated at over 80 millions this year.

The saw mill at Doon, Ont., owned by Messrs. J. and B. Bean, was destroyed by fire on April 9th.

Owing to scarcity of material Quebec saw mills will not begin operations before the middle of May.

The Georgian Bay Lumber Company have the largest number of logs ever cut in Matchedash, Ont.

Belleville lumbermen have commenced to drive the 200,000 logs hung up during the winter at that place.

The life of a planing mill is estimated to be about five years; that of a steam saw mill at seven years.

Mr. Tait, of the Bird Tail Tail Creek limits, has reported at Birtle, Man., over 3,000,000 feet of timber cut.

The following saw mill owners have assigned: Messrs. Train & Sons, Burk's Falls, Ont., and F. Baril, Warwick.

The coal company, Lethbridge, Alberta, intend using the bulk of the lumber cut this summer in their running operations.

It is reported that a good deal of lumber will be exported from Quebec to Melbourne, Australia, during the coming season.

The coming season's cut of lumber, lath and shingles in the Parry Sound district will be larger than that of any previous season.

Mr. Jas. D. Moore, St. Mary's, Ont., has purchased the planing mill of Messrs. Humphries, Richardson & Humphries, and will carry on the business in future.

Geo. Cassidy has sold out his saw and planing mills at Chatham, N. B., and is removing to British Columbia, where he will again engage in the same business.

The machinery of what is known as the West End saw mill at Minnedosa, Man., has been purchased by Mr. Peter McArthur, who will remove it to Lake Manitoba.

The fly wheel of a portable saw mill in operation in the township of Thurlow, Ont. burst a few days ago, destroying almost the whole rig, but fortunately injuring no one.

It is said the lumbering firms of McLaren, of Perth, Ont., and Ross, of Quebec, will erect a model saw and lumber manufacturing mill at New Westminster, B. C., this summer.

The E. B. Eddy Co., of Hull, Que., intend using locomotives of the dummy pattern in their lumber yards the coming summer, as is done by large lumber dealers in the United States.

In addition to the five million feet of logs cut this winter by the Minnesota and Ontario Lumbering Co., they will get out and saw about ten million feet, which they were unable to get out last year.

The value of forest products exported to the United States from Ottawa for the quarter ending March 31, was \$306,902, being an increase of twenty-one per cent. over the corresponding period of last year.

The Quebec Lumber Company's accounts are said to show a debit to profit and loss at the close of last year of £7,706, the balance of loss from 1886 to 1887 brought out in the revenue accounts is £314.

Messrs. J. & J. R. Gillies took out over 200,000 logs on their White Lake limits during the past winter. Their mills at White Lake will be run to their fullest capacity this season.

The Department of Public Works has been asked to give its approval of plans and sites for certain booms which the Restigouche Boom Company propose to construct across the Restigouche river.

In consideration of a vigorous protest on the part of Winnipeg lumber dealers against the use of British Columbia cedar for block paving purposes, the City Council will use pine grown within the Province.

The *Ampror Chronicle* says: A wonderful stick of timber has been cut and made on Mr. Thomas Hale's new Amable du Fond limits. It is twenty-six feet long, and averages twenty one inches wide, from top to bottom, on each of the four sides.

Casper Hillier in the *Lancaster Inquirer* dispels the idea that it takes 100 years to grow trees before they become profitable, by giving the results of his own experiments, showing that white pine 40 years old was 72 inches in circumference; hemlock, 48 inches; and walnut 35 years old reached a circumference of 54 inches.

The demand for lumber both at wholesale and retail continues brisk, and there have been some large sales, prices being steady. Some of the mills have sold their cut for future delivery at good prices, while others, in anticipation of a future advance, continue to hold on. In consequence of the stocks being light, prices are advancing.

The Royal City Mills Company, of Westminster, B. C., expect to have the railway being constructed by them for the purpose of hauling logs to the water's edge completed and in readiness for traffic by June 1st. The company has a canal 2½ miles in length at Mud Bay Camp, by which the logs are conveyed from the limits to the bay.

At the annual meeting of the Alberta Lumber Co., held at Winnipeg, W. Huntington, Henry B. Beard, of Minneapolis and J. B. McArthur, Hugh J. McDonald and J. S. Ewen, of Winnipeg, were elected directors for the ensuing year. In addition to laying out a town site, and making valuable improvements on the Red Deer, the company is erecting a first class saw mill.

Mr. F. Robinson, of Beane, British Columbia, has been on a visit to Ontario for the purpose of purchasing new machinery for his saw and planing mills. His purchases while here include a planer and matcher, heavy surfaces, giant water wheel, saw filing machine and set of skimmers. Mr. Robinson intends to manufacture during the coming season about three and a half million feet of lumber.

The lumber industry of Michigan is said to give employment to 50,000 persons, whose wages last year amounted to \$15,000,000. The capital invested aggregated \$60,000,000, and the product was: Lumber, 4,162,317,778 feet, valued at \$58,370,438; shingles, number, 2,677,855,750, valued at \$6,673,387, making a total value of \$65,043,825. The figures show an increase for 1887 over 1886 of 178,200,603 feet.

Representatives of the leading lumber firms met a number of officials of the Grand Trunk Railway at the Board of Trade rooms in this city on April 26th and protested against the recent advance in lumber freights on the Northern branch of the Grand Trunk. The representatives promised that the matter would receive the consideration of the Company's managers, and the decision arrived at will be reported at the adjourned meeting to be held on the 8th inst.

The Minister of Finance has introduced a resolution into Parliament investing the Governor General with authority to remove the export duty of \$1.50 a cord on shingle bolts; \$1 per thousand on spruce logs, and \$2 per thousand on pine logs, whenever it appears to his satisfaction that similar articles from Canada may be imported into the United States free of duty, or at a rate not exceeding that payable on the same, under such proclamation when imported into Canada.

Westminster Columbian: A gentleman from New Brunswick representing a large lumbering company on the St. John river, has been in the city lately with a view to securing a suitable site for the erection of extensive saw mills, which will cut lumber for the export trade only. The gentleman in question made a tour of the coast and came to the conclusion that Westminster was the most convenient and suitable point for the erection of the mills. He has now gone east to report, and it is probable that something definite will be done in the matter during the next six weeks.

The first man to accomplish the daring feat of running the Ampror slide on a stick of timber, says the *Chronicle*, was Alexander Oran, foreman for Conroy Bros. It was shortly afterwards performed by our Mr. James Havey, Jr., and "Chain Lightning" Stewart, who went through softly on the same stick. It was a very common thing for Stewart to do, and many a time he did it, just for amusement. Stewart was a remarkable man, and it is said that he did many daring acts on the river. He could handle a log cut of timber, as fast as any one, and it was a common thing for him—in the shanty, during the winter season—to mount the ground-stone and have the boys run it as fast as they were able, so as to give him feet practice for the spring drive. He came very near losing his life several times through his fool-hardiness. Once, I think it was on a slide somewhere in the vicinity of Black Donald Creek, Stewart undertook to run through on a stick of timber. It was a rough place, and the logs were very often broken after they get through, so steep was the pitch at the end. Stewart was warned by his companions not to make the attempt, but warnings were not new things to him, and, watching for a good piece, he jumped on it and was soon sliding along the narrow passage at a lightning speed. His comrades shouted at him to jump for they well knew that to go over that frightful pitch was certain death. At the end of the slide was a projecting beam, and when Stewart neared it, his well-trained eye measured the distance, and, making a bound, alighted safely on it. It was well he did, for if he had stuck to his timber his reckless career would certainly have terminated there and then.

Correspondents' Opinions.

This department is set apart for the free use of subscribers in advancing their opinions, expressing criticisms, or relating bits of shop practice or experience. The editor hopes to see it liberally employed and promises to enlarge it, so far as necessary, to accommodate communications.

THE SHORT SYSTEM.

Editor *Mechanical and Milling News*:

HASTINGS, Ont., April 17, 1888.

IN your issue of April 1st I noticed an article in advocacy of the short system from Mr. Dobson. I don't wish to controvert his opinions, but to my way of thinking he has cut it too short. If the quality of the work performed by his present short system is equal in every respect to that which can be produced by gradual reduction, then quick reduction would be an advantage over the gradual. Such, however, is not the case by any means. It is a fact well known to every well-informed miller that high grade flour, strictly speaking, can only be got from the best quality of middlings which gradual reductions can produce. I have worked mills of 100 to 350 bbls. capacity on all kinds of wheat, and I find that the mills which make the best separations are those which make the most money out of the wheat. When I hear so much talking about "short system milling" I feel like asking if those few who are its advocates are the only wise ones, and those who have studied the art for years the dark-minded ones. One obstacle in the way of the short system mill in this country is, that every miller thinks he can run one. The packer, sweeper or oiler, can make as good flour and as clean feed as any one, and this is just where the great big mistake is made. Not that a short system mill needs a better miller than a long system mill, but the best man is always the cheapest in the end, in any position. A system may be much shorter with six brakes than another with three.

The great question now before the milling world is: Cannot machinery be invented which will make as good flour with less outlay? There can be no better flour made than is now made on the six break system, but the time is coming when less expensive machinery will be employed and as good results obtained. All of us realize that this is a world of improvement, and most of necessity keep advancing, and yet when Mr. Dobson says he is making 250 lbs. per hour on his two break system of as good flour as any straight roller on the market, and cleaning his off's, I am given to think he is trying to boom the Dobson flour dressers, or possibly he has never had the opportunity of inspecting a six break mill that was doing first-class work. If so, I would advise him to do so before he again tries to push his two break ideas into anybody's head as being better than six breaks, for when he tries that on he denies the real principle of roller milling, which always was and always will be a gradual breaking, and not a grinding of the wheat berry. Hoping you will be able to find room for this in your valuable journal,

I am yours, etc.,

ROBERT TINCK.

PERSONAL.

Items of personal intelligence from or concerning persons engaged in the various branches of mechanical industry represented in Canada will always be welcome in this column, with the stipulation that the name of the sender be given, not for publication, but as a guarantee of good faith.

James Wesley, miller, has removed from Halifax to Dartmouth, Nova Scotia.

Mr. T. S. Williams, a member of the firm of W. B. Brown & Co., died at Simcoe, Ont., recently.

Mr. S. Briggs, of the Hart Emery Wheel Co., Hamilton, Ont., has gone on a three months visit to England.

Mr. George Corbett, senior member of the iron founding firm of George Corbett & Son, Owen Sound, Ont., is dead.

Mr. G. Hastings, manager of the Ogilvie Milling Company's mill at Winnipeg, Man., is on a visit to eastern Canada.

John Stephenson was severely injured in Brennan & Son's planing mills at Hamilton, recently, by being struck by a flying board.

Capt. Clark, who is to have charge of the Canadian exhibits at the Glasgow Exhibition, has arrived on the scene of his duties.

The Hon. T. B. Pardee, Ontario Commissioner of Crown Lands, has returned from Florida where he spent the winter endeavoring to regain health.

The Toronto Board of Trade has granted its efficient Secretary, Mr. Edgar Willis, six weeks leave of absence, which he proposes to spend in visiting his parents in England.

Mr. M. McLaughlin, of the Royal Dominion Mills, Toronto, will embark in a few days with his family for Europe, where he purposes spending a well-earned vacation. We join with his many friends in wishing him bon voyage.

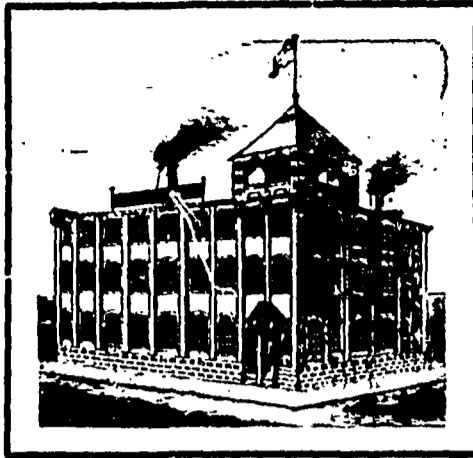
Mr. J. D. Naismith, the well-known baker, of this city, was a guest at the first annual banquet of the National Association of Master Bakers held in London, Eng., recently, and responded to the toast, "The health of our friends from o'er the border and o'er the sea."

Mr. W. Gillespie, proprietor of the Dutton, Ont., Mills, whose little daughter was so brutally ill-treated by her uncle, "Dr." Whiting, has the sympathy of the public at the present time. We join with thousands of others who have read the details of the cowardly offence in hoping that the inhuman monster Whiting may get the full measure of punishment which he merits.

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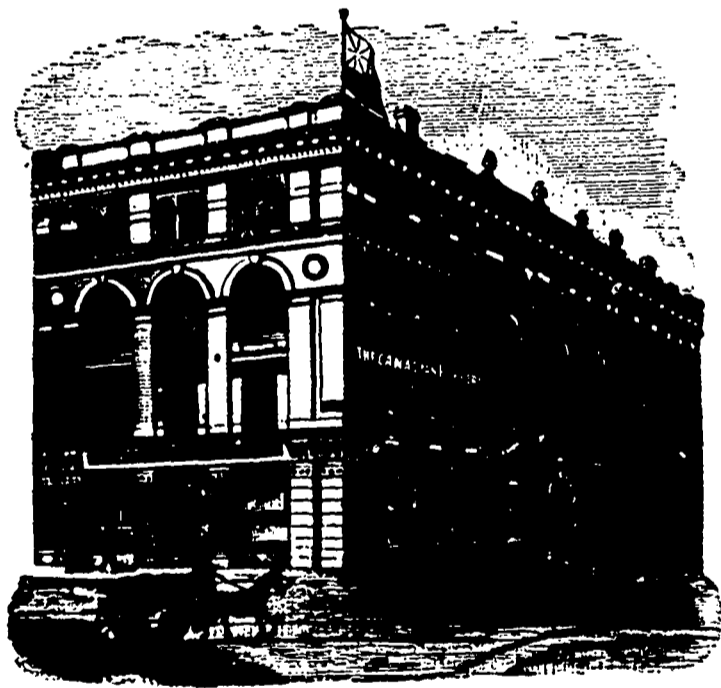
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W. SMITH, Manager.



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THE ATTACHMENT OF NOZZLES TO STEAM DRUMS.

TO the best of our knowledge we have never seen the nozzles of a large steam drum, that is, those forming the connection between the boilers and drum,

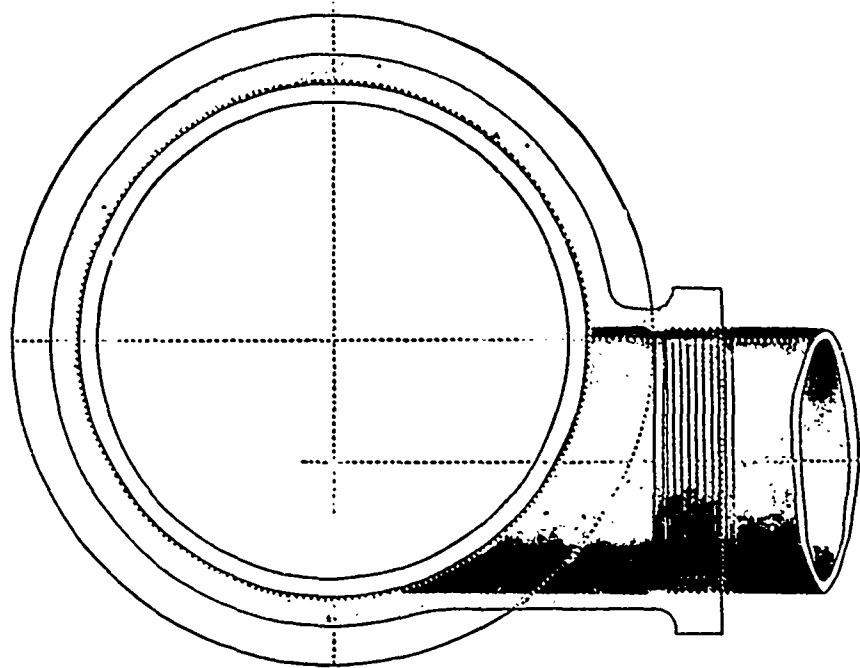


FIG. 1.

put on as they should be. This seems to be rather a sweeping statement, and may seem to reflect upon the abilities of our leading boilermakers, steam engineers, pipers, and others who have had more or less to do with the designing of such work, but it is nevertheless true.

For drums up to ten inches in diameter, made usually of ordinary steam pipe, the connections from the boilers are generally by means of the ordinary screwed tee. We will suppose, for instance, that four sixty-inch boilers are set in a battery. Then the drum would be of ten inch pipe, the steam pipe from each boiler, five inch, and they would connect with the drum with a 10 in. x 10 in. x 5 in. tee with inlet, outlet, and branch all threaded, and the whole screwed together.

So far this is all right.

But the pipes leading from the drum to the engine and other parts of the establishment are not usually the full size of the drum. They will oftener be found not over six inches in diameter, and are taken out by means of usual forms of fitting. These pipes being led horizontally from the drum, with all centers at the same height, leaves a chance for water to collect in the lower part of the drum. This is apt to cause trouble unless the drum is dripped. This drip must be connected to all the boilers and be furnished with valves so that the water may always be returned when but one boiler is running, and that one, any boiler of the battery.

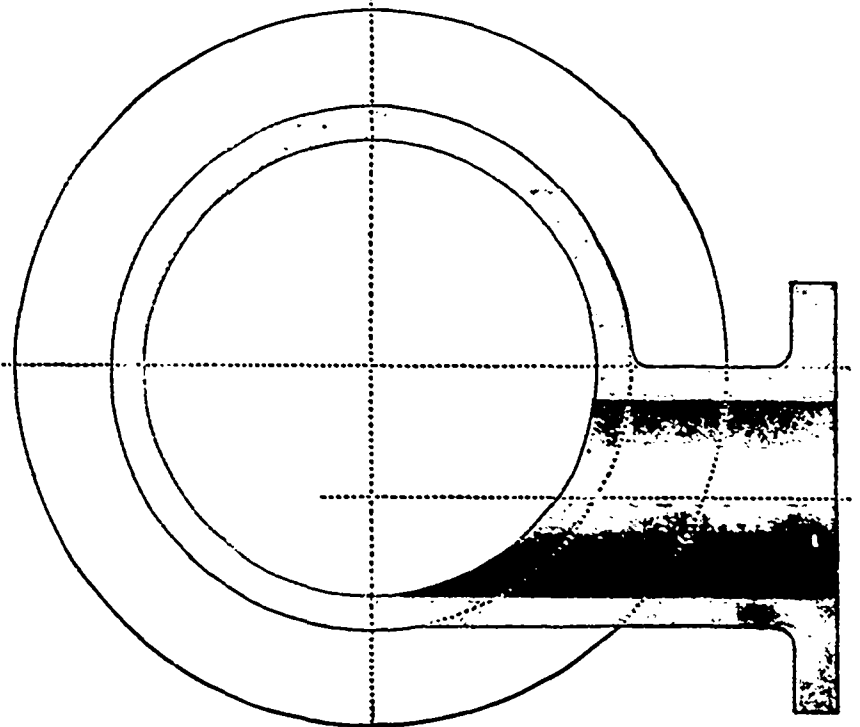


FIG. 2.

This arrangement works all right, but it is of the nature of a makeshift, and the work should be done in such a manner that it is not necessary.

The connections to the boilers should be made by means of eccentric fittings. Figures 1, 2, 3 and 4 show in section, fittings adapted to this purpose, which would cost no more than those of the ordinary pattern, and the expense of the drip connection would be saved.

Fig. 1 shows an ordinary screwed tee with the exception that the branch which receives the steam pipe from boiler is dropped, so that the bottoms of the pipes forming the drum and that leading from boiler are the same level. Then when connection is made with any boiler in the battery, the drum always has a chance to drip freely back into the boiler. Under no circumstances can water collect in the drum, and no extra piping is required.

Fig. 2 shows a section through the branch of a cast-iron flanged tee, such as would be used in making the connection with a pipe larger than ten inches in diameter. The same remarks apply as in the case of Fig. 1.

Fig. 3 is a section through a nozzle such as would be put on a large drum, either of lay-welded pipe, or a riveted-up drum. It should be put on eccentrically when connections to the boilers are made. For pipes leading out of the drum this is not essential, and the connection had better be

made as shown in Fig. 6 further on.

A word here about putting nozzles of this kind on to drums. A common way of doing it is shown in Fig. 5. A "shim" or caulking piece of wrought iron is put between the pipe and the base of the nozzle, and the rivets extend through pipe, shim, and flange of nozzle, and are driven from the outside. The joint is then made tight by caulking the edge of the shim. As the rivets are driven from the outside against the rigid cast iron flange, it is impossible to bring the flange and pipe into close contact, and very hard caulking is resorted to. Even this generally

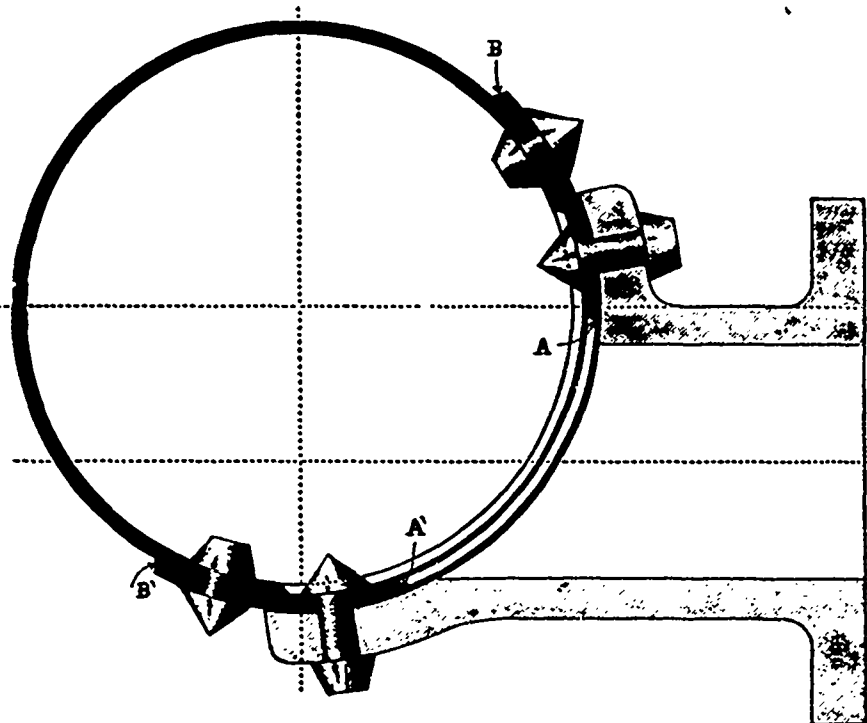


FIG. 3.

fails to make a permanently good job, leakage is apt to set in soon, and is difficult to stop. Fig. 3 shows a much better way to do this job. A patch is first riveted to the nozzles, and caulked at "A." This is then riveted to the pipe and caulked at "B." By this means a permanently tight piece of work is secured.

But a better way still to do this work, would be to use a mild cast steel nozzle, as shown in Fig. 4. The rivets can then be driven from the outside, the edge of the flange brought down closely to the pipe, and caulked at "A" in the usual manner. This form of nozzle would leave nothing to be desired. We believe that steel castings can easily

be obtained at the present time possessing the requisite qualities for a nozzle of this kind.

Fig. 6 shows the best method of making the nozzle attachment to drums of large size, either riveted up or made of welded pipe, when the branch pipe is taken out from the center, although for some reason or other it is seldom used. The cast iron screwed nozzle is simply riveted to the inside, which allows the rivets to be

driven from the outside, the iron of the drum is brought closely down to the flange of the nozzle, and the caulking edge is outside, in short a *good job is easily* made, whereas, if the nozzle is put on the outside of the drum a *bad job* is made at much *greater cost*. Of course if the drum is large enough to admit men inside to drive rivets, and do efficient caulking, as good a job can be made in one case as in the other, but such large drums cannot be advised. They are useless and expensive appendages.—*The Locomotive*.

PROPER HUMAN DIET.

By F. C. IRELAND.

FOLLOWING up the subject I commenced in your March number, the quantities of food there mentioned as necessary for the average man under average circumstances per day, appears to need a further explanation. The 4 oz. of protien, 2 oz. of oil or fat, and 2 oz. of carbohydrates may not be understood by the average reader. The protien is obtained from lean meat, white of eggs, curd of milk and the gluten of wheat. Butter and lard are known to be fats, while carbohydrates are obtained from sugar, starch and vegetable foods generally. To judge more properly of these constituents of food so necessary to our daily subsistence the 4 oz. of protien can be secured by eating lean meat, fish and animal food generally, and in doing so to remember that the two ounces of fat are to be taken with it and the 18 ounces of carbohydrates must be secured from cereal and vegetable articles, some of which, as wheat, contains a percentage of both the other two. Of all the various articles of food, wheat supplies the quantities nearest the

above table of any other. Corn meal and oat meal come next. People in ordinary occupations who eat abundance of meat, and but little vegetable or cereal food are reversing the order of nature and must suffer in consequence. On the other hand the wood-chopper and men in shanties exposed to the cold, can eat salt pork and beans in abundance and could not very well get along without strong food to supply the heat, energy and power required for other work, while if the same person should eat the same food in hot weather and during intervals of idleness, they would soon become sick. This is accounted for by the fact that fat yields twice as much energy as protien and carbohydrates, and that while one pound of white wheat flour contains as much energy as a laboring man under ordinary circumstances needs to keep his body warm and muscular strength to do his work, a pound of fat pork is equal to four of the wheat flour; consequently the person who eats the fat must work off in some way the extra energy and heat which he gets from the extra food. The heat contained in the bodies of some people is very great compared with others. In youth the heat is much greater than in older persons. Those who are shivering upon the slightest exposure to cold are not living on the right kind of diet, or are taking improper quantities of some kinds of food and not sufficient of other kinds. It is impossible to give full particulars so that people may be guided correctly in their diet, but one thing is certain, most people eat too much food that does not digest or nourish them properly. It is not what we eat, but what we digest, that nourishes the body. In this respect, the old maxim "the best is the cheapest," does not apply to human diet, except in its relation to nutritive value. Statistics have been carefully taken in parts of Germany, Great Britain and in the United States of the cost of

supporting working people, and here are the figures:— Families earning from \$250 to \$300 a year spent 62 per cent of their earnings on food. Those whose incomes were from \$400 to \$600 a year spent 55 per cent. on food; while those who had from \$800 to \$1,100 a year spent 50 per cent. of it on their food. In other words, the families

stomach is like a piece of intricate machinery. It has such an amount of chemical activity to perform in doing its work, that when any of its parts are weak or diseased they affect the whole being and disturb the equilibrium of the mental and moral sensibilities. The average man, in order to get the quantities of the various constituents

Legislature of France enacted a law against the use of yeast, but fashion overcame the law and the physicians too. The white bread prevailed, and the physicians' prediction has been realized not only in Toronto, but all over the world, until not only yeast, but baking powder manufacturers, have become a necessity, which further necessitates the increase of physicians and dentists. How true are the words of Rambler: "Few enterprises are so hopeless as a contest with fashion." Food reform is now becoming fashionable, and so there is hope of its success.

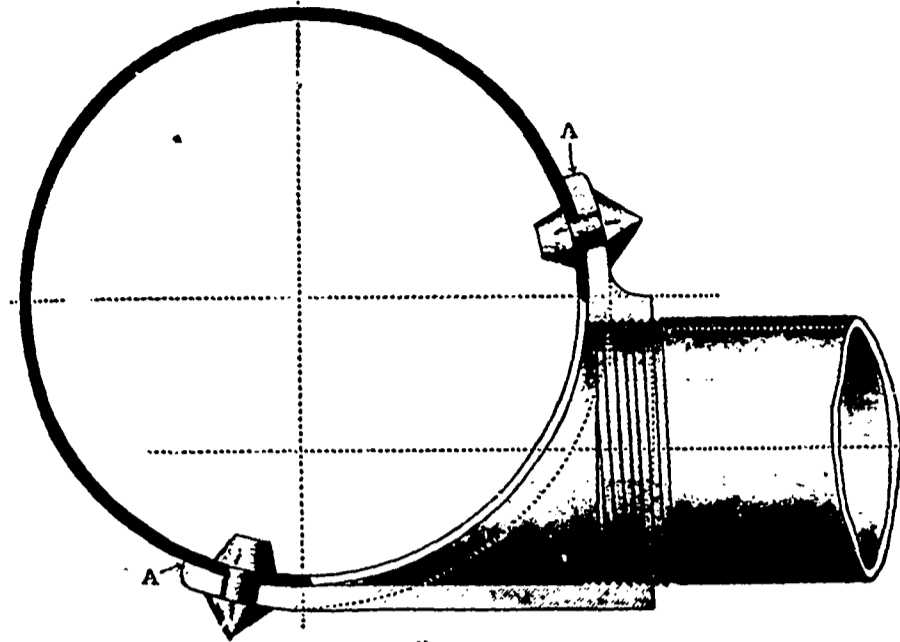


FIG. 4.

first mentioned lived and worked hard on \$155 a year; the next class lived and worked on \$275 a year; while the third class lived and worked not nearly so hard on \$450 a year. It is supposed that the two last mentioned classes had more sickness and less robust offspring than the first mentioned class who lived on half the money value of food. The waste of money on food each year is vastly more than is spent for education and religion, and add to that waste the amount spent in drink, and it is simply enormous, not to speak of all the attendant evils. Many temperance people are induced to drink for the purpose of assisting the stomach to digest the indigestible and improper quantities of food taken into it, and medical men sometimes take the awful responsibility of prescribing certain liquors for this purpose, instead of adopting the more difficult and consequently less popular means of regulating the diet. Liquors may satisfy the craving for relief from indigestion, but if the same diet is persisted in that caused the trouble, the relief and excitement will not be of long duration without a return to the poisonous remedy, until the disease returns so frequently that the remedy has to be as frequently taken, and in the course of a few years the remedy has made a drunkard, and that is the worst disease of all. If people would study the wants and wastes of the system, the kind and quantity of food necessary for their occupation, and eat to live, instead of living to eat, the evils of dyspepsia, neuralgia, bad teeth and a thousand of such ailments that afflict the people, would gradually disappear. Crime would also diminish, for it is now proved that many of the worst crimes are committed by persons whose passions are inflamed and their mental and moral faculties diseased. They are render-

the custom of drugging resorted to, and then more goods of the same kind, and in the same or larger quantities, are put into the hopper and ground and supplied to the stomach, which has been stimulated to activity by the drugs. For a time it does its work, but not long, for instead of the drugs and more food, all it wanted was rest—a complete cessation from food. It appears that half the people are afraid of starving to death, while the fact is they are eating themselves to death. The fasts of the ancients have disappeared, and so have the health, robust constitutions and power of endurance of the ancient to a great extent passed away. It would be a blessing to the world if they would study this subject. If the great laboratory of the stomach, with all its mechanical parts were better understood, the digestive apparatus could be better kept in order. How can a person run a machine properly without understanding its mechanical parts? It is not expected that every person can be a physician, but every person can understand enough of physiology to know how and what to eat to preserve health, strength and energy. It is of such momentous importance that it should take precedence of all others.

THE OATMEAL MILLERS' COMBINE.

M. R. D. R. ROSS, Secretary of the Oatmeal Millers' Association, has been summoned to give evidence before the Committee on Combines at Ottawa. Concerning the Oatmeal Millers' Combine Mr. Ross stated that there are about sixty oatmeal mills in Ontario, and that four of the largest could supply the whole Dominion trade in this article. The association was organized last summer. Previous to that time meal had sold at less than the cost of oats. There was 24 millers in the association out of a total of 60. The total output of the association was fixed at 135,500 barrels of oatmeal per annum. Each member was allotted a certain percentage. If he sold more than his allotted quantity he had to pay 30c. per barrel into the association. If a member sold less than he was entitled to he was paid 30c a barrel on the difference between his allotment and the quantity sold. Every month each member made an affidavit as to the quantity he sold, and a statement was issued to all the members of the association. The witness produced the March statement, which showed that fourteen members had produced 1,658 barrels of meal less than they were allotted.

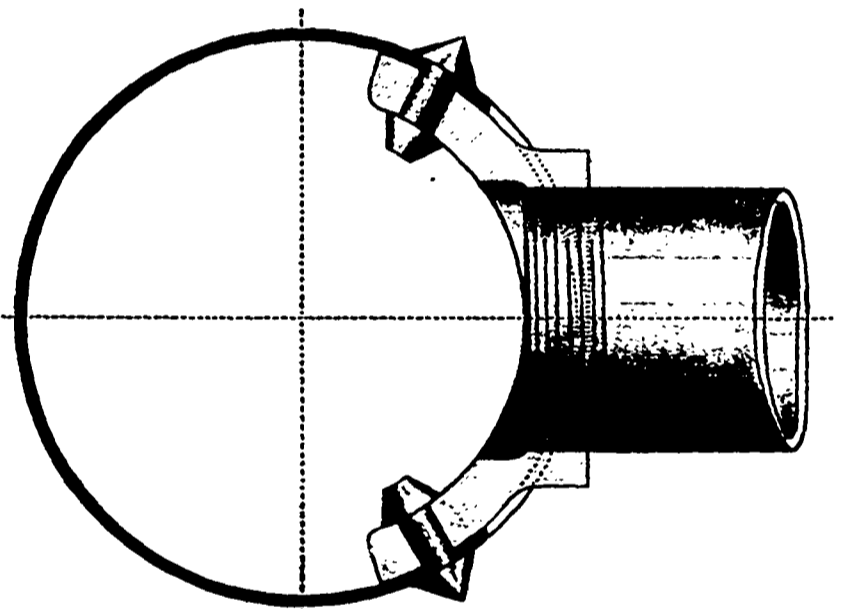


FIG. 6.

On account of their under production the association paid these members \$497.70. The total output of the association during March was 6,215 barrels. The witness stated that the association paid the owners of ten mills in Ontario to keep their mills idle. The amount the association expended for this purpose was \$526 per month. The lowest amount paid for keeping a mill idle was \$300 a year and the highest \$800 a year. The trouble was that the Canadian market was not large enough to consume the output of the mills. Two years ago when the exportation to Great Britain fell off the mill owners of Canada found their capacity was much larger than the demand. The reason it was impossible to export was because the oats sold lower in England than in Canada. If the millers had access to the American markets the business would become more profitable.

At a subsequent meeting of the Commission, the chairman announced that from the minute book of the Oatmeal Association he had discovered that, contrary to the statement of Mr. Ross, the combination had appointed Mr. Payne, of Stratford, to buy all their oats and that members who purchase oats elsewhere had to pay Mr. Payne \$1.50 per carload.

C. P. R. Supt. Whyte is investigating the charges made by Manitoba grain dealers who complain that in the returns from Fort William their wheat shipments were not holding out weight. He promises to have the grain carefully weighed before it is shipped, and if there is found to be a surplus he will divide it *pro rata* among the grain shippers who claim losses.

There was a strike on April 4th of carpenters and millwrights employed on the new flour mill at Keewatin. The object was to have wages put up to \$3 per day all round. The strike was a failure, some of the workmen refusing to take part in it, and others who did take part returning to work before the close of the day. The men who instigated the strike were discharged.

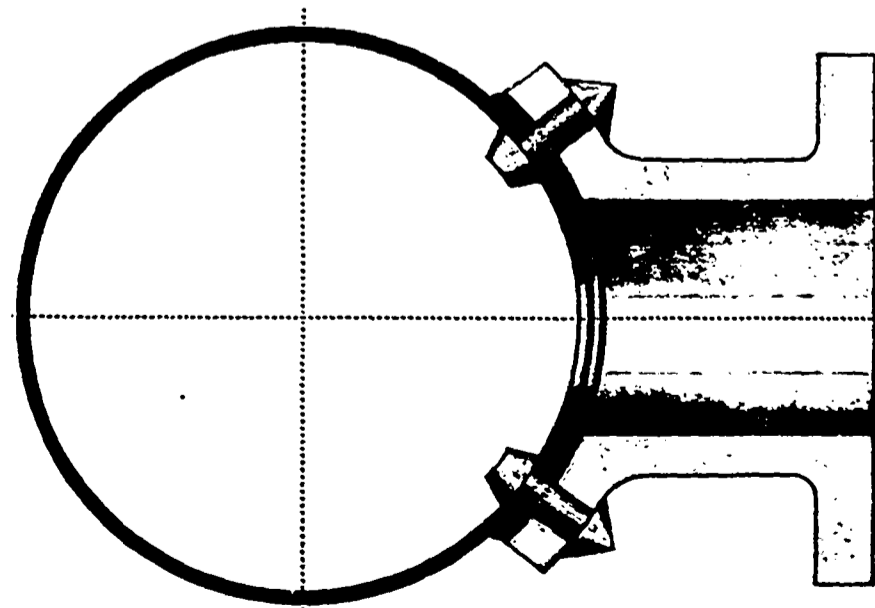
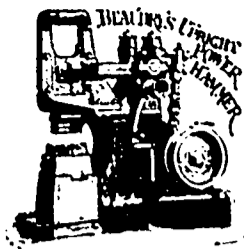


FIG. 5.

ed desperate without being restrained by some higher principle, rush out and are goaded on by feelings of dissatisfaction with themselves and every body else until with or without any provocation, they commit the sin that brings them to disgrace. If their mental, moral and physical health had been kept intact by proper living, they probably would not have done the deed. The

to please the age? When the bakers of Paris imported yeast from Flanders a hundred years ago, their bread was much whiter and lighter than that made by leaven, and in consequence of this it became very popular, but the physicians of Paris condemned the use of yeast as detrimental to the nation's health, and their condemnation was so strong that the



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No payment will be made to newspapers inserting this advertisement without authority having been first obtained.

FRED. WHITE,
Comptroller, N. W. M. Police.
Ottawa, March 20th, 1888.

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WELDING BY ELECTRICITY.

ONE of the newest discoveries in the field of electrical science is the use of electricity in welding metal almost instantaneously, forming a point of juncture as strong as, or stronger than any point in the original units. Prof. Elihu Thompson, the celebrated electrician, is the inventor of this remarkable process. The principle involved, says the *Boston Journal of Commerce*, is a very simple one, and has been in practical use in the Thompson-Houston works, at Lynn, for some months. Only two forms of machines have as yet been fully developed and put into practical working order. The theory in each case is the same. A strong current of electricity is passed through two powerful conductors, at the end of which are placed two clamps, in each of which one of the two units of metal is firmly secured. This clamping principle, apart from certain minor technical peculiarities in the method of applying the current, is the principal point of the invention. By modifications of these clamps, pieces of metal of almost any form can be so perfectly welded that the point of juncture cannot be distinguished, and that the strength of the joint is equal to that of any part of the solid metal.

The first form of the machine, and the one that is most used at present in the works, is called a "transformer." It consists of a huge induction coil, through which are passed alternating currents of high potential force, and they are transformed into alternating currents of low potential force. In the low potential circuit is obtained a current of one volt, or a fraction over, equal to from 10,000 to 30,000 amperes. To each end of the transformer is attached a horizontal conductor of solid copper several inches in diameter, and about a foot in length. At the end of each conductor simple clamps, working with thumbscrews, are attached. Into each of these clamps one of the pieces of metal is screwed, with the ends of the latter almost, but not quite, in contact. The current is turned on and easily regulated by a rheostat handle, working with a crank and screw. The operation of fusing the two pieces of metal, or different metals together, is the work of but a few seconds. A very strong current is required, but only for a limited time, and a very great amount of power is not necessarily needed to produce the desired result. The actual volume of the current, while it lasts, however, must be considerable. The temperature reached is an important feature, but cannot be determined by any definite rules. Experience, governed by a careful study of the incandescence of the metals, is the principal factor to success. By the color of the welding point, just as an ordinary blacksmith judges of the proper temperature of his two pieces of metal, must the important moment when the pieces to be welded reach just the right heat be determined. The temperature rises so quickly that it is concentrated directly upon the weld, and it is not diffused over the bulk of the metal. It is applied first to the centre of the bar, working thence outward, and the process is, therefore, directly the reverse of the ordinary method. This doubtless gives the superior strength to the welding point. This form of machine is used for lighter work requiring a moderate and easily controlled electrical energy. The second form, used for heavier work, is a plain upright dynamo of immense power, by means of which the current works directly through conductors of great concentrating ability. Upon the tops of these conductors the clamps are attached in various forms, according to the kind of work for which they are intended. The different methods of applying these clamps are matters of simple mechanical detail. The power of multiplying the number of forms, or combinations of forms and clamps is almost infinite. The latter form of machine is intended for heavy work, in which immense electrical energy must be used. The first form or "transformer," is intended for use in detached machines on different benches in a factory, but all operated from a central power. The dynamo machine works directly from the motor.

A series of experiments were recently witnessed upon "transformer." The most powerful machine is only used in repairing a broken shaft or in doing some other important piece of work. In the first, two pieces of wrought iron rod, one-half an inch in diameter, were placed in the clamps. The alignment of the latter is regulated so perfectly as to make a practically straight bar of iron after the welding is complete. The electrical current was turned on by the movement of the rheostat handle. The ends of the fragments immediately turned red, then yellow, and emitted a few sparks, and the welding was complete. The operation was finished in less than five seconds. When the solid bar of iron was taken out of the clamps, so perfectly was the heat concentrated upon the point of juncture that the ends were quite cool.

The heat, however, soon spread outward, and made

the red uncomfortably hot. No chemical or other foreign substance, except the usual pinch of borax used in ordinary welding, is employed in the process. This is necessary in order to keep the points of contact clean. When the proper fusing point is reached, a moderate pressure is applied, forcing the two ends firmly together and completing the union of the fibres. In this case the current had an electrical energy estimated at 1½ volts. Next, the welding of two pieces of copper rod, ½ an inch in diameter, was effected. In the first trial the temperature was rather too high, as the person operating the machine was somewhat inexperienced, and the regular welder was absent. The metal fused almost immediately, the incandescent running quickly up both rods for about an inch on each side of the welding point. The copper boiled and dropped like sealing wax held for a minute in a gas jet, only in the former case the operation was incomparably quicker. Owing to the excessive heat, a poor juncture was made, but only in so far as it left the axis of the complete rod not perfectly true. The second trial resulted in a straight rod of copper, which only required the filing away of a slight projection, or "lug," as it is technically called. The rod was then screwed firmly into a vise and twisted completely around once, showing the point of juncture to be as strong as the original substance. In both cases the rod near the weld was slightly oxidized. A fixture of cast brass of complicated and peculiar shape was welded so firmly that after the "lug" was removed, it was as perfect as ever.

Many curious specimens are shown to illustrate the manifold uses to which this invention can be applied. In all cases the welding was so perfect, even in fusing together two different metals, that when the "lug" was filed down, even the exact point of juncture could not be determined. One highly polished rod was made up of alternate sections of brass copper, German silver and iron. Malleable iron, wrought steel, or cast steel may be hammered into shape at the weld while the metal is red hot, exactly as the ordinary smith does it. A peculiarity of the electrical process is that it requires but very light hammers and strokes. Several cast-steel chisels, gouges, etc., which had been broken, were so skilfully welded that no one could tell, after the "dressing up" process, that they were not new tools. Cast-iron, which no smith has ever been able to weld, is united as well as any other metal, and it is not necessary to tinker up a rough fracture, but simply to fit the fragments together as neatly as possible. Copper or lead pipe is joined in so workmanlike a manner that the inside diameter is not materially diminished. Both lead and copper pipes that had been welded, were twisted into all sorts of fantastic shapes without yielding at the juncture. In one instance a perfect "collar" was put on a joint—that is, a ring was put on and welded on in the most symmetrical and substantial manner.

ment on the arm, whereby the pressure of the spring may be regulated, and a cam or incline on the frame against which the anti-friction roll has a bearing in the rotation of the carriage.

5. The combination, with the rotary carriage of a shingle-sawing machine, of a dog near the periphery thereof and guided in radial ways in said carriage, and arm connected to said dog and extending inwardly past the stationary dog toward the centre of the carriage, a spring pressing said arm and dog inwardly, a cam-surface on the frame in position to press out the said arm during a portion of the revolution of the carriage, and a support for the inner end of said arm.

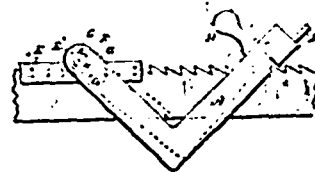
6. The combination, with the rotating carriage having a rack, of a shaft bearing a pinion engaging said rack, a pulley on said shaft, a counter-shaft toward the opposite side of the machine, having suitable pulleys and belt-connection to the pinion-shaft, a saw-shaft, and belt-connection from said saw-shaft, straddling the central arbor connecting to one of the pulleys on said counter-shaft.

7. In a shingle-sawing machine, in combination, a horizontal saw, a tilt-table supported on a universal bearing, a pendent lever connected to said table, means for tilting the table longitudinally, and a shifter for operating the table laterally during the longitudinal movement, whereby the table is tilted longitudinally and laterally at the same time.

8. The combination, with the horizontal saws and rotary carriage of a shingle-sawing machine of the character described, of a tilt-table at each side of the machine, a train of mechanism by which either tilt-table may be tipped by power communicated from the rotary carriage, a handle near the operator's position, and connections, substantially as described, leading from the handle to each tilt-table, whereby the tilt-tables may be separately thrown into operation.

Saw-Swage.

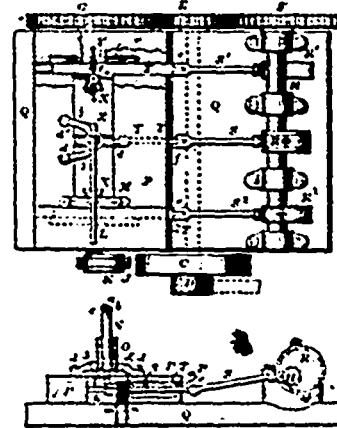
No. 380,758. Samuel Hill, Ottawa, Ontario, Canada. Filed Jan. 13, 1888. Serial No. 260,667. Dated April 10, 1888.



Claim. A saw-swage consisting of the body A, provided with a slit, B, to receive the saw, and having at one end a punch, D, and anvil C at the end of the slit, and the other end of the body provided with holes G and thumb-screw F, and a grooved bar, E, to bear on the top of the saw-teeth.

Nut Making Machine.

No. 380,244. Justin H. Burdick, Utica, Wis. Filed Dec. 5, 1887. Serial No. 256,966. Dated March 27, 1888.



Claim 1. It a nut-making machine, the combination of a bender, a pair of die blocks, and a mandrel, and mechanism for successively moving these parts in the order named toward a common centre.

2. The combination of a bender, a pair of die blocks, a mandrel, and a plunger and mechanism for successively moving these parts in the order named toward a common centre.

3. The combination of a bender, a pair of die blocks, a mandrel, and a plunger carrying a crower, and mechanism for successively moving these parts in the order named toward a common centre.

4. The combination of a frame, a pair of die blocks adapted to move within the same, skeleton safety pieces inserted in the outer ends of the die blocks and bearing anti-friction rollers, a shaft carrying eccentrics, connecting rods, thrust bars jointed to the said rods and bearing inclines adapted for engagement with said rollers, and retracting springs connecting the said die blocks with the frame.

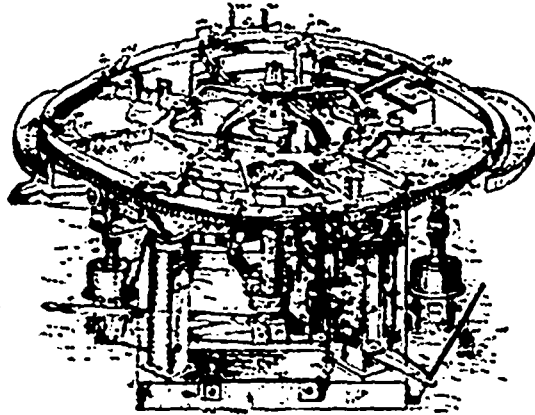
5. The combination of a frame, a pair of die blocks adapted to move with the same, a shaft carrying three eccentrics, thrust bars adapted for engagement with the die blocks and connected to the outer eccentrics, a mandrel connected to the intermediate eccentric and bearing a plunger, and a bender located above and adapted to reach the common centre to which the dies and mandrel are successively moved by the action of the said eccentrics and connections.

6. The combination of a frame a pair of die blocks adapted to move within the same, a shaft carrying eccentrics at each end, and an intermediate eccentric set out of line with the end eccentrics, connecting rods and thrust bars connected to the end eccentrics, a connecting rod and mandrel connected to the intermediate eccentric, a plunger and crower carried by a mandrel, and a bender located above and adapted to reach the common centre to which the dies and mandrel are successively moved, a shaft having a gear at one end forming a part of a train of gears in mesh with the gear of the described eccentric shaft and bearing an eccentric on its opposite end, a walking beam connected to the bender at one end, and a connecting rod jointed to the other end of the walking beam and to the last named eccentric.

Latest Canadian Patents.

Shingle-Sawing Machine.

No. 380,346. Willis J. Perkins, Grand Rapids, Mich. Filed June 30, 1887. Serial No. 242,938. Dated April 3, 1888.



Claim 1. A shingle-sawing machine having saws mounted on vertical arbors and a rotary bolt-carriage supported on a central vertical shaft, in combination with a lever extending from the outside of the frame to the central shaft, fulcrumed near and having a bearing on said shaft, whereby the shaft and carriage may be lifted to permit access of the saws.

2. The combination, with the rotary carriage and central vertical shaft of a shingle-sawing machine, of a lever formed of sections, the inner section fulcrumed near and engaging the central shaft of the carriage, and the outer section extensible beyond the outer portion of the frame of the machine.

3. The combination, with the rotary carriage of a shingle-sawing machine, of a central vertical supporting-shaft, a lever stepped under said shaft and extending outside the frame of the machine, and a swing-piece attached to the frame and adapted to engage said lever and hold it up or down.

4. The combination, with a rotating carriage of a shingle-sawing machine, of a dog near the periphery of said carriage, a bent arm pivotally connected at its outer end to said carriage and at its inner end bearing an anti-friction roll, a spring surrounding said

COST OF ELECTRICAL POWER PLANTS.

THE conditions of electrical power transmission have been thoroughly studied, by competent engineers, and are now so well understood, that those conversant with the political aspects of the subject are well assured that within a few years even the smallest towns and villages will supply themselves with electric light and power plant. In such places a plant of 50 horse power, or even less, will be quite sufficient to furnish a good profit on the moderate investment of capital required. The establishment of a power centre, even in a rural village, cannot fail to attract a greater or less number of small, though by no means unprofitable industrial enterprises, and the mere fact that such power can be had will in itself tend to rapidly increase the demand. The management of an electric power plant requires no unusual scientific knowledge. Once the station has been established it can be carried on by the ordinary intelligent class of mechanics and workmen who are to be found in every village. It is computed by statisticians, that the average price at which power is sold in the United States approximates \$110 per horse power per annum. A 50 horse power electrical plant, including the station building, engines, boilers, dynamos, distributing wires and fixtures, can be erected at present prices at an expense not much exceeding \$150 per horse power, and the gross cost of operating such a plant may be fairly estimated at about \$4,000 per year. Experience has shown, that in consequence of the intermittent demand for power by a group of miscellaneous consumers, it is entirely safe to contract to supply a quantity considerably in excess of the actual capacity of the station, so that indeed as much as 70 horse power might be sold from a 50 horse power plant, thus bringing a yearly gross revenue of \$7,000 or more and leaving a net profit of some \$3,000. When a good water power is available at a moderate outlay, the profits might be even more than we have estimated.—*Scrivener's Magazine.*

MONTREAL TECHNICAL SCHOOLS.

By D. J. CAMERON.

TO all who feel interested in the material progress and national advancement of our own country it is satisfactory to know that the Council of Arts and Manufactures of the Province of Quebec, is making steady forward steps in the direction of art industrial education. The establishment of free evening drawing classes in the Province of Quebec for instruction of a practical nature has already attained marked beneficial results, and a visit to the schools whilst in session, promptly dispels the notion which many people entertain, that drawing is a merely ornamental study, for there is no mechanical industry requiring construction which does not to some extent employ the principle of drawing, and in these evening classes which are conducted by competent practical teachers, the pupils are not only instructed in the principles and methods of construction, but are required to develop their conclusions in a practical manner with their own hands. The stair builder, after having made his plans, proceeds to lay off his material, and develops his reasoning faculties by erecting from his own plans the actual stairs.

THE SCHOOLS

There are eleven distinct classes in the Montreal evening school, each class meeting twice a week from 7.30 to 9.30 p.m. By kind permission of Mr. S. C. Stevenson, the Secretary of the Council of Arts, the writer was permitted to inspect each class at work.

The first class visited was the

FREEHAND DRAWING (ELEMENTARY)

conducted by Mr. Frank S. Cleverly, assisted by Mr. E. Bregent. This class has an average attendance of 98 pupils, two-thirds having daily employment as engineers, architects' pupils, carpenters, engine fitters, mechanical draughtsmen, etc., and the remainder are attending day school. The method of construction pursued in this class is similar to that recommended by the South Kensington School of Art. Junior pupils having no idea of drawing, are first given two points on their drawing paper, between which points they are taught to make a straight line. When this task—to the beginner a difficult one—is mastered, they are taught to draw a gate, a box, or some other simple subject. From straight to curved lines is the next step, and the pupil is given some outline object, such as tea cup and saucer, to work upon, and by graduated studies he is trained to a proper knowledge of form and proportion, and in this manner is prepared for the higher classes. The pupils being in all stages of advancement, a hard task is imposed upon the two teachers to give proper attention to each of the ninety-eight. This class should be divided, and one formed for boys attending school, and the other for young men in mechanical pursuits or offices during the day.

FREEHAND DRAWING (ADVANCED)

This class is conducted by Mr. A. Boissacq, A. R. C. A. It is intended for pupils more advanced than those attending the former class, being more comprehensive. It includes applied designs and drawing from the human figure or ornament. The majority of the pupils are engaged in industrial pursuits.

MECHANICAL DRAWING.

The teachers in this department are Mr. J. S. Gardham and Mr. S. C. Wilkinson. The instruction is of a very practical nature and is designed chiefly for mechanics. The ages of the members range from 14 to 35 and the occupations represented are: mechanics, 45; pattern makers, 8; moulders, 3; brass finishers, 2; plumbers, 2; tinmiths, 2; engineers, 1; clerks, 1; students, 3. The fact of these pupils working for the most part, ten hours dur-

ing the day and coming from all parts of the city to devote two hours to study, shows an ardent desire for advancement. Having provided themselves with necessary tools and materials, the pupils are first instructed in their proper use, and then proceed to do copy work of the simplest nature both in pencil and in ink. Having become a fair copyist, the pupil is given a sketch of some detailed piece of machinery, with dimensions, or a wooden model. The different views of the piece represented he is required to "lay down to scale and finish up" according to workshop practice.

ARCHITECTURAL DRAWING.

This class is under the direction of Mr. I. E. Vanier, C.E., and Mr. E. Belanger, and is intended for carpenters, builders and cabinet makers. The instruction consists of exercises in plane geometry and projection, and the pupils are also instructed in the details of framing plans and elevations of buildings and of working drawings. The majority of pupils are engaged as carpenters, cabinet makers and tinmiths, and as the use of tin for cornices and architectural decoration is of late entering so largely into building and construction, the opportunity for knowledge in this direction is duly appreciated.

MODELLING AND WOOD CARVING.

This class was formed for the instruction of marble and stone cutters, wood carvers, and for all whose occupations require a knowledge of the chisel. The necessary tools are provided free, and although the number of pupils in attendance is not large, the work that they have completed bears evidence of their industry and application. Plaster casts are chiefly used as models, the pupils commencing with simple forms and proceeding by degrees to more difficult subjects. The benches and lights are very conveniently arranged, and every facility is provided for the convenience of those at work.

LITHOGRAPHIC CLASS.

The object of this class is to afford apprentices and workmen engaged in lithographic establishments an opportunity to study and practice work, which they are not enabled to do in the places where they are regularly employed. The course of construction commences with the preparation of the lithographic stone, and proceeds by regular steps until the pupil is able to finish a drawing on the stone with pen, pencil or brush, ready for the press, thus gaining a knowledge of the whole process from the "graining" of the stone to the production of finished copies from the press. This class is attended by 18 pupils, who, under the able teaching of Mr. J. Labelle, have produced a number of creditable studies.

PLUMBING CLASS.

This class is open only to plumbers' apprentices and those employed in plumbers' and steam fitting establishments. The workshop is fitted with benches, melting pots, tool chests and all necessary appliances to accommodate thirty-two working pupils. These places are all filled, and there were many applicants who could not be admitted for want of room. The instruction is given under the immediate direction of the Master Plumbers' Association, and consists of a course of practical work on seams, overcast joints, cup joints, traps, horizontal or upright wipe joints and branch joints, wiping on a stop-cock, wiping a flange and wiping on a ferrule. Short lectures or "shop talks" follow each evening's work, on the subjects of "Soil Pipes," "Trapping and Ventilation," "Supply Pipes," "Boilers," "Solder and Mixtures," "Tanks," "Fixtures," "Common Mistakes in Plumbing," and other subjects of useful knowledge to every plumber. It is most pleasing to notice the close attention of the young workers, who are kept at one subject until they have thoroughly mastered it, and they exhibit with evident pride the results of their study and practice. The progress in this class is highly satisfactory both to the pupils and their masters, and the interest the latter are taking in the class is an example which employers in other industries would do well to follow.

DECORATIVE PAINTING.

This class is taught by Mr. F. E. Meloche. Pupils before entering must have a good knowledge of drawing. The object of this class is to assist those who wish to have a thorough knowledge of decorative painting according to the rules of art.

PLASTER WORK AND SCAGLIOLA.

Mr. R. Rogers is the teacher of the above subjects. This most interesting class was instituted for the purpose of teaching plasterers, house decorators and others, the higher grades of plaster cornice work, casing, ornaments, etc., and for the instruction of pupils in the art of making scagliola. Scagliola is a species of coloured plaster or stucco made in imitation of marble, the manufacture of which is not commonly known in Canada. Scagliola is quite equal to marble for inside decoration, and is produced at a fraction of the cost of the latter.

The last class organized, but by no means the least in importance, is the

PATTERN MAKING CLASS FOR BOOT AND SHOE MAKERS.

under the direction of Mr. Joseph Godin. The course of lessons is intended for shoemakers generally, and particularly for those who wish to have instruction in the study and practice of pattern cutting as applied to the manufacture of boots and shoes. The studies are of a very practical character, the pupils first making, reducing and enlarging patterns of all kinds, and afterwards fitting them to the cast.

A duty of 20 per cent. has been placed by the Dominion Government on corn flour when it is found to contain all the properties of the corn or corn meal, less the bran and other parts removable by bolting only, and not capable of being used as starch without further change. Wheat meal, as wheat flour, will be charged 30 cents per barrel.

The one thing needful in the majority of the small water mills of the country, says an exchange, is a water wheel governor, which will regulate and adjust to changes of load as readily as a good governor on an engine. Water wheel governors can only be applied to turbine wheels, and to be effectual the gates must work freely and easily, no rubbish must be allowed to get to the wheel, and gate rods must work freely. The see-saw motion of many water mills is a constant aggravation and a loss to the proprietor.



Sheet-steel is now copper-plated on both sides by electro-deposition and used as sheet-copper. The sheet is decarbonized steel, and one of the copper sides is tinned. The new material is manufactured at Pittsburg.

According to experiments mentioned in *Indian Engineering*, the tensile strength of a wet rope is only one-third that of the same rope when dry; and a rope saturated with grease or soap is weaker still, as the lubricant permits the fibres to slip with greater facility. Hemp rope contracts strongly on being wet, and a dry rope 25 feet long will shorten to 24 feet on being wet.

TO CASE-HARDENING SMALL IRON RIVETS.—Pack the rivets in a sheet-iron box with charcoal and powdered prussiate of potash, or bone charcoal, or scraps of leather cut fine; heat for an hour at a full red, and pour out rivets and dust into a tub of water. Do not wait to separate the rivets from the packing; they will cool too fast, and interfere with the hardening.

A new gas nearly identical with ammonia whose production has been long sought in vain, has been successfully prepared by the German chemist Curtius. It is variously called hydride of nitrogen, amidogen, diamide, or hydradig, and is a stable gas up to a high temperature, with a peculiar odor, and very soluble in water. Like ammonia, it is compound of nitrogen and hydrogen.

MEASURING MANGANESE IN STEEL.—An approximate idea of the amount of manganese contained in steel can be ascertained by means of the magnet. A magnet capable of lifting 30 pounds of ordinary steel or iron will only lift a few milligrammes if the metal contains 20 per cent. of manganese. So small a quantity as 8 per cent. of manganese will nearly neutralize the magnetic attraction.

From tests made several years ago the deduction was drawn that iron bars scarcely bear the reiterated application of one-third the breaking weight without injury; that is, a comparatively light stress repeatedly applied will break a bar of iron with the same certainty as the single application of a heavy stress. Hence prudence requires that in manufacturing beams, they be made capable of bearing at least six times the greatest weight that could be laid upon them.

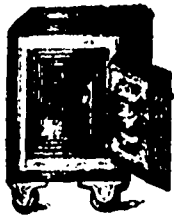
Much difficulty is experienced in mending broken articles made of cast-iron, owing to the slight affinity of that form of iron for tin solder. This difficulty can be overcome, and the soldering of the broken piece accomplished, by scrubbing the surfaces of the fracture with a brass-wire brush until they become perfectly yellow from the adherent particles of brass which were rubbed off the brush. These brazed surfaces can then be joined firmly together with ordinary tin solder, as is the case with brass itself.

The well-known machinist coppering solution can be composed of one ounce of sulphate of copper, or blue vitriol, dissolved in about four ounces of water. The addition of a teaspoonful of nitric acid will make a solution work quicker. This solution has but little or no effect upon the brass when simply placed upon it, but put some of the solution on the place to be coppered, and in the solution hold any small piece of steel or iron, letting it touch the brass, and a very interesting thing will be soon seen. A film of copper soon covers the brass wherever there is any of the solution. The solution can also be applied drop by drop with a piece of iron or steel wire.

Lyrodene is a new liquid which renders wood, textile fabrics, paper, and such inflammable materials fire-proof. The liquid is made of all colors, so as to be used as a substitute for paint; and it is said to render houses and other out-buildings fire-proof. It was used for fire-proofing the woodwork of the recent Jubilee Exhibition at Manchester. Washable water-paints called "squal" are also produced by the same inventor, T. Griffiths, F. C. S., and they can be applied directly to metal work. They contain no oil, and may be washed with water, while, on the other hand, they do not blister in the heat of the sun. The paint is stated to be not more expensive than ordinary paint.

The theory is held by Prof. Mendeleef, of Russia, that petroleum is produced by water which penetrates the earth's crust and comes in contact with glowing carbides of metals, especially of iron. The water is decomposed into its constituent gases, the oxygen uniting with the iron, while the hydrogen takes up the carbon and ascends to a higher region, where part of it is condensed into mineral oil, and part remains as natural gas, to escape wherever and whenever it can find an outlet. If this assumption is correct and a sufficient store of metallic carbides is contained in the earth's interior, petroleum may continue to be formed almost indefinitely and yield a supply of fuel long after the coal has become exhausted. Prof. Mendeleef supports his views by producing artificial petroleum in a manner similar to that by which he believes the natural product is made.

A. J. Simmons, of Indianapolis, asserts that he has discovered a method of economizing fuel by which the use of coal will be made cheaper than natural gas. He gives the following explanation: "I discovered that the atomic movement of flame and electricity is the same, and that it can be insulated. On the other hand, while the atomic movement of magnetism and radiant heat is the same, it cannot be insulated. Faraday was the first to discover the mechanical effect on flame. My discovery relates to the chemical effect, which is the superoxide of oxygen, generally known as ozone. I placed an iron bar in the bridge wall of a furnace, and by varying the magnetism in the bar, found I could distort the flame at will. For this purpose, in my first experiment, I used a dynamo, but afterwards, trying the cell system, obtained effects nearly equal to those from the dynamo. Through a process known only to myself, and which I will not patent, the flame produces a magnetic prestige which brings down the oxygen, the life of all fires. When properly fired, no smoke is emitted, because the same process exhausts the hydrogen, the one great element of smoke."



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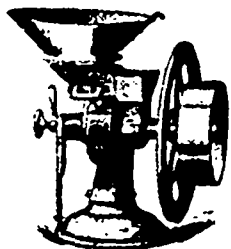
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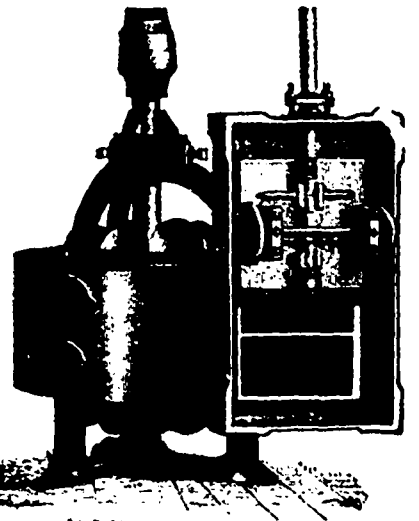
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Send for Descriptive Pamphlet which gives a full description of the Wheel and other valuable information. Also contains a very extensive list of Gear Patterns.

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THE HERCULES Automatic Wheat Scourer and Separator

**THE ONLY WHEAT SCOURER
EVER AWARDED A GOLD MEDAL.**

**THE ONLY AUTOMATIC WHEAT SCOURER
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THE ONLY WHEAT SCOURER
That Needs No Attention Whatever.

THE HANDSOMEST AND MOST DURABLE MACHINE ON THE MARKET.

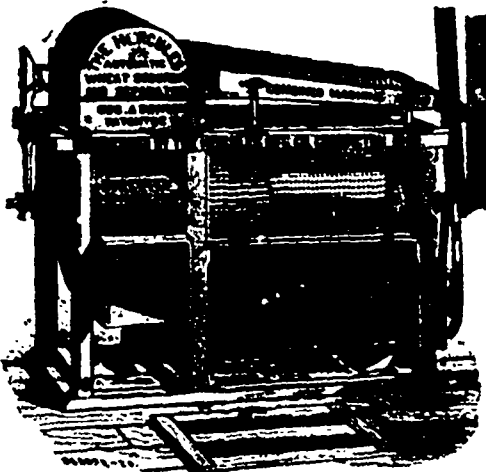
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MAGNETIC ATTACHMENT

METALLIC SUBSTANCES.

NO EXTRA CHARGE FOR SAME.



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THE HERCULES

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.

"SOME FIGGERS."

VERY few people have ever estimated the value of the fuel which feeds the saw mill furnaces of the United States in the form of sawdust, which moves directly from the saw to the fiery gulf into which it is dropped by the automatic sawdust feeders in the mills. Rating it at the price it would bring provided it could be saved in the form of inch lumber, one would stand appalled at the figures. For every million feet of lumber piled on the docks, coming from the circular saw, about 200,000 feet of the best portion of the timber passes into the "fiery furnace" as fuel, in the form of sawdust. Or, to make it comprehensible, in the year 1882 the mills on the Saginaw river cut over 1,000,000,000 feet of lumber, which was the turning point in the output. That year 200,000,000 feet of pine lumber passed into the seething receptacles which produce steam, and was consumed for fuel. Suppose we estimate the cost, 200,000,000 feet, at \$1.4 per thousand "straight measure,"

and we have the enormous sum of \$2,800,000! This looks like a pretty expensive fuel account for the mills on the Saginaw river; but that is what it would amount to in the form of lumber instead of sawdust. As before stated, it is no wonder that the lumber manufacturers of the country are looking anxiously for relief, at least, partially in the direction alluded to. Even if twenty per cent. of this could be saved, it would amount to ever half a million dollars, and this would be the actual saving between one billion feet of lumber cut by an ordinary kerf circular saw, and a thin band saw, and it looks as though it would be worth saving, when pine stumpage is as high, even, as \$10 per thousand in some instances.

Timberman.

Messrs. Sadler, Dundas & Co., Lindsay, Ont., have put in a new 80 horse-power Corliss engine.

W. Helson's grist mill at Sebringville, Ont., was burned to the ground on Friday, April 27th. Loss on the property, \$3,000; no insurance.

AN OLD PATENT BROUGHT TO LIGHT.

A PATENT is about to be filed in the United States Patent Office, says the Engineer, which bids fair to prove that there is nothing new under the sun. The certificate is dated 1829, and is signed by Andrew Jackson. The drawings and specifications cover the invention of a typewriter. It is styled a typographer, and the original patent record was destroyed in the patent office a dozen years ago. The drawings of the time-stained patent closely resemble the construction of the modern type-writers. The patent was originally taken out by Wm. C. Burt. His grandson lately discovered the drawings, and is now prepared to contest the validity of the Remington and Caligraph patents, which enjoy a practical monopoly.

The largest purchase ever made of ash lumber on the Kingdon & Pembroke R. R. was made this spring, when the Rathbun Company bought Thompson & Avery's cut of over 300,000 feet.

TIMEWELL & SON,

Designs, Plans and Specifications prepared for all class of buildings. Tenders obtained, and buildings superintended in any part of the province. Having had a large experience in the construction of Grain Elevators and Mills, we are in a position to supply working plans, etc., for these buildings, and the necessary machinery for any capacity on the shortest notice. Correspondence solicited. No charge for preliminary designs.

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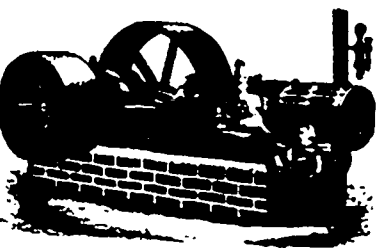
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THEIR BOILERS AND ENGINES are specially built with a view to safety, economy and efficiency, get out quotations before deciding your purchase, by writing BECKETT ENGINE CO., Hamilton, Ont.

ECONOMY--TO STEAM USERS--great saving in fuel; a steady and uniform steam supply and a positive increase of steam capacity are effected by using the U. S. Rocking Grate Bar Co.'s grates, manufactured under patent by Beckett Engine Co., Hamilton, Ont., from twenty to twenty-five per cent. saving according to testimonials, in use in over one hundred and forty thousand horse-power of steam boilers. Two boilers with these grates do the work of three with the fixed grates. Full particulars from BECKETT ENGINE CO., Hamilton.

LIST OF WATER WHEELS for sale by H. W. PIERRE, Brantford, Ont. Send for descriptive catalogue.

60 IN. SCLATER WHEEL.

60 IN. SAMPSON, Cole's patent

TWO 48 IN. LEFFEL WHEELS, Kennedy make.

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TWO 42 IN. SAMPSON TURBINES, Dickey, Neil & Co.'s make.

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TWO 30 1/2 IN. LEFFEL WHEELS.

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ABOVE WATER WHEELS in good order. Other wheels of machinery taken in exchange. Send for list of Engines, Boilers, Iron and Wood-working Machinery. H. W. PIERRE, Brantford

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Circular Saw Tables; Wood Turning Lathes; Mortaring Lathes.

Car Mortaring Machine; Wood Benches; Wood Shapers.

Large Surface and General Purpose Wood Planing Machines.

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Large Iron Shaper, English make; Milling Machine.

Schlenker Patent Bolt Cutting Machine.

No. 6 Northey Steam Pump; Large heavy Tumbling Barrels.

Steam Heater, 51 x 72 inches.

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Foundry 3 Legged Drop, 35 ft. high, 1100 pound drop; 37 inch Gear Wheel.

Steel Boiler, 68 x 168 inches.

Horizontal Engine, Cylinder 18 x 36.

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Leffel Water Wheels; Portable Engines.

Fairbanks Platform Scales; Steam Pipe and Fittings.

Fire Extinguishers, Sand Blast for sharpening or cleaning Files.

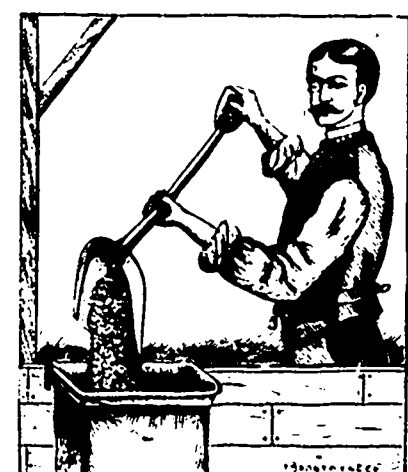
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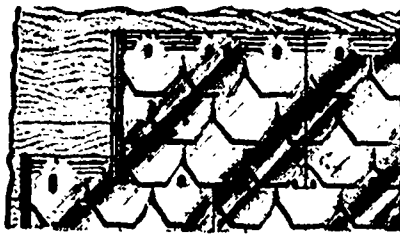
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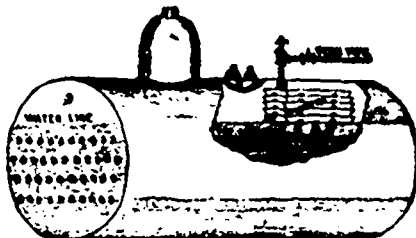
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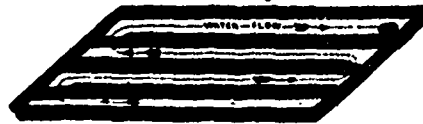
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No Purger Used!
Heat alone does it!



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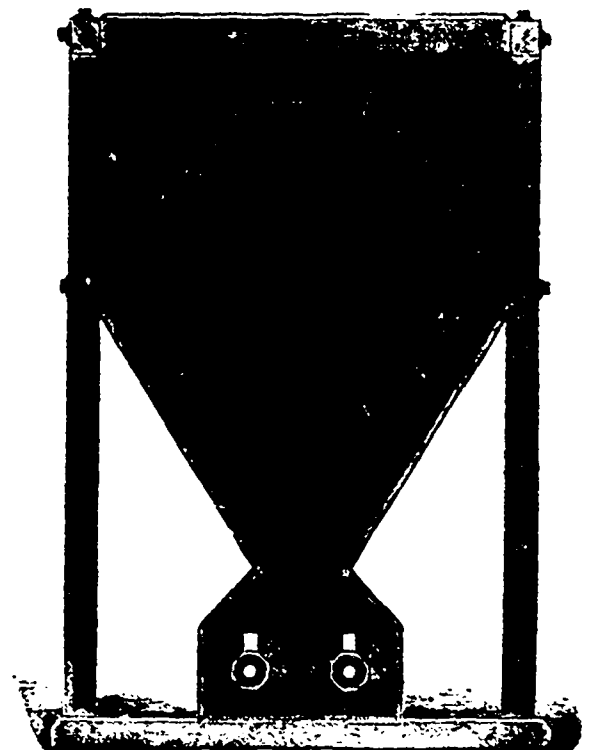
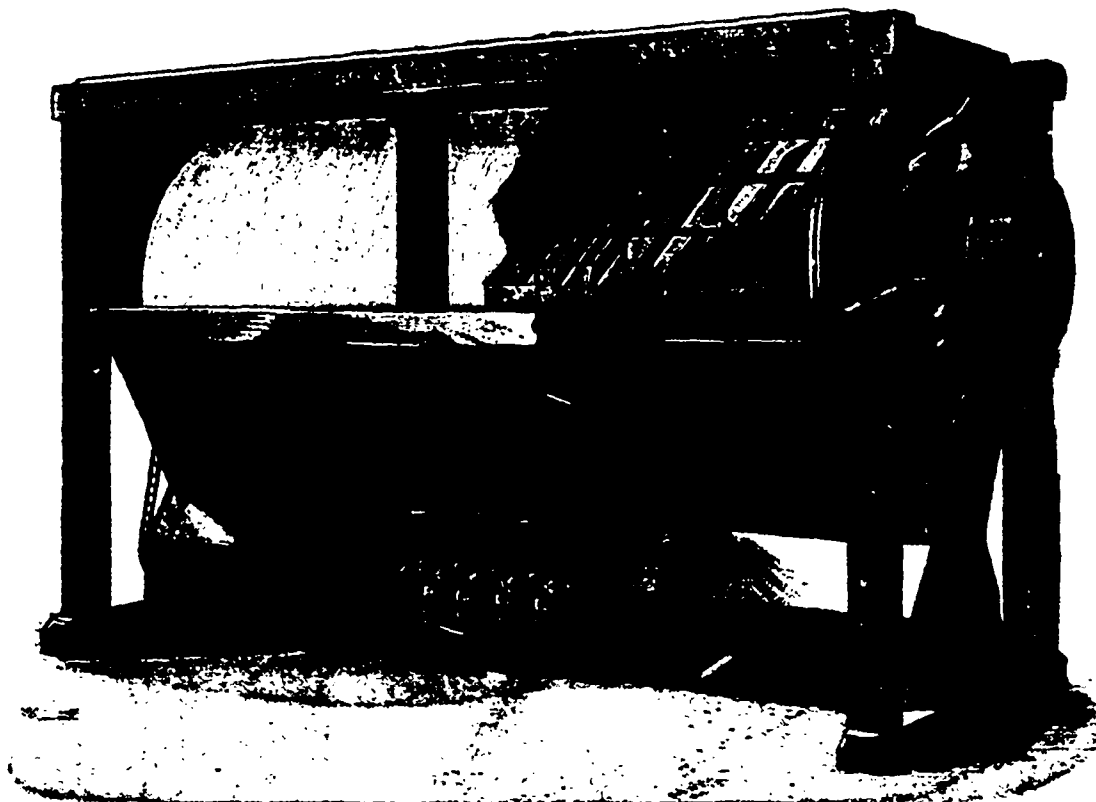
SHOWING ONE OF THE PANS OF PURIFIER. FOR CIRCULARS WITH REFERENCES, PARTICULARS AND PRICES, ADDRESS

THIS PURIFIER ENTIRELY PREVENTS THE FORMATION OF SCALE UPON SHELL AND FLUES OF ANY BOILER IN WHICH IT IS USED. ALL IMPURITIES ARE EXTRACTED FROM THE WATER BEFORE IT REACHES THE WATER LINE, AND ARE DEPOSITED IN THE PANS OF THE PURIFIER.

THESE PANS CAN BE REMOVED, CLEANED AND REPLACED WITH VERY LITTLE TROUBLE, AND IN A VERY SHORT TIME, WITHOUT EMPTYING THE BOILER OF HOT WATER, WHICH MEANS A SAVING OF TIME, LABOR AND FUEL.

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THE SILVER CREEK FLOUR BOLT.

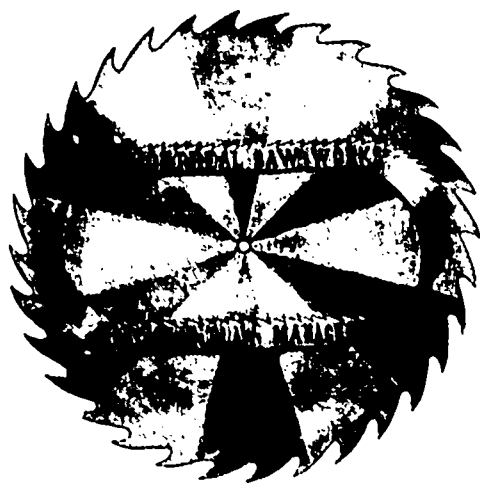


THIS Bolt is enclosed in a strong, substantially built frame, and put together in a manner peculiar to our work. Inside the cylinder is secured in a novel way a stationary arch or bridge, the radius of which comes within one-half inch of the travel of the elevators. On the up-going side this bridge forms part of a true circle, but from a short distance past the highest point on the down-going side it has a flat surface upon which are placed slats or gates by means of which the travel of the material being treated can be regulated at any point. The motion of its Cylinder is from 24 to 34, according to size. Its capacity is immense, and we do not hesitate to say is greater than that of any other machine on the market. The objection to the centrifugal system of bolting, of high speeds, is overcome.

It secures the dashing action at a low speed; its elevators continually elevate the flour, gently dashing its against the cloth. On the up-going side it is dashed against the bridge, and from this repeatedly against the cloth, which action is renewed by the down-going side on all the flour carried over the bridge. In other words, instead of having beater chase beater at high speed, say 200, we dash the flour from the elevators on the cloth and against a stationary object, the bridge, by running them at low speed—say 30. The eddy under the bridge is quite as spacious as that in the centrifugal, and the liberated specks float into it and toward the tail as readily as they do in the centrifugal, securing the same air separation and capacity at a minimum outlay of power. We have a number of these Bolts now in use in mills we have built, and their work is highly satisfactory.

Write for Descriptive Circulars and Testimonials,

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STRACHAN AVENUE, TORONTO, ONTARIO.



Montreal Saw Works,

CHAS. M. WHITLAW, Manager,

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SAWS
TAPER GROUND SHINGLE SAWS
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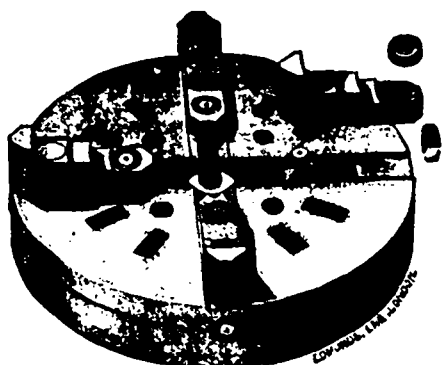
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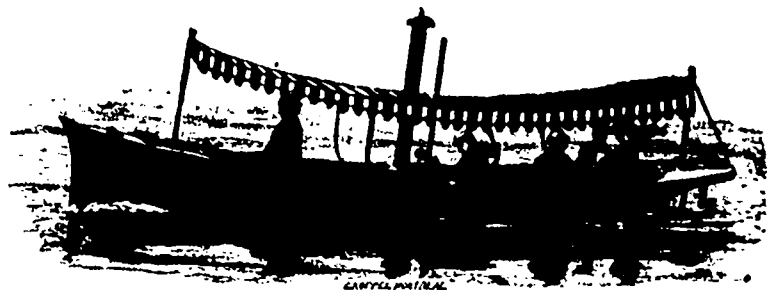
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COAL OIL FOR FUEL. No Dirt, Dust or Smoke. No Engineer required. Simple, Safe, Durable and Economical.

STATIONARY and MARINE ENGINES and BOILERS from 1 to 5 horse power. Complete launches from 20x4 to 30x6. Write for Catalogue and circulars.

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"NEW AMERICAN" WATER WHEEL

Preferred by mill experts as the VERY BEST.

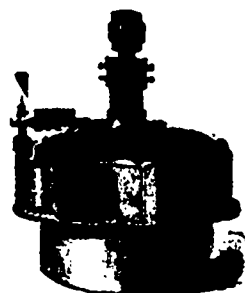
Was selected for driving the large Keewatin Mill.

Will grind with Rolls over 2 bbls. tumbled N. P.

E. P. CAVE, ROLLER MILL BUILDER, THISTLETON, ONT., writes: "She is a daisy," and "I will not fail to recommend it to any one who want of a Water Wheel."

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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.

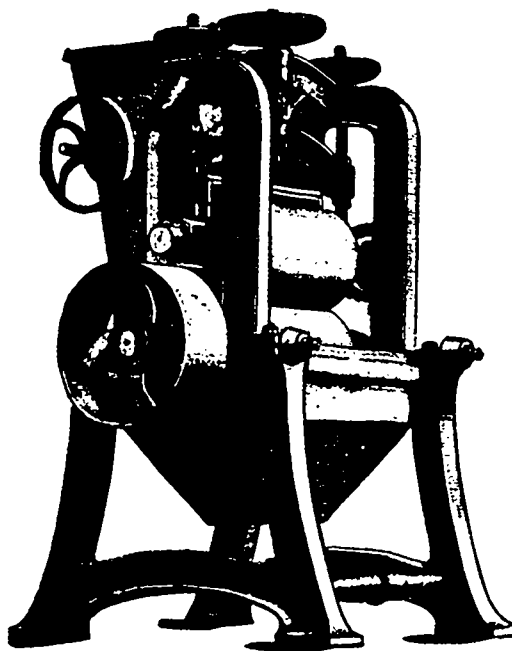
Our Purifier and Aspirator combined is the best machine we know of for the proper handling of middlings.

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.

ABINGDON, September 13th, 1887

JAMES JONES, ESQ., Thorold, Ont.

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.**