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THE CANADA LUMBERMAN

VOLUME XVI. NUMBER 9. } TORONTO, ONT., SEPTEMBER, 1895 { TERMS, $1.00 PER YEAR Single Copies, 10 Cents

BY THE WAY.

A TELEGRAPHIC dispatch from Rat Portage, Ont., of a week since, tells of a shut-down among the mills of the Ontario and Western Lumber Association. Last spring wages were reduced from $1.50 to $1.35 per day and the demand now is that these be raised to the former rate. This not being acceded to, the men, to the number of about 200, stepped out and the mills have closed down. The men labored 11 hours, and are willing to accept either the old rate or a reduction of hours to 10, or an increase to the old rate as follows: Laborers, $1.50, pilers, from $1.75 to $2. It is said that other grievances existed between the men and Manager Cameron, but the latter has stated that he is willing to leave a decision in the case to the Keewatin Lumber Co. as arbitrators, but to this the men do not accede. A good deal of lumber has been coming into Manitoba from Minnesota and selling at low prices. If the strike should last for any length of time it will have a hurtful effect on the trade of that province, no doubt, by stimulating this outside trade.

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Among recent logs from the Georgian Bay territory cut into lumber at one of the Michigan mills, was one log sawed at the South End Lumber Co.'s mill, at Bay City, Mich., which produced 1100 feet of 4 in. plank, all clear stuff, and valued at $33. Five of these logs foot up $150, when converted into lumber. And yet we are sometimes told that there are no fine timbers in these degenerate days.

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IT has not been all plain sailing with the big log raft floated down the Pacific Coast, though the outcome of the venture has been an improvement on some of the disastrous failures that had taken place before. At San Francisco things got a little lively, and betwixt the combined influences of wind and tide the tug-boats that had attempted to hold the raft in position were nearly pulled out to sea, making imminent for the moment danger to all the craft anchored thereabout. But as this is a small affair compared with the former experiments, there is reason for those on the Pacific Coast, who have been determined to pursue this experiment of rafting logs on the Pacific, to be congratulated.

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The decrease in the lumber cut of the Saginaw river mills is one of the remarkable changes that has overcome the lumber business of recent years. The statement is that the cut will not exceed 250,000,000 feet, though other estimates place the figures up to 400,000,000 feet. Even taking the latter figure, this will represent a big decrease from a year ago, when the cut was 482,500,000 feet. This decrease, of course, has been taking place for a number of years, but this season is more noticeable than ever before, because the figures are getting down so small. In contrast to this is the immense increase in the cut of the Duluth district, which it is expected will reach 500,000,000 feet. By procuring logs in large quantities from Canada and from the Lake Superior district, the calculation has been that Michigan would continue to hold its own as a lumber manufacturing centre, but the figures of this year hardly bear out this conviction. The fact is Michigan lumbermen have been importing lumber from Duluth in large quantities this year, rather than buying the product of their own mills, claiming that price is in favor of Duluth. As one of the various transformations which trade undergoes, it will be highly interesting to watch conditions in this case. Canada, as one source of supply for Michigan, is interested in the change.

SAWED HOOPS.

THE manufacture and sale of sawed hoops during the past few years has been watched with varying opinions, regarding their practicability and ultimate success. A recent interview with an experienced manufacturer of this article, says a writer in the Woodworker, produced the information herewith presented.

In entering into this industry, a very essential thing is to procure a fair quality of hoop poles, as free as possible from short crooks and ugly knots. Poles should not be cut earlier than the latter part of August or the first of September, when they are usually free from sap. For making tierce hoops they should be cut not less than eight feet two inches in length, and from 1¼ to three inches in diameter at top or small end. Poles of these dimensions yield easily from two to six good marketable tierce hoops.

In preparing poles for the saw, care should be used in having them properly knotted without making serious cuts in the bark. This part of the work should cost about 30 cents per 100 poles. After knotting they are ready for the cut-off saw, where they should be reduced to eight feet in length. They are then ready for the hoop saw, usually a band saw about 12 feet in length, welded together and revolving around two 24-inch wheels, one above the other. To obtain the best results these wheels should be speeded to about 800 revolutions per minute. An operator on each side of the saw serves to force the pole against the saw, while another assists in guiding it along its course, receiving the hoop and returning the pole for further and similar proceeding. A good sawyer can, with little experience, turn out from 1,500 to 3,000 hoops per day on such a machine.

The laps can be successfully cut by touching them against a disc wheel containing four knives set opposite each other, the wheel revolving about 300 revolutions per minute.

At this point a sawed hoop can be made as perfect as any bark hoop manufactured, by using a planer. This gives it the appearance of a shaved hook and preserves the fibre of the wood. Planers are now in use which have a capacity of planing hoops about as fast as one machine can saw them.

The remaining details of sawed hoops manufacture consist in building and tying. This should be done as soon as they leave the planer.

The entire cost of labor in manufacturing hoops in accordance with the foregoing process, amounts to about 28 cents per 1,000 for hickory and 34 cents for oak.

The principal difficulty met with in this industry seems to be the carelessness in selecting No. 1 poles in sufficient quantities. However, there is no reason why sawed hoops made from good poles should not be as satisfactory, if not superior, to the averaged shaved hoop. Their uniformity adds greatly to the appearance of a finished package, and with proper care in the different stages of manufacture, they should certainly command the same prices as shaved hoops.

A FOREST TURNING TO COAL.

REPORTS from France say that on the shores of Brittany, between St. Malo and St. Lunaire, in the vicinity of the St. Enogat station, at a place called Port Blanc, the tides have lately displaced a considerable amount of sand to a depth of some nine to thirteen feet. Accompanying this phenomenon is the fact that forests known to have been buried for periods covering eighteen or twenty centuries have been brought to light, and a vast forest has been discovered in process of transformation into coal. Ferns and the trunks and barks of trees are to be seen in an advanced state of decomposition, being already beyond the peat formation, showing the films and flakes which are found in coal, and while some of the trunks are sixteen feet in length and still very distinct, they are becoming rapidly transformed.—Iron Industry Gazette.

TREES SUCCEED THEMSELVES.

LUMBERMEN say, "When the pines are gone they are gone forever." But what are the facts? From time immemorial such trees have grown in various parts of the old and new world in the same places where nature has been allowed to have her own way. The pines of Maine have been cut over and over again on the same wild grounds. The ancient oaks of Britain have replanted themselves times without number on the very spot where the Druids worshipped. The redwoods of California and elsewhere yet live among their giant ancestors that date back even before the beginning of the Christian era. Despite human rapacity, the great cedars of Lebanon, whose sires were cut by King Solomon for his temple, have repeated themselves on those shaggy heights, a few yet lingering under religious protection. The olive trees of Palestine, and the fig trees, and the willows on the lower banks of the Jordan, under whose shade the nomadic Israelites pitched their tents, have again and again during all the centuries since replanted themselves there, rebutting the theory that they do not succeed themselves. If these instances are exceptions to the rule, they count for the rule when conditions warrant it.

If men rob the supports of the pines or any other class of trees, of course they will die out, and another species of less value may take the ground and hold it. The reason why there are so many tree rotations is because men interfere and produce the conditions that necessitate them. "When the pine forest is burned over," says Robert Douglas, "both trees and seeds have been destroyed, and as the burned trees can not sprout from the stump, like oaks and many other trees, the land is left in a condition for the germination of tree seeds, but there are no seeds to germinate. It is an open field for pioneers to enter, and the seeds which arrive there first have the right of possession." The cotton-winged seeds of the aspens and other poplars generally get ahead, taking root on high and dry soil, where some other seeds would die. The burned over land is their paradise, and their paradise is the forest retrogression for which our lumbering methods have paved the way.

Conifer and other seeds may sprout under their parent trees, but their young shoots speedily pale and die, if the shade is too dense. The same result occurs, though in reverse order, where the trees are all cleared off. If they sprout, the sun's excessive heat soon kills them. If a fire burn up the leaf mulch and the roof network in the soil, of course the seeds are destroyed, and there is no succession of forest growth there, simply because "we can not make something out of nothing." Observing there no reappearance of the old species, men aver "The pines once gone are gone forever," and they ring the changes on this "lumber adage" to convince us that it is useless to try to save our pines.

Some common sense needs to be drilled into men's understanding. By the decay of fallen leaves and limbs, mosses and other minor vegetations, aided by water thus conserved, forest trees manufacture their own nutrition and support. Hence forest soil that is not raided by axe or fire does not "run out" like a farm soil planted with the same kind of seeds from year to year. It is plain that successive tree crops will continue to grow and do well on their own native heath under a practical system of forestry, whereby the forest conditions are improved by cutting for the market.—Lumber World.

A SPLENDIDLY EQUIPPED WOOD-WORKING PLANT.

DESCRIPTION OF THE NEW SAW MILL AND PLANING MILL OF J. W. HOWRY & SONS, FENELON FALLS, ONT.

IN the march of progress that is characteristic of the days in which we live the advances that have been made in manufacturing lines stand out most prominent. In wood-working the advance has, in some respects, been more noticeable than in some other directions of manufacture. This point has been reached, that it is impossible to keep up in the race and competition of to-day, unless the most improved machinery constitutes the equipment of wood-working establishments. The concern satisfied to work along with the old plant, finds itself handicapped at every turn, the productive power of the institution weakened and the cost enhanced.

A retrospect of the history of wood-working machinery since the days when Sir Samuel Bentham first secured a number of important patents, contrasted with the equipment of later day establishments, shows very clearly the large progress made. One need only go back a quarter of a century and draw the contrast between the machinery of that day and the present, and in many particulars the difference is as remarkable.

The position of a well equipped wood-working establishment in the present day can be best seen by taking a concrete illustration. We do this by a reference to the saw mill and planing mill of J. W. Howry & Sons, of Fenelon Falls, Ont., whose new mill is considered to be perhaps the most perfectly furnished in the Dominion. This is especially the case as regards the planing mill and box factory.

J. W. Howry & Sons take their place among the lumbermen of the United States, who have seen in Canada a profitable field for operations, particularly within recent years, as the timber resources of their country have been rapidly diminishing. The firm consists of J. W. Howry, John H. Howry and H. K. Howry. They have long born a reputation as progressive business men in their own country, and the energy they have thrown into business in Canada furnishes further proof of this.

The saw mill at Fenelon Falls is equipped with two 12" Prescott band mills, one Challoner double block shingle machine, lath mills, etc It is a combination steam and water mill, that is the mill proper running by water, the carriages, log turners, log stops and unloaders being worked by steam. The capacity is 200,000 feet daily, the mill being run 22 hours out of the 24.

The box factory and planing mill, around which in some respects especial interest centres, is 100ft. square, run by water, and is connected with the saw mill by a shaft 200 ft. long, which is attached to a water wheel in the saw mill. In the planing mill there are four surfacers and matchers, one moulder, two cut off saws and one edger. The planing machines and cut off saws are made by the S A Woods Machine Co., of Boston. It is also equipped with one standard band resaw, made by the W. B. Mershon & Co., of Saginaw.

The box factory is equipped with a cut off saw and rip saw and it is capable of turning out four cars of box shooks daily. Here, there is also a patent shingle department, where the blocks 16" and 18" are worked up into shingles with fancy butts for gables of houses.

The lumber operations of the firm are on a large scale from whatever standpoint the business is viewed. The firm owns large timber interests in the northern districts of Ontario. What is familiarly known as the old Scott mills are theirs, and also the Boyd mills in Monmouth, Sherbourne and Glen Morgan. They have between 12,000,000 and 15,000,000 feet of lumber on hand and expect to manufacture 18,000,000 more before the close of the season; the larger part of it will go to the United States.

The location of the mill property is on the proposed route of the Trent Valley Canal, and the G. T. R., 14 miles north of Lindsay. There is at the present time about eight miles of railroad sidings covering over 50 acres of land.

Messrs. Howry have about 20,000,000 feet of logs on the way down the streams, which are to be manufactured this year, and it is their intention to run the mill winter and summer. Their annual output is about 30,000,000 feet of lumber, 5,000,000 lath, and 15,000,000 shingles.

PLANING MILL AND BOX FACTORY OF J. W. HOWRY & SONS, FENELON FALLS, ONT.

BURNING SHAVINGS.

IT is considerable of an art to burn shavings in such a manner as to keep up a regular supply of steam and not injure the boiler. Shavings make probably the most intense heat that any boiler is subjected to, except when oil is used. The fireman will put in a small amount of shavings in front of the furnace, light them and check down the damper until the steam begins to start; then once well under way, he will fire slowly, feeding the shavings "little and often." The sign of proper combustion in a furnace is a bright flame all over the grate surface. This is very hard to secure when shavings are burned, especially if a bunch two feet thick be thrown into the furnace right in front of the fire door, and the fire allowed to taper down to nothing round the edges and back of the furnace. The signs of bad combustion are blue flame, dark spots and smoke. More particularly is this the case when coal is burned. To a certain extent it is true with shavings and with all other kinds of fuel. Good firing is accompanied by an absence of dark smoke, except perhaps for an instant after firing. The thickness of fire is perhaps a matter of choice more than of necessity. Evenness of surface of fire is more to be required than thinness. Regulate the draft according to the thickness of fire, quality and quantity of fuel, etc. A thin fire is best when a boiler must be forced.

ARTIFICIAL YARN FROM WOOD-PULP.

THE production of artificial cotton yarn from wood-pulp is declared by a Rhode Island experimenter to be a practicable industry, the difference between the two materials being said to be very light as regards appearance, softness, strength, lustre and general condition. It appears that for this purpose the wood of the spruce or the pine is used, and is defibrated, after which it is disintegrated thoroughly and subjected to a good bleaching. Much depends upon the latter process, an essential point being that the whiteness of the stock equals that of the genuine cotton material. Thus far, it is stated, the bleaching compounds have consisted of hot solutions of bisulphate of soda and chloride of lime, after bleaching the subdued pulp the cellulose is treated with a compound of chloride of zinc, castor oil and gelatine, resulting in the formation of a paste which is reduced to strands and rubbed into thread. Under the naked eye the pulp thread is said to differ very little in appearance from the real cotton, possesses practically all the features of a pure cotton thread, and is white and soft, but when compared beneath a strong microscope a difference is noticed, the fine, fussy and loose fibres so prominent in cotton threads being missing in the pulp sort, though not to the disadvantage of the latter. The peculiar twist character of cotton thread is also absent in the pulp strand, while the latter seems harder and smoother under the glass.—Northeastern Lumberman.

RESISTANCE OF WOOD.

THE resistance of wood to destruction is extremely variable, depending upon the kind of wood and the conditions to which it is exposed, for the durability of the same specific gravity varies in air and under water. Ordinarily, oak will last one hundred years, beech seventy-five years and the conifers eighty-five years. As estimated by the Engineering Record, oak subjected to alternate dampness and dryness lasts fifty years, pine at the most twenty years. If kept continually dry, oak wood will last three hundred years and pine one hundred and twenty to one hundred and fifty years. Oak and beech last indefinitely under water, and alder lasts much longer under water than in the air. The most durable woods under water are oak, alder and pine; the least durable, birch, linden and willow.

In the air timber is exposed to the ravages of insects, the sap wood being attacked more than the heart wood. Woods rich in resin, like the elm and poplar, are not so much troubled as those like the alder, willow, birch, yoke elm and red beech, which have an abundance of sap and are rapidly deteriorated.

Observations upon the preservation of timber have shown that, first, the more warm and humid the atmosphere the more rapidly the wood deteriorates; second, timber felled in winter is more durable than that felled in summer; third, timber raised in cold climates is most durable, and fourth, the best timber is that raised on meagre soil.

Timber construction which is protected from heat and humidity is only endangered by worms, and, on the contrary, that which is in a damp and badly-aired place fails by rotting, which is really produced by microscopic vegetable growths. Under water timber is attacked by the taret. The primary cause of the decay of wood is the presence of albuminoid substances in the sap, and incrusting materials which afford nourishment to insects and microscopic vegetations.

THOSE LITTLE MILLS.

By John Shaw, in "Lumber."

I OFTEN go into planing mills that remind me of the galleys of the old class of whale ships of thirty or forty years ago. The stove filled almost the whole width of it and there was just room for the cook when the door was slid back to crowd in and sit down on a little narrow bench that he had to brace up against the stove in order to sit down with safety on it. In this galley was kept all the cooking utensils for a crew of from twenty-four to thirty-six men; and you can imagine how pots had to be nested together, and kettles and dishes and all the cook's necessary utensils had to be grouped and corraled in order to get them in that little galley, in which he had to be almost doubled up to stand. He had to be like the boy's toad—when he stood up he sat down. But the cooking was done there, and the whalemen got fat and lazy and often had the scurvy for a change.

We may as well call this convenient as to call a planing mill convenient where you have to climb over a grindstone to get at a band saw, or a band saw so near to a molding machine that you have to have a board nailed up to keep from getting into the bottom band wheel when setting up.

I know low beams and floors are very convenient for laying and sticking up files and tools and wrenches on, but the inconvenience comes in when dust and shavings have so covered them up that you have to go pawing around in the shavings and dust to find them The cook's galley had this in its favor, that the dust could not cover up the spoons and knives and forks he had stuck in it to be handy to get at

We must often have charity for those who put machinery into low and narrow quarters, because, from the conditions of being near the center of their trade they find it hard to find proper quarters in which to set up their machines.

Notwithstanding this, they pay an awful percentage for their narrow accommodations, and yet, it seems as if some firms courted this percentage of loss by voluntarily selecting little, low, tucked-up quarters, where machines are fairly piled on top of each other, like packages in a warehouse.

I have in my mind now a room 30x60, in which is an engine, three planers, a jointer, two turning, a molding machine with saw, a band saw, grindstone, emery grinder, and saw for sawing strips for matchers. It has the accommodation of running all the planed stuff outside, but all molding stock is dropped inside, and it is an art study to keep things clear so anyone can get around the mill. If this room was convenient to an open shed where a stock of lumber could be easily handled, there would be some excuse for crowding so many machines into so small a space, but it has not even this convenience, and stuff has to be left in a load or two at a time and carried around by hand.

We do not consider it a sign of convenience when lumber is laid around in a mill as if it was going to play leap the frog to get where it was needed, and yet once in a while we find this to be the case. Firms that have been a long time in the business hold on with an awful tenacity to old surroundings, and hold on to old-fashioned machines because they have got used to them, and in being so used to it, they feel like the elderly lady did about moving into a new house. She could get along very well with everything, but could not see for the life of her where she was going to hang her broom and dust pan And so it seems with many old firms. They have always been used to being piled up in a heap, and they would be lost in a good, wholesome, clean, convenient mill, where everything was get-at able, and the machines did not tread on each other's corns. Not a great while ago a firm was prospecting for a mill site, and the point they wanted to make was to locate so that the cost of handling stock should be brought down to the least possible amount, and stuff could be delivered to the machines and shipped from the mill at very little cost. They said: "We don't want to handle our stock any more times than we can help, and we shall fix it so that when once in the mill, once at the saw and once at the planer for matched stuff, and once at the planer for surfaced stock, will be all we shall handle till it goes directly on cars or vessel." They believed they could make a profit on their stock by saving in the cost of handling, and they were men that could and would accomplish what they undertook. The plan of the mill was very large and roomy, with accommodations for laying in a large amount of rough stock. All lines of shafting was under the floor, and the planing mill proper was only one story, with truss roof, which was to be lighted in the best possible manner.

The truss roof left the whole floor free from any obstructions so that teams or trucks could unload at any desirable point. You say, and truly, that all firms, or individuals, cannot so desirably locate. I grant that they cannot, in all cases, but I do say that there are hundreds of cases where mills are just the counterpart of their owner, pinched and shriveled and tucked up. Men often show their character in whatever they do, whether it be in building a mill or shop, or in the daily transaction of business.

Years ago I often heard a man say he wished his —— mill would burn down so he could build a decent one. The old mill never did burn down, "bad luck to it," but a couple of years ago he had stood it just as long as he could, and it was razed, and now a splendid mill stands in the place of the old one, and in speaking to me about it recently he said: "If I had torn it down twenty years ago I would have made enough to have twice paid for the building." A thousand others might "go and do likewise," and all the regrets they would have would be that it was not done "long, long ago."

A great many carry these old places because they came to them as a legacy from some grandfather or ancient maiden aunt, who wore spit curls each side of her wrinkled brow, and to lose the memory of these ancients, long since gathered to rest, would be a great sacrilege, and hence any loss of money or inconvenience would be a virtue if the memory of ancient departed friends and their eccentricities were only preserved.

To anyone locating or building a mill or shop or factory now, one great point to be gained is, room enough in it to handle the stock of whatever kind you are making conveniently. It is true that some men understand better than others do the fine art of passing stock along from one machine to another. This is where good calculation comes in, and it is far better to call in such expert experience, where it will be for our benefit, than to rely on ourselves, when we can find out a better way from others. It is a common thing to seek information in regard to money investments, trusting almost implicity on another's knowledge in making or getting loans or making investments. Then why not as well avail ourselves of others' experience and knowledge in arranging buildings and machines for making the money which we may hope to buy bonds or stocks with (may be you could get some of the recently issued bonds, if you pay enough for them).

It is a wonder that inexperience does not oftener seek the aid of experience in such matters.

Oftener it is that "every crow thinks her own young the whitest," and men are apt in the same way, to think that in all such matters, their own opinions are superior and more practicable than are any one's else, and hence the idiom, "They that dance must pay the fiddler."

AN ENGLISH BAND SAW.

AN English builder of band saw mills has built a horizontal band mill which is now on exhibition in London. From published cuts and descriptions it appears that the carriage and log run is under the saw, with all the machinery suspended above it, the cutting being done by the under half of the saw, slicing off the top of the log to any thickness desired, the whole saw frame being raised or lowered by a twin-screw motion. It is said to be very simple in all its workings, and as it requires no space below the mill floor proper, the makers claim that if the portable band mill ever comes into use it will be a horizontal one, something after the pattern of this one, if not this very thing. From a mechanical standpoint these claims are not unreasonable. It now remains for an American band mill maker to take up this English idea, perfect it, and build a light, strong, portable mill that can be placed on the ground in the woods, and that can be transported easily and operated economically.—Hardwood,

THE CARE OF BOILERS.

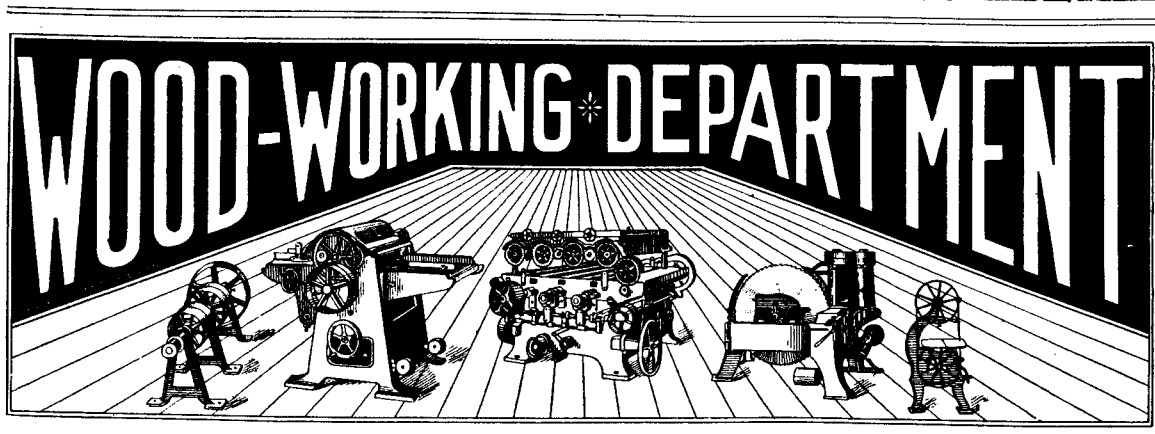
THE boiler being the vital part of the steam plant, which again is the center of all motion and life in a mill or factory dependant on that form of power, all the skill and attention possible should be directed to their preservation in good order, and at the smallest possible expense consistent with good results. To this end all means proposed should receive the careful consideration of those interested, so that the best plan applicable may be chosen in each place. It is evident that the same method is not practicable under all circumstances, for while the general principles involved are in all cases the same, the working out of these principles necessarily varies. Thus all water derived from wells where the underlying rocks are anything except granite or sandstone contains a greater or less proportion of solid matter, varying, according to one list in my possession, from as little as 6.7 grains per gallon to as much as 353.8 grains per gallon. In the same localities the water of the streams is likely to partake to a considerable extent of the characteristics of that in the wells. So it may be said that over the greater part of the country it is impossible to procure even comparatively pure water. Even that which falls as rain and snow in inhabited localities contains impurities washed from the air in its descent, although the proportion is so small as not to interfere with its use in boilers, provided it could be obtained in sufficient quantity; but this, from the nature of the case, is impracticable.

Of course not all the solid matter found in well water is of the kind which forms scale. Lime and magnesia are the principle ingredients of scale, with at times a combination of iron and some organic matter, a mixture of iron especially forming a peculiarly hard and obstinate scale. The question of greatest interest to a man in charge of steam boilers is. "How shall I get rid of the scale in my boilers?" The correct answer perhaps smacks of the Hibernian, but I believe it to be: "The best way to remove scale from boilers is not to let it in." After a dozen years of experience with water containing seventeen to twenty grains of solids per gallon, the greater part being of the incrusting kind, I am satisfied that with a little care and the use of moderately good exhaust steam heaters no trouble need be had with scale in a boiler which is well taken care of.

One great trouble in this matter is that owners are unwilling to allow the firemen reasonable compensation for the extra time required to properly do the work connected with keeping the boilers clean. Some only allow a quarter of a day's pay for the time necessary on Sunday to wash out and clean up generally. It is safe to say that the firemen, unless made of sterner stuff than the majority of the race, does not, on an average, put in much more time than he is paid for. Other owners allow full pay for the day, depending on the engineer and fireman to keep the plant up to the highest condition possible. In one such plant with return tubular boilers, which has been run for fifteen years, with the kind of water just mentioned, no trouble has been had with scale on the boilers for ten years at least; and the heaters are not of the most recent construction either.

Very much depends on the care taken of the heaters as to their efficiency, for if they are allowed to become foul, the accumulation of slush is liable to pass on to the boiler, at least, if the heater is one of the closed variety. While it is a little more trouble to take care of an open heater, as they are generally provided with some kind of a filter which requires some attention to keep in good order, they are, I think, a little more efficient in heating the feed water, while the proportion of steam condensed in the process, being pure water, is also of some advantage. Where the plant is of sufficient size to warrant the expense, or where the water is so hard as to require it as a measure of safety, the addition of a live steam heater of proper size will almost prevent scaling. The water being raised to the temperature of that in the boiler, practically all the incrusting matter is dropped by the water, which is then frequently filtered through a layer of finely-ground coke or similar substance, and so enter the boiler practically pure.—F. Riddel, in American Miller.

A Boston man has patented a process by which glass veneers are made to represent highly polished wood.



PRODUCTIVE POWER OF TIMBER.

RUSKIN has said: "Men don't and can't live by exchanging articles, but by producing them." This has a very practical application if a study is made of the lumber trades. The standing trees of the forest represent large wealth, and are among the enviable resources of this country, but it has only been since the woodman's axe touched these trees, that they have attained to the immense value that is to be attached to timber limits to-day.

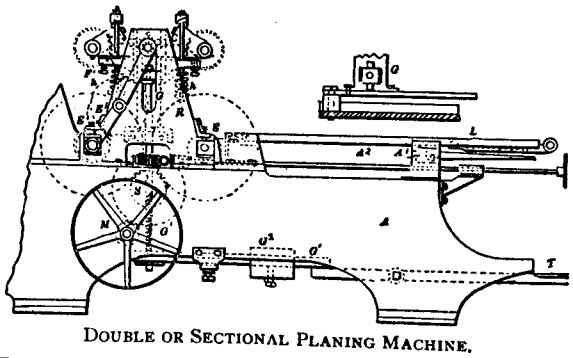
The manufacturer of lumber is the one who has given value to the products of the forest, and the prosperity that has already been scored in this direction points the story of further prosperity just as increased activity is given to the manufacture of lumber. To refer again to Ruskin, the trees of the forest must be placed in the position of producing articles of utility; then they become valuable and peoples thrive through the result of this productive wealth.

The thought is one that gives force to the figures of wood-working production, published in these columns a month ago, and ought to awaken activity in wood-working circles.

When men who own timber limits are coming out of a season of depression, such as has been witnessed of late in this country, as well as in other lands, they look almost instinctively to the course likely to be pursued by manufacturers. Be assured that the men who take the rough log, and after that the sawn board, and cut it up and transform it into various articles of manufacture, cause hope to perch on the banner of the man whose money is locked up in the trees of the forest. Given evidence that building operations are becoming active, and as a consequence sash and door factories are working to their full strength, and lumber will quickly go into consumption. The heart of the hardwood man is delighted when he is told that the furniture factories are planning a busy season. Let commerce in its many ramifications commence to boom and the box factories do not remain idle, and the lumberman who has box stuff to sell sees a means of lessening the overcrowded character of his piling grounds.

It is worth while for lumbermen to use every legitimate means to add to the development of the planing mills and box factories of the Dominion. As shown by the Government statistics of the past year, there has been development in this direction in Canada, but there is ample field for further increase and progress.

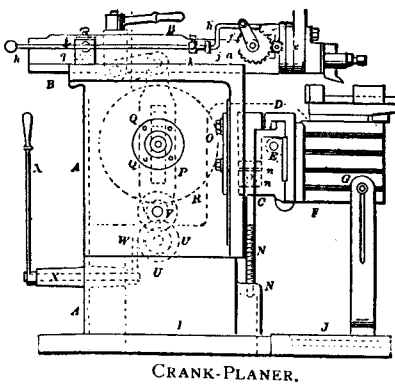
NEW UNITED STATES PATENTS.



DOUBLE OR SECTIONAL PLANING MACHINE.

Patentee: Louis T. Pyott, Ardmore, assignor to Daniel A. Waters and William G. Vernon, Philadelphia, Pa. Filed Feb. 2, 1892. Serial No. 420,118. Dated July 9th, 1895.

CLAIM 1. In a sectional or double planing machine, a vertical guide way on each side of the machine, a cross-head adapted to slide vertically therein, vertical lifting rods on which the cross-head is mounted, weighted levers to which the free ends of said rods are attached, upper entry-feed rolls constructed in sections, each having independent driving bearings pivotally mounted upon the cross-head, and counteracting spring controlled rods mounted upon and having their resistance entirely within the cross-head, whereby a double set of resistance supports, both operating through the cross-head, is provided for the feed rolls, said resistance supports operating independently of each other, either as to both sections of the feed rolls or as to either section thereof. 2. In a sectional or double planing machine, a vertical guide-way on each side of the frame, a cross-head adapted to slide therein, a vertical rod on which the same is mounted, said cross-head being provided with independent spring rods and swing arms mounted thereon, forming an independent driving shaft support for each individual section of the upper feeding-in rolls with its resistance entirely within the cross-head.



CRANK-PLANER.

Patentee: Ulrich Eberhardt, Henery E. Eberhardt and Fred L. Eberhardt, Newark, N. J. Filed April 20, 1894. Serial No. 508,261. Dated June 25th, 1895.

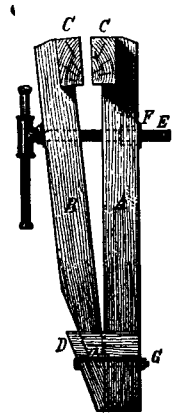
CLAIM 1. In a planer, the combination, with the main feed gear, of an oscillating arm having a pawl applied to the gear, a feed rod extended from such an arm and having opposite smooth parallel surfaces, and a friction clamp secured to the frame of the planer and clamped upon the opposite parallel surfaces of the feed rod. 2. The combination, with the adjustable ram head *c*, provided with the tool slide and feed screw *s*, of gearing mounted upon a ram for rotating the screw, an oscillating arm having a pawl applied to the main feed gear, a feed rod extended from such arm along the side of the ram, and a friction clamp secured to the frame of the planer and clamp upon the feed rod. 3. The combination, with the adjustable ram head *c*, provided with the tool slide *d* and feed screw *s* of gearing mounted upon the ram for rotating the screw, an arm with pawl applied to the main feed gear, a feed rod extended from such arm along the side of the ram, a friction clamp clamped upon the feed rod, a bearing attached to the main frame and a swivel connection between such friction box and bearing. 4. The combination, with the ram provided with the disk *b*, of the transverse shaft e^1 inserted in the edge of such disk, the pinion *e* and feed gear *a* and pawl *g* for actuating the shaft, the adjustable head *c* provided with the double bevel gear *t*, the slide *d* carrying the tool post and the pinion s^1 within such head and the screw *s* fitted to a spline within such pinion.

The James Shearer Co., Montreal, are applying for incorporation, with a capital stock of $200,000, to manufacture sashes, doors, blinds, mouldings, etc.

A HANDY VISE.

A WRITER in Lumber furnishes the following description of a handy vise:

Having been many times in need of a vise in and about a mill, I concluded one day to make one that would answer for almost all purposes, so I got two pieces of white oak, 3 x 5, planed them and took two shorter pieces of the same material and put across the top to make it in the shape of a vise jaw; I then got a common bench screw and put through the two pieces and fastened them rigidly together at the bottom, and the vise was ready for use. As seen by sketch, it isvery simple. A is 3x5 oak, to the proper height you want the vise. B is 3x5 oak, a little shorter. C is 2x4 oak (or hard maple is better), about twelve inches in length. D is a block made for B to rest on, which must be made so as B won't slide out when opening the jaws, also with a small piece on each side to hold it from moving sidewise. E is the bench screw, which can be bought at any good hardware store at small cost. F is the burr or nut which is sunk in the oak, A. G is a bolt to fasten D. By marking the piece C larger, it makes a very good as well as a noisless filing clamp for cross-cut and hand saws.



A HANDY VISE.

THE FADDIST AMONG WOOD-WORKERS.

IN his own quaint, and sometimes, blunt way, "Job", in the Lumber World, deals thus with the wood-worker who takes on the garb of the faddist. He says:

It wood seem incredible that a business man, so constantly in contact with hard facts as a planing-mill operator, for example, would or could be the holder of a fad that would cost him good money every day, and yet every man on the road will find such a man, here and there. Not long ago I found a faddist who owns a planing mill. His fad is that only one firm in the country can make planing machines that are fit to be used. The amusing part of this man's fad is its falsity. The machines he swears by are, beyond any sane doubt, the most primitive machines of the class that are made to-day. He has so long used these machines that he simply knows nothing at all about improved machines.

He pays as much for these primitive machines as he would have to pay for up-to-date machines. If any machine is offered to him at a higher price, he concludes it is a swindle. If one is offered to him at a lower price, he concludes it is a no-good machine. He stands ready to match his old-style, half-good machine against all creation for work, and every agent who has by chance visited him has gone away with the idea that the old fellow is a mule who by by some freak of transmogrification, has got into the body of a man who owns a planing mill.

This faddist's mill was burned recently. The announcement that he would rebuild caused a number of agents of machinery houses to visit him, and every manufacturer in the line flooded him with letters, circulars, catalogues and other literature. The old fossil stood firmly on his fad against all comers who tried to shake his faith in the machines by which he swore. The only concession he could be prevailed upon to make was to permit one or two other houses to put in high grade planers on trial alongside of planers built by his favorite house.

The trial machines were placed. The tests showed them superior in every way to his favorites. They ran easier, kept in adjustment better, turned out more and better stock, and were actually offered to him at prices slightly below those of his favorites. Nothing availed. The faddist could not be induced to believe the evidence of his own senses, and the new and superior machines were taken out.

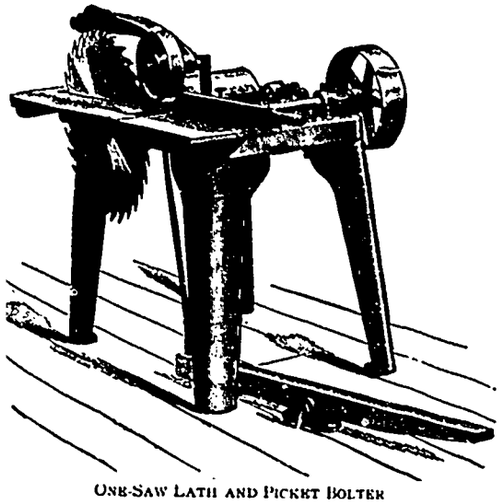
That man to-day has a mill that cost him quite a sum more than he needed to pay for a plant that would do 25 per cent. more work with the same outlay for operating, and do every bit of it 50 per cent. better than his mill does it. Faith of that stripe in a fad is a touching thing to see. It is not the general thing for a man to be obstinate when his obstinacy costs him good dollars.

The day of the fossil in the wood-working business is

past. The fossil, who could subsist and even make money, when times were good and profits large, is succeeded by the up-to-date hustler, who has shaved the costs of production down to a notch below what he can get for his wares in an overcrowded market.

A SAW BOLTER.

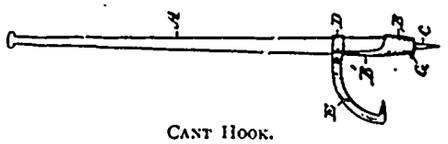
HEREWITH is an illustration of a one-saw bolter for lath and pickets. The machine weighs 625 pounds and occupies a space 3 by 4½ feet. It has a 22-inch saw, so that it can cut slabs about 8 inches thick. The guide is adjustable to different positions for lath or



ONE-SAW LATH AND PICKET BOLTER

pickets. The bottom feed-roll is of steel spurs, making a very strong feed; the top press-roll is lifted by a foot lever and can be weighed as desired. The arbor is of steel 1¾ inches in diameter and runs in long self-adjusting ball-and-socket bearings. A spreading knife, which does not appear in the cut, is placed back of the saw to prevent the bolts from pinching it. This bolter is suited to a wide range of work in getting out dimension stock, as the guide is so quickly set for different sizes. A guard is attached above the saw to protect the operator.

NEW CANADIAN PATENT.



CANT HOOK.

Patentee: Thomas Pink, Pembroke, Ont., 20th May, 1895; 6 years.

Claim.—A cant-hook having the socket B provided with a tang B', and the ferrule or clasp D, carrying the dog covering the end of said tang when surrounding the handle A, as set forth.

MODERN MACHINE SHOP PRACTICE.

WHILE almost all kinds of mechanical business within the past few years have been gradually assuming the form of specialties, the machine shop is no exception to this rule, says a writer in the St. Louis Lumberman. If we go back comparatively but a few years the average machine shop might be said to have no regular line of business. The proprietors were ready to contract for anything from a forty horse-power engine down to a straw cutter. The men employed as machinists had no special part of the work to perform, but were expected to perform lathe, planes and vise work as well as to make and dress their own tools, and notwithstanding the low rate of wages that were paid at that time, the average cost of machinery and machine work, when compared with the quality of that which is turned out by the modern machine shop, was much greater than at the present time.

In modern practice, however, this system of working men promiscuously upon any and all parts of a machine in the process of construction has long since been abolished in all first-class machine shops, and the work is divided into special parts, and each man so far as possible, is kept constantly upon one class of work, and the perfection of all classes of machinery that is put upon the market may be attributed not only to each shop adopting a certain class of machines to manufacture exclusively, but also to the system of working each man, so far as possible, upon some special part. Another quite important change in machine-shop practice has taken place within a few years in the system of apprenticeship. At the present time and under the present system upon which all first-class shops are conducted, when a young man enters the shop as an apprentice, it is not expected that he will learn all the different branches of the work. In fact, that would be impossible in the time usually allotted for that purpose, and even if he were to do so the chances are that he would only get a smattering of each branch and be incompetent to perform the work of either in a skillful and workmanlike manner.

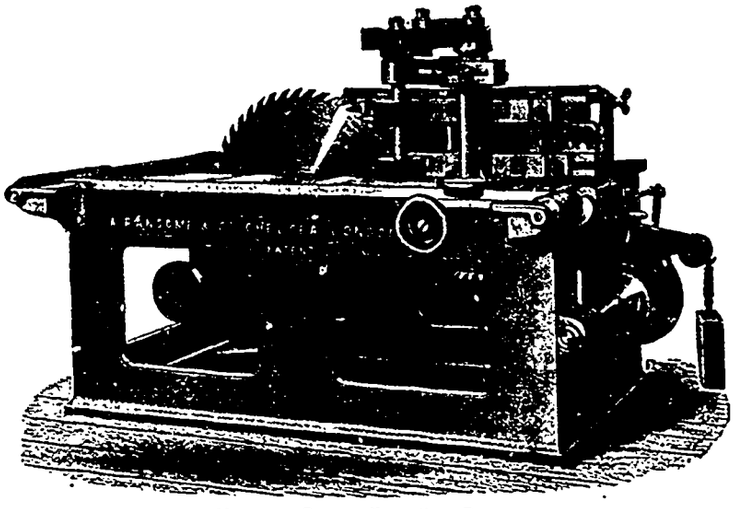
The fact is, young men of the present day are not willing to devote sufficient time for that purpose, as the average time for an apprenticeship in this country has by custom been fixed at three years. No matter what may be his natural mechanical abilities, it is quite safe to say that no young man is able to learn all the different branches of machine work and become a competent workman in either branch in that time. Consequently in modern practice, when the young man enters the shop as an apprentice, he can usually have his choice to become a lathe workman, a planer or a vice man, and which ever branch is determined upon it is expected that he will give his whole time and attention to this one branch. Now if lathe work becomes his choice, which includes all kinds of turning and boring, besides other work that is usually performed upon a lathe, and if he devotes his three years of time faithfully and intelligently to this particular class of work, at the end of his term, provided that he is possessed of ordinary mechanical genuis and ability, he should become an expert workman and be able to earn first-class wages in any shop. The same theory is true with all other branches of machine making. Even if he should be given the privilege to attempt to learn even the three principal branches of machine making, viz., lathe, planer and vise work, in that time, he could not possibly devote but one year to each branch, and he would at the end of his term find that his knowledge of either would be so limited that he would not be proficient in either, and should he obtain a job in a strange shop, if he succeeded in retaining it, he would at once be classed as a second or third class workman and his wages rated accordingly.

Take, for example, an expert lathe man when given a job to perform he is able at once to know just how to take hold of it and just what tools are required in order to perform it in the best and most perfect manner, and he will go about the same in an intelligent manner, and the job is often completed in about the same time it would require a man not so familiar with lathe work to get his lathe and tools in order to begin. Again, where a man has his own special lathe and tools and a special class of work to perform, he will naturally take more pride in keeping it clean and in perfect order; his small tools are carefully selected and kept in order also, so that he is at all times ready to take hold of any job in the line of lathe work and perform it in a workmanlike manner. The same rule is equally applicable to the planer, and probably no other tool in the shop requires more skill and judgement in its use than the planer.

An old planer man once remarked in the presence of the writer that the most important point about planing is to put the work on straight and take it off straight. It is true that in most first-class shops special chucks are provided for certain kinds of work, so as to render the springing of the work less liable, but even then unless much care is manifested in placing the work in the chuck it is liable to be sprung; still, the use of special chucks not only facilitates the work of chucking, but with proper care it is less liable to be sprung than otherwise. But there are always certain pieces of work that require planing for which a special chuck is not always available, and in such cases the work must be secured to the patten by means of bolts and straps. This requires not only skill and judgment in order to secure the work firmly to the patten, so as not to change its normal shape, or without being sprung, or otherwise distorted. In many cases castings, no matter how carefully they may be chucked, when a cut is taken off from one side and the bolts are released, there will often be a tendency to warp towards the side from which the cut is taken. This is most frequently the case where the plate is thin and only to be planed upon one side, and it is not unfrequently the case that it may require a second chucking and another cut taken from the surface. The experienced workman, however, will in most cases be able to judge from the shape and style of the casting to be planed whether it is liable to warp and take all the necessary precaution against it. While the modern system of working each man upon special work has had much to do with the present state of perfection which is found in all classes of machinery materially decreasing the cost of production, the workman has also been materially benefitted by this change in practice. Under the old system of management, first-class workmen were only able to obtain about $1.75 per day, while at the present time the same class of workmen are able to earn from $2 to $3. And while all will admit that modern machinery of all classes is much more complicated than formerly, still the manufacturers are able to put upon the market a much more perfect machine and at less price. Again, special tools for special work, has had its effect, for while certain kinds of work required the slow and tedious process of hand labor, now the same work is performed in many cases upon special machines for that purpose in a more perfect and economical manner.

VERTICAL ROLLER-FEED SAW BENCH.

THE engraving below is of an endless feed saw bench, English manufacture, of new design, in which the piece being sawn is carried past the saw by revolving rollers attached to a swinging arm bolted to the bench.



VERTICAL ROLLER-FEED SAW BENCH.

This arm is adjustable to suit stuff of various thicknesses, and to work in connection with saws of various sizes.

The feed rollers are driven by a suitable arrangement of gearing, giving four different rates of feed.

A special feature of the machine consists in the readiness with which the feed rollers, with the standard which carries them, can be removed when it is desired to use the machine as a plain saw bench. The bench is made in two sizes.

BUTCHERS' chopping blocks are made of white oak, maple, birch, sycamore, and one or two other woods. White oak is preferred, but probably three-fourths of the blocks are made of maple, because of its greater availability. It is hard to get a solid block; most of the trees large enough to make good blocks have heart checks.

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—BY—

C. H. MORTIMER

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THE CANADA LUMBERMAN is published in the interests of the lumber trade and of allied industries throughout the Dominion, being the only representative in Canada of this foremost branch of the timber industry of this country. It aims at giving full and timely information on all subjects touching these interests, discussing these topics editorially and inviting free discussion by others.

Especial pains are taken to secure the latest and most trustworthy market quotations from various points throughout the world, so as to afford to the trade in Canada information on which it can rely in its operations.

Special correspondents in localities of importance present an accurate report not only of prices and the condition of the market, but also of other matters specially interesting to our readers. But correspondence is not only welcome, but is invited from all who have any information to communicate or subjects to discuss relating to the trade or in any way affecting it. Even when we may not be able to agree with the writers we will give them a fair opportunity for free discussion as the best means of eliciting the truth. Any items of interest are particularly requested, for even if not of great importance individually they contribute to a fund of information from which general results are obtained.

Advertisers will receive careful attention and liberal treatment. We need not point out that for many the CANADA LUMBERMAN, with its special class of readers, is not only an exceptionally good medium for securing publicity, but is indispensable for those who would bring themselves before the notice of that class. Special attention is directed to "WANTED" and "FOR SALE" advertisements, which will be inserted in a conspicuous position at the uniform price of 15 cents per line for each insertion. Announcements of this character will be subject to a discount of 25 per cent. if ordered for four successive issues or longer.

Subscribers will find the small amount they pay for the CANADA LUMBERMAN quite insignificant as compared with its value to them. There is not an individual in the trade, or specially interested in it, who should not be on our list, thus obtaining the present benefit and aiding and encouraging us to render it even more complete.

THE COMING LUMBERMEN'S MEETING AT BUFFALO.

THE annual meeting of the United Associations of Lumbermen, to be held at Buffalo on Sept. 3, 4, and 5, will have more than usual interest for Canadian lumbermen. The location is central for many of those engaged in the lumber trades in Canada. The selection of Buffalo is also suggestive of the discussion of questions of international interest to the trade. We do not know that this has been specially planned by the management, but it may be expected, in the case of lumbermen from all sections of the United States meeting at a border point, that lumber matters having an inter-relationship to Canada will form the subject of conversation, if not of open discussion.

The official programme takes in such questions as the following: Insurance, Contractors Credit System, Wholesale Consumers, Influence of United Associations, Local Associations, Early Days of Retail Trade, The Social Side of the Association, The Territory of the Retailer, The Scalper, Lumber Trade in Hard Times, State Association Work, The Ideal Association, What Constitutes a Regular Dealer? The Management of Retail Yards, Local Competition, and The Attitude of the Retailer to the Wholesaler and Manufacturer.

It is worthy of remark, that out of the seventeen subjects appearing on the programme five of them will discuss, in different ways, the one question of organization and associations for lumbermen. It would be, we are sure, a great help to Canadian lumber interests, if a considerable contingent of Canadian lumbermen might hear these papers and the discussions that will follow. We are lamentably weak in Canada in the matter of lumber organizations.

When the matter of home markets in one shape or another comes up for discussion it is not unnatural to anticipate that the relations between United States and Canadian lumbermen will be considered. It is not likely that all will see with one eye on this question, for, whilst American lumber for Americans sounds very nice on paper, it is not a view that all engaged in the lumber trade in the United States can endorse. The question is growing, whether in an important raw material like lumber, a free market is not the best for everyone concerned, and for a country as a whole.

The secretary of the United Associations of Lumbermen in a letter to the CANADA LUMBERMAN says that the social features of the meeting are going to be the most clever and enjoyable that have ever been presented to a convention of lumbermen. The country adjacent to Buffalo is viewed as peculiarly adapted to entertainments of this character, and the Buffalo and Tonawanda lumbermen have made great preparations for the entertainment of their visitors, the principal features being an excursion to the docks and yards of dealers of those two cities, showing their shipping capacity, stocks, etc., all of which will be of interest to the visitors present. Second, there is to be a grand excursion by water from Buffalo to Niagara Falls taking in all the points of interest in that vicinity with dinner at Queenston and a supper on the steamer on the return trip. A reception will be given on the first evening at the Hotel Iroquois, the headquarters of the convention, and on the second evening there will be a grand Hoo-Hoo contatenation. An interesting feature of the Association meetings will be the attendance of ladies and they are sure to enjoy the social features.

The hope is expressed by the secretary of the United Associations, and we may say that this includes lumbermen in all their different branches, timber limit owners, manufacturers, wholesalers and retailers, that there will be a large attendance of Canadian lumbermen. The dealings of Canada with the United States are on a sufficiently large scale to make the one interested in the other, and we can only hope that the expressed wish of the officers of the American Association will be realized.

LUMBER AS AN INTERNATIONAL AGENT.

IT is fitting, on the eve of the big meeting of United States lumbermen at Buffalo, to which reference has been made elsewhere, that one should take a glance at the field of lumber operations in Canada and the United States

It is not only business, but patriotic, that those engaged in the lumber trades in these two countries should jealously guard their home interests. It does not follow, however, in doing this, that a narrow business view must necessarily be taken. The fact is, that the time has gone by when lumber, as a commercial product, can be viewed from any narrow standpoint. More, perhaps, than any other article of commerce, it is international, and cosmopolitan in its nature. It enters into consumption in all parts of the world, and all parts of the world must look to those countries that are the richest in lumber for supplies. More than this, it is being discovered that in different parts of the world are to be found timbers indigenous to the particular territories, that are needed in other parts of the world, where timber is one of the principal resources, but yet where these particular kinds of timber are not grown.

It is impossible to keep closely in touch with lumber interests, and not become impressed with the over lapping needs of the lumber trades, in so far, and particularly, as the United States and Canada are concerned.

Canada ranks lumber as one of its richest resources, and this is the case whether we speak of Ontario, the Lower Provinces or British Columbia. These resources can only be changed into gold by finding a profitable market, and to-day we are obliged to seek other than a home market. There would not be nearly so great encouragement for the heavy investments of capital represented in lumber to-day, if there were not other avenues of disposing of the product, than those within the confines of our own Dominion. A natural and profitable market for Canadian lumber is in the United States, a fact that has created an intimate business relationship between men engaged in the lumber trades in the two countries, and one that is growing rapidly.

This relationship does not arise simply through the exportation of lumber from Canada to the United States. United States lumbermen, as they have found the products of the forests in their own country becoming exhausted, have looked to Canada as a source of supply, and at the present time the trade of United States lumbermen, who have an interest in Canadian timber limits and saw mills, is very large. We need only mention the names of A. T. Bliss, Gen. R. A. Alger, E. C. Whitney, Arthur Hill, D. L. White, A. T. Fletcher, R. A. Loveland, Albert Pack, E. W. Fowler, Emery—Holland Lumber Co., J. T. Hurst, William Peter, Merrill, King & Co., Fisher & Turner, and Eddy & Sons, to suggest many other names of United States owners of Canadian limits. Nor are the investments of United States capitalists in Canadian lumber confined to any one province, for their holdings in all the provinces are large.

That various views of the situation suggested by these conditions are held by Canadian and United States lumbermen, is true, but with the broadening character of commerce, the most liberal view that can be taken of conditions will, in the end, be found most helpful to trade. The fact that such conditions have an existence ought to prove a circumstance of wide interest to the lumbermen of these two countries, who are likely to come together at Buffalo the early days of next month.

ANOTHER CUSTOMS CASE.

ANOTHER dressed lumber dispute has come to the front. The Board of General Appraisers in the case of F. W. Wood & Co. entered protest against the decision of the collector of customs at Burlington, Vt. which was to the effect that certain bird's eye maple and rock elm cut into strips a half an inch thick, planed two sides, with rough edges, were cabinet woods, and subject to 25 per cent. duty. This decision was based on par. 676 of the Wilson Act, which reads: "Sawed boards, plank, deals and other lumber, rough or dressed, except boards, planks, deals and other lumber of cedar, lignum vitæ, lancewood, ebony, box, granadilla, mahogany, rosewood, satinwood and all other cabinet woods."

The view of the Appraisers was that bird's eye maple and rock elm ought to be classified among the woods exempt from duty. Their decision reads as follows: "It seems to us that the woods Congress intended to cover by the exemption in par. 676 are those which are chiefly used for cabinet purposes. The value and rarity of the woods enumerated and of others, such as cherry and black walnut, would render them unsuitable for other uses. Maple and rock elm are not named in the list exempted and they are not of the character of the excluded woods, which are rare, costly and highly ornamental. We find secondly that the said goods are not cabinet woods. The protest is sustained."

In this instance the United States customs collector did not get the sympathy of the Appraisers, but the case is one not likely to end here, and will make at least the third case in dispute since the passing of the Wilson tariff, to wit, the red cedar of British Columbia, the dressed lumber case of J. W. Howry & Sons, and the present one.

The question can again be fittingly raised, whether, with as little delay as possible, a broad and intelligent interpretation should not be given touching the whole question, as to what constitutes cabinet woods and dressed lumber. As it is the customs officers are the ones who raised the question. Sometimes they are sustained by the Appraisers, only to have the decision finally reversed by the United States Circuit Court, and again, as in the present instance, the decision is unfavorable to the customs officer. Uncertainty, however, is a result in all cases, and this can only mean an injury to business.

A FRANK VIEW.

THE Lumber Journal, of New Orleans, La., is frank and honest in its view of the dressed lumber dispute, even though its sympathies are with the Appraisers in exacting a 25 per cent duty. The Journal fully concurs with Mr. Hotchkiss in his opinion that "dressed lumber" in its general sense applies to all the product of the planing mill, and closes some sensible comments on the question with these words: "To be sure the commonsense construction of this question is under the present law in favor of the Canadians, at the expense of our own producers. This should not affect the decision, however, as a wrong committed for selfish ends almost surely establishes a precedent that reacts to the hundredfold detriment of those who do it. The way out of a dilemma of this kind is to change the law, not to juggle with or misinterpret it." That is what we call a square deal.

EDITORIAL NOTES.

A CIRCUMSTANCE that tells of the growth of lumber interests in the southern states is found in the large increase that has taken place of late years in the establishment of wood-working concerns in that territory. The wood-working establishment that would thrive must, if possible, get near the place where there is abundance of timber, and whilst this is not as necessary in these days of many railroads as was the case some years ago, yet it is important. Certainly it is the case, that if wood-working concerns will pay anywhere they will pay where the necessary raw material can be readily obtained. The suggestion carries with it some importance for Canadians, who would find it profitable to cultivate the establishment of wood-working plants in districts where they are not known to-day, and yet where the necessary forest product is near at hand.

A MATCH is a little thing, but the extent to which the match business is growing in Canada is a matter of importance to the lumber trade. The raw material, of suitable kind, is here in rich abundance, and with easy means of transportation to foreign markets, Canadian matches should be exported in large quantities to almost all parts of the world. Progress in this direction is taking place. The exports of matches and match splints in 1894 amounted to $216,038, as against $204,410 in 1893, $196,185 in 1892, $168,237 in 1891, and $114,712 1890. In England, however, there are yet imported, despite the fact of the large manufacture of matches there, $1,500,000 of the finished goods, which, as has been remarked before, ought to come from Canada. The field open in Great Britain has a relative existence in other countries. It is stated that taking the world throughout, $50,000,000 are invested in the match business, figures that are very suggestive of the possibilities of the business.

THE average man does not take a long look ahead. Sufficient unto the day is the evil thereof with him. Were the suggestion of a contemporary, that farmers plant trees along the lanes, highways, and other places not suitable for crops, generally adopted, there would be less liklihood of a scarcity of timber in this timber country in the days that are to come. There is little or no expense to be attached to the planting of rows of maple, oak, pine, beech, hickory, walnut and other trees on the farms and country sections of the Dominion, and while the people slept the trees would grow, and in due time there would be a forest produced worth good money. The suggestion has already been made that it would be an investment that would pay large interest, for the farmers of Ontario to set aside a corner in their farms, and reforest these with suitable trees. Timber is becoming more scarce every year, and future generations, if not the present, would reap a rich legacy by the adoption of this method.

WORD that comes to the LUMBERMAN from a correspondent in Newfoundland that the forest fires in that colony have not been nearly as damaging in their outcome as was generally reported at the time is cheering. It is the case, however, that even when bush-fires secure comparatively little headway the loss sustained is heavy. A recent report from British Columbia conveys the news that heavy losses in timber limits have been made in that province from this cause, and the unfortunate aspect of the case there, as almost everywhere, is found in the fact that these fires invariably result through carelessness, or designedly. In British Columbia it is pointed out by a local contemporary that the fires there have usually occurred through the careless dropping of a match or by the indifference and carelessness shown by those engaged in camping and picnicing throughout the woods. The matter is of sufficient importance, and indeed so serious, that the reiteration of a word of warning is not alone desirous, but a great necessity.

THE by-uses of wood are constantly increasing. It seems difficult to say for what purpose wood will not in some manner be used. In some countries saw-dust is actually being mixed with grain, from which bread is made, and whilst we must admit that tastes differ, it is claimed that this condiment is nutritious and palatable. A change in the uses of wood has developed of late in supplanting the softer woods as broom handles by certain species of hardwoods. Until lately broom handles have been made of soft wood, and they have not always been the most elegant articles. Now handles are made of hardwood, shorter and neater, and far less liable to be come scratched or uncomely. In certain parts of the country large quantities of hardwood are consumed for this particular purpose. Of course, as one has remarked, this change from softer woods to hardwoods for the purpose named, may only be a freak of fashion and some of these days something else will be proposed. In the meantime it is providing a reasonably profitable trade.

A PENCHANT of the Lumber World of Buffalo is to get a rap at Canada whenever an opportunity presents itself, or, rather more frequently, with little or no reason for the step. This Buffalo friend thinks that the credit Canadians take for their superior methods of preventing forest fires is not justified by the costly fires that have taken place in the Dominion this season. One compliment, and it ought to count for something with a lumber journal, that has been paid to Canadian foresty legislation is the adoption of legislation in the United States modelled on similar lines. And whenever the question of forest preservation is agitated reference is made to the progress attained in Canada in this direction. The facts speak for themselves. So does the other fact, that no serious bush fires have occurred in Canada for some time, not even this season, dry as it has been, compared with the fires among our neighbors to the south. What of the terrible fires in Minnesota last year, when there was less reason to make these chargeable to a dry season?

THE number of prominent lumbermen, those with experience and capital, who are changing their base of operations from some of the older fields to the newer fields, is one of the interesting features of the lumber trade. No inconsiderable investments have been made on the Pacific Coast, and in New Brunswick, by Ontario lumbermen. The Brunette Saw Mills, which were destroyed by fire recently, as well as other mills in British Columbia, are owned almost entirely by Ontario lumbermen, and no small amount of capital from this province has been invested in spruce lands in New Brunswick. We find the same kind of thing operating across the border. Many of the older firms there are changing their location from Michigan to Wisconsin and the Lake Superior district, while it is recorded that, in the near future, supplementary to what has already taken place, large sections of timber land in the Puget Sound and Washington territories will come into the hands of Eastern lumbermen. The lumbermen in Ontario, who are wealthy to-day, have in most cases made money by securing timber limits while values were low, and disposing of them as they commenced to advance. Low values in timber limits cannot be found in Ontario to-day, but these investments are possible in other parts of the Dominion. And so with the big lumbermen of the United States. There is not much money to be made in buying timber limits in Michigan, but in the Lake Superior districts and the Southern States and on the Pacific Coast, the men who get in on the ground floor will make a substantial turn-over of their investments in later years, just as in recent years they have done this with their holdings in the older lumber states.

CAPITALISTS across the border, interested in spruce manufacturing in any of its departments, are keeping a close eye on conditions in Canada. They recognize the fact that this country is unusually rich in spruce. At Odgensburg, N.Y., to take just one instance, a member of the Gould family is at the head of the Continental Match Co., which has established a factory in that city. A local journal tells us that this concern was influenced to locate at Odgensburg because near to the great *Canadian spruce forests north of the Ottawa river.* Just what ground these cover the Odgensburg journal explains with some detail, as well as pointing out the methods by which this product can be lumbered. To quote. "The Ottawa river has a number of tributaries from the South, which are crossed by the Canadian Pacific Railway, at the mouths of which there is ample water power. There is a project already on foot to build pulp mills where this cheap water can be obtained The spruce timber used in making pulp could be cut and floated to the mills and ground into pulp at a very small cost. The supply of timber is practically inexhaustible, as, while a large amount of pine has been cut from the region described, the spruce has never been touched." If there is a country that has a cause to rejoice in its immense natural resources it is Canada Considering the awakening that is manifest at the present time in the mining districts of British Columbia, the activity that is shown in the development of the iron ore of Ontario, the progress in spruce fields in Quebec and New Brunswick, and the rich coal mines of the Maritime provinces—without going further, is there not a wonderful foundation on which to build a great country?

THE value of little things is a lesson more quickly picked up in the present day than in former times. Observation and ingenuity have proven that much wealth can sometimes be brought out of the utilization of products, and indeed refuse, that hitherto had not been counted worth anything. In the lumber trade we do not despise the culls and refuse, nor even the saw-dust, to the same extent as in the early days of lumbering. We are not indeed so prodigal in the matter of using wood for fire-wood, for we have learned that it pays better to cut beech and maple into lumber than into three piece lengths, only to burn in the stove. Economy has grown in this direction, so that in the pitch pine regions of the United States a new industry is springing up that promises to increase vastly in the future. It is the simple utilization of the enormous fields of fat pine logs and stumps, from which all resinous matter has been extracted. These have in many cases in the past been allowed to decay where they happened to fall. This "lightwood," or fat pine, as it is called, is cut up as fire-wood in most of the eastern cities. A machine is invented for shaving up the logs and stumps into appropriate lengths. These are then tied up into small bundles and sent to the cities in ships. It is said that at the rate of one cent a bundle the old stumps will yield nearly as much profit as the trees sold as timber or for other uses. The truth is, as men use their wits, it will be learned that there is hardly need for the most despised articles to go to waste nowadays.

IN these columns, a month ago, was recorded the fact that preparations were being made to enter the woods for the coming season in the Georgain Bay districts, as also in the Ottawa territory. Activity in this respect becomes increased as we draw nearer to the fall months. It is yet too early to predict what will be the cut of the year, but it seems not unlikely, with the prospects of better times, that there will be no reduction at least on that of the past year. The cost of stumpage renders it almost imperative that those who have money invested at present prices should make a considerable cut every year, for they will catch it, if things do not go right, with heavy interest on the standing timber, if they do not on the lumber actually on the piling grounds. Then of the better grades of lumber there is no mistake that stocks all over are low, and so far as it is possible to supplement supplies in this direction, it is desirable, and a good price for this class of lumber is sure to be obtained. At the same time it is well that a measure of caution be observed, for it would be a damper on the prosperity of the lumber trade if, with business generally improving, there should be an overcut, that would have the effect of keeping down prices. Speaking specially of the output of spruce for 1896, the Northeastern Lumberman, of Boston, thinks that perhaps the low prices for spruce that have prevailed lately may serve to discourage Canadian operators from cutting even as many logs as they did last year. But against this view, it must be remembered that the demand for spruce, especially for wood-pulp, is increasing with great rapidity. Besides, if prices have not been what the Northeastern Lumbermen's Association would like, the volume of trade done in the United States by New Brunswick and Nova Scotia spruce men has been of a size to encourage a further cultivation of this trade. There is, of course, the $2.00 duty in favor of Canadians, which did not exist a year ago.

OTTAWA LETTER.

[Regular correspondence CANADA LUMBERMAN.]

THE movement in lumber along the Ottawa river at the present time is altogether quiet, and the prospects of a revival are not the most cheering. The fleet of Ottawa Transportation Co. barges on the Hull side of the river, beside Nepean Point, has been further increased by several other boats, which have been laid up for the remainder of the season, as business was so quiet.

It has been a rare occasion when the water of the Ottawa river has been as low at this season of the year as it is at the present time, and it is feared that navigation will be impeded at many points where saw-dust shoals have been growing. Reports from up river are to effect that the water continues high enough to allow the driving of logs on nearly all the larger tributaries.

The first raft of square timber from the Upper Ottawa this year is passing through the government side at the Chaudiere, and as usual a number of strangers are availing themselves of the opportunity to take the exciting run and final plunge, where the raft is being made up for towing down the Grenville. The timber belongs to William Mackay and is for the English market.

Barnett & Mackay have sent out their first gang of men for the season's cut on their limits on the Montreal river. Buell, Hurdman & Co. are sending a gang to Kippewa and Magnawsippi. The David Moore Lumber Co. have also sent up their first shantymen and J. R. Booth has taken a gang from Gatineau Point. As far as learned shantying operations have not begun on the Upper Gatineau.

Messrs. Hill & Fowler, of the St. Anthony Lumber Co., and Mr. Quinn, have returned from an inspection of the Company's new mill at Long Lake up the Parry Sound road. Everything is now working satisfactorily and the Company expect to cut upwards of 60,000,000 feet a season. It is their intention to construct another mill in the course of another year. The capacity of the present mill for sawing will be about 250,000 feet per day, supplied by three band-saws and one gang saw, with edging, butting and trimming saws, sufficient for the requirements. Saw-dust belts carrying a continuous supply of saw-dust to the furnace will furnish necessary fuel, and the balance of the saw-dust and other waste material will be disposed of by means of a burner. This burner is constructed of iron plate ⅜ inch thick and lined inside with a brick 18 inches thick, the top being covered with a heavy netting.

OTTAWA, Can., Aug. 22, 1895.

NEW BRUNSWICK LETTER.

[Regular correspondence CANADA LUMBERMAN].

AS you have had occasion to remark in the trade review in the weekly edition of the LUMBERMAN, the season here has been more than usually prosperous, and shipments from the province have run into large figures. This is due, in no small extent, to the impetus that has been given to trade with the United States.

Reports received here from Dublin, Ireland, tell of a large demand for St. John, Miramichi and Quebec spruce deals at steady prices.

Sawyer's mill at Harland, which was closed down for some weeks on account of no lumber being in the booms, has again commenced operations.

There is likely to be a new saw mill erected at Trocadie. Messrs. Hill & Standford, of Bangor, Me., are interested in the project, owning 10,000 acres of timber land in that district.

Edward Walker, of Bass River, has recently shipped two large vessels with spruce for Great Britain. He proposes to erect a new building and put in a planing and matching plant.

It is now definitely settled that the mills of W. C. Purvus and A. Cushing & Co., destroyed some time ago by fire, will be rebuilt, the asked-for assistance from the municipalities being granted.

Messrs. Goodwin, of New Horton, have removed their steam mill to Memel to saw A. H. McLane's logs, which they have purchased. Mr. McLane is offering for sale by public auction the large gang saw mill at this village, and all of the milling property on the Saw-Mill Creek purchased by him last year.

Large quantities of spool bars sawed at Richard's mill, Boiestown, N. B., have been shipped to Scotland this season. Steam power is being placed in the mill at Richard & Gunter's, and when completed it will enable them to saw more than 3,000,000 feet of lumber a year, besides spool bars. White birch is used principally for spool bars, there being large quantities of it in the Miramichi district.

ST. JOHN, N. B., Aug. 24, 1895.

BRITISH COLUMBIA LETTER.

[Regular correspondence CANADA LUMBERMAN.]

ALIVE to every interest that will facilitate lumbering on the Pacific Coast, electricity is being introduced into the forests here. A complete electric plant will be in operation in a very short time on the west coast of Vancouver Island and the logs will be hauled by electricity, supplied by portable motors. The motors will be easily movable from place to place as the timber is cut. There being abundance of water adjacent to the scene of operations, all the trouble and expense of building a railway for the use of locomotives will be avoided by the simple method of stringing a wire to convey the electricity to the spot it is required for use. A canal has been dug through a portion of these limits, so as to facilitate the transportation, and it will require the application of the electric power for only a few minutes to haul the logs from their place to the water. The limits are in the Euculet district and are owned by Mr. Wm. Sutton. Even in this province the success of lumbering depends on keeping down the cost of production and it is anticipated that the introduction of electricity will be a means of saving expenses, though it will represent a considerable investment of capital at the outset.

C. P. Burton has placed an order with the B.C. Iron Works, for machinery for a saw mill at Nawas Harbor.

Bush fires are raging along the lines of the Island Railway, and fanned by a strong wind threaten considerable damage to the settlements. Thousands of acres of valuable timber are said to have been burned.

Lumbermen here are not slow to realize the benefit that will come to them by the decision of the United States Circuit Court in again placing red cedar upon the free list. Red cedar shingle and bevel cedar have already obtained a high reputation and for interior finish it is gaining in popularity. There is an improved feeling in the lumber trade generally throughout the province.

NEW WESTMINSTER, B.C., Aug. 23, 1895.

MICHIGAN LETTER.

[Regular correspondence CANADA LUMBERMAN.]

THE rapidly accumulating stocks, with the sawing season in full swing, is giving rise to some concern by saw millers on these shores. Stock has just moved off slowly enough this season to cause the new cut to swell the stocks on the piling grounds too largely. It is more than likely that in some cases the mills will be closed down as a remedy for this difficulty. At Bay City the South End Lumber Co. has leased the McLean mill property, on which to pile lumber.

More lumber arrived at Saginaw by water during July than was shipped out by water.

The lumber shipments from Saginaw for the month of July were distressingly small, totalling only 2,125,000 feet.

The lumber operations of C. K. Eddy & Sons, in the Georgian Bay districts, the coming fall and winter will be on an extensive scale.

Greater activity in shipments of shingles has prevailed in Manistee during the past few weeks than at any other time in three months.

A log was sawn at the mill of the South End Lumber Co., Bay City, ten days ago, that scaled 1100 ft. It was Canada stock and was cut up into 4 inch plank.

In the lumber camp of the A. W. Wright Lumber Co., in Ross Common County, 3,000,000 feet of logs a month are being cut and sent by rail to the Company's mill at Saginaw.

The big steel steamship, Penobscot, was launched from Wheeler's yard, Bay City, a fortnight ago. It is said to be the largest freight steamer on the lakes and will cost complete $200,000.

It is somewhat remarkable that despite the fact that the statistics of the past year or two have shown a great falling off in the vessel lumber trade, yet some of the shrewdest lumbermen in Michigan are making investments in vessel property.

No small amount of interest is manifested by lumbermen here over the dressed lumber case, and they will await with a measure of anxiety the result of the recent appeal here before the Board of General Appraisers. Whilst some manufacturers are wishing that dressed lumber should be taxed the 25 per cent. and thus exclude Canadian competition, this is not the case with everyone engaged in the lumber business in Michigan. Some of the largest holders of Canadian limits are Michigan lumbermen, and they have seen a prospective and satisfactory trade ahead in the manufacture of dressed lumber near to their limits in Canada, if it could be exported to the States free of customs trammels.

SAGINAW, Mich., Aug. 24, 1895.

PRACTICAL HINTS.

"JOB" IN LUMBER WORLD.

WOOD-WORKERS nowadays are fruitful in resources. There is hardly a mechanic in wood in the country who does not carry about in his head from one to a hundred valuable ideas pertaining to his work. Experience always suggests to the true mechanic improvements, novelties and originalities, and the worker who can should put his ideas into shape and patent them. Many a man is carrying matured ideas which, if put into form and machinery or processes, would enrich him. Don't let your ideas die unused. Bring them out. Dress them in iron and wood and set them to work for your good and for the good of the world.

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Workers in wood will be interested to learn that, in putting together quartered pine or any other kind of wood, greater strength and durability may be obtained by placing the grain of the wood at an angle of 60° than is obtained by crossing at 90°. The reason for this is that, as all wood expands and contracts more or less under the variations of moisture in the atmosphere, the pieces glued at an angle of 60° can expand and contract to a certain extent without tearing themselves apart, as is the case when glued at an angle of 90°. The 60° glue-joint simply pulls the object out of place a little and disturbs its shape, while the 90° glue-joint pulls things all to pieces in its effort to accommodate itself to climatic conditions.

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Wood-workers who have kept their senses at work know the value of the draw cut. The art of varying the angle of cut by varying the motion of the cutting tool is learned almost instinctively in actual practice. The small boy very quickly comes to understand that his knife will cut better if he gives the blade a drawing motion while cutting. This is due to two reasons: One, that the knife, even when it is sharp, is microscopically a saw, and the drawing motion gives the teeth a chance to act; and the other, that, as the drawing becomes more rapid, the cutting angle of the blade is made smaller and sharper, so that a rapid draw really gives a temporary sharpness to the instrument.

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Now here is something that is important, if true. An inventor, whose name I have not learned, is said to have invented a band-saw that possesses the power to saw during both the forward and backward courses of the log carriage. In this invention the saw is provided with two sets of teeth, facing in opposite directions, and is sustained by band-wheels, and the operation consists in a forward movement of the carriage, which brings the log in contact with the teeth facing one way, while the retreat of the carriage utilizes the teeth facing the other way, assuring a considerable economy of time and wear of the saw. Any difficulty in reversing the "lead" or angle of the saw face toward the log to accommodate the alternate motions of the carriage is overcome by the log-carriage performing the reversal movement. The upper band-wheel, which is movable, is connected with the carriage by means of a series of screw shafting, well geared; the carriage runs its course in one direction clear of all mechanism, and with the wheel face and saw resting thereupon, tilted at the angle required to saw a slab from the log, completing the course and reversing for the return, the carriage is instantaneously brought in contact with pawl-and-ratchet, which, working in conjunction with a rock-shaft and pitman, transmit, by means of the screw-shafting, a motion to the upper band-wheel, which throws the latter at an opposite angle and holds the saw in readiness for its work upon the log while the carriage retreats. At the end of the retreat the connection is again broken automatically, and the carriage again makes its clear run.

"I had to babbit a solid box some time ago. The shaft 1 11-16 inches; I turned the mandrel 1-64 inch small, and gave it a good coat of 'Dixon's pipe graphite'. The box came out just right side for the shaft. I did not let the mandrel stay any longer in the box than was necessary, as it would have 'stuck,' no doubt. It is a good plan to heat the mandrel first."—B. F. Odell in American Machinist.

SHAFTING, PULLEYS, ETC.

IN designing a mill or manufacturing plant, says C. R. Tompkins, M. E., one of the most important features, aside from the arrangement for good and sufficient power, is the line of shafting and the necessary pulleys for the purpose of transmitting the power to the several machines to be used. Now, it is just as important that good judgment be manifested in this part of the plant as in any other. The fact is that much needless expense is often caused in the first instance, besides a continual loss of power in the second, by an injudicious selection of the shafting.

A line of shafting unnecessarily heavy, with pulleys and couplings to match, not only involves a greater expense in the first place, whether it is purchased by the pound or foot, but the extra amount of friction on the journals caused by that weight is a factor that should also be taken into consideration. It is a well-known fact that the frictional resistance with all bodies in sliding contact is in direct proportion to the weight pressing them together, so that the weight of a line of shafting with heavy pulleys, no matter what the speed may be, will exert a constant frictional resistance in proportion to the weight.

While there can be no question as to the economy in all cases of using a lighter shaft at greater speed than was formerly the case, still it is not advisable under any condition to go to extremes in either case, for the reason that, with a little forethought and calculation in the first instance, we may avoid either.

As a rule, in all modern mills and factories, the tendency has been toward lighter shafting and pulleys of small diameter, with a corresponding higher speed, and there is no question but much more satisfactory results have been obtained. The shortest and most reliable rule that has been found to obtain the torsional strength of all sizes of shafting, is to multiply the cube of the diameter by 600, and this product by the number of revolutions per minute, and divide by 33,000 for the horse power. The ultimate torsional strength of a shaft is not the power required to twist it off, but a power not quite sufficient to give it a permanent set.

Now, according to this rule, which has been verified in many cases, a shaft 3 inches in diameter at 200 revolutions per minute should not be required to safely transmit the 32 horse-power, while by the same rule a shaft of 2 inches diameter of the same quality of iron running at 300 revolutions will safely transmit 43 horse-power. Now, all other things being equal, it is evident that where not over 35 horse-power is required, a 2-inch shaft at 300 revolutions per minute is the most economical. For example, the weight of a line of 3-inch shafting 40 ft. long, without couplings and pulleys, is 955 pounds, while a 2 inch shaft of the same length weighs 424 pounds, a difference in weight of 531 pounds. Now, the frictional resistance, as before stated, is in proportion to the weight, and without any lubrication is estimated that it amounts to 25 per cent., but with a good lubrication this may be reduced, according to the best authorities, to 8 per cent.

Now, taking 8 per cent. as the average, we find that with a 3-inch shaft we have a constant frictional resistance of 76.40 pounds to contend with, while on the contrary, the frictional resistance upon a 2-inch shaft amounts to but 34 pounds. Here an important question arises which has been frequently discussed, and that is whether the speed has anything to do with the frictional resistance.

One authority says that "with hard substances and within the limits of abrasion, friction is as the pressure, without regard to surface, time or velocity." In another place the same author states as follows: "A regular velocity has no considerable influence on friction; if the velocity is increased the friction is greater, but this depends on the secondary or incidental causes as the generation of heat and the resistance of the air."

Now, without entering into a full discussion of this question, if we take the question of speed into consideration, the argument is still in favor of the lighter shaft. We found the frictional resistance in the 3-inch shaft without taking the speed into consideration to be 76.40 pounds. Now, if we multiply this by the speed, as some contend it should be, we have a total resistance of 15,280 pounds per minute to overcome, while with the 2-inch shaft by the same proposition we have 10,200 pounds per minute to overcome, showing a difference in frictional resistance in favor of the 2-inch shaft of 5,080 pounds per minute.

Now, as to the question of pulleys. In order to obtain say 900 revolutions from a pulley driven from a 3-inch shaft at 200 revolutions per minute, it will require a pulley 36 inches in diameter, while the same power and speed may be obtained from the 2-inch shaft at 300 revolutions from a pulley 24 inches in diameter.

Now, in the foregoing argument in favor of lighter shafting and higher speed, the torsional strength of the shaft has only been taken into consideration, and while the torsional strength of a shaft of a certain diameter may be amply sufficient to transmit the required power with perfect safety, still the lateral strength must also be considered. A shaft, no matter what the size may be, in order to fulfill all the conditions of practical use, must possess sufficient lateral strength to stand the pull of the belts, together with the sudden shocks which may be sustained when heavy machines are started suddenly, and for this reason, under peculiar conditions, it may be advisable to use a shaft a trifle larger than the rule calls for. But under ordinary conditions, if the distance between the boxes or hangers is in proportion to the size of the shaft, it will not be found necessary to vary much from the foregoing rule.

One of the most common faults in erecting a line of shafting is in too great a distance between the bearings, and it is often the case that a shaft abundantly heavy is rendered ineffective from this cause, and when a machine is started the shaft springs, so as to cause the belt to slip, unless the pulley happens to be close to the bearing.

While it is good practice in all cases where the conditions will admit to run all heavy pulleys as close to the bearing as possible, still it is not always practical to do so, consequently the size of the shaft and the distance between the bearings should be so calculated that there will be sufficient lateral strength to admit of placing the pulleys upon any part of the shaft between the bearings.

There is no question but as a general rule a shaft that possesses sufficient torsional strength to perform the work, with a modern allowance for contingencies, will, if the bearings are placed at a proper distance apart, also possess sufficient lateral strength for all practical purposes.

In practical experience it has been found that the most reliable rule for this purpose is to take three times the diameter of the shaft in inches for the distance from center to center of the bearings in feet. Thus a shaft of 2 inches in diameter should be 6 feet from center to center of its bearings. One of 2½ inches would call for 7 feet and 6 inches, while one of 3 inches may be 7 feet, and so on.

WHY SAP FLOWS IN TREES.

DISCUSSING the flow of sap in trees, one writer presents the following interesting theory. The maple tree is active in the summer and passive in winter. Pressure, suction and zero are conditions of the tree when not in leaf, when at rest and passive. Varied weather as to temperature is the case of these varied conditions. Under certain conditions the whole tree may be in pressure, while another part of the same tree may have been in suction. When the tree is in pressure, it is throwing out moisture sap, whether tapped or untapped. When the tree is in suction, it is reversed, taking in moisture of water, whether the tree is tapped or not. When the tree is tapped the pressure is visible. To make the suction visible, connect a glass tube to the spout, a round wooden one, by rubber, fill the tube with water or sap, or even syrup, when the tree is in suction, and you will see the contents passing down the tube and of course passing into the tree. Pressure and suction exists all the same if the tree is not bored, but, being unseen, it is recognized little even by vegetable physiologists. Pressure may be measured with the steam gauge, and also with a mercurial gauge, while suction can be measured with a mercurial gauge only.

The highest pressure that I have noticed was 34 pounds on a square inch. This would hold a column of water over 60 feet high. The pressure of the atmosphere at the sea level is 15 pounds upon a square inch. This amount of pressure is exerted on every square inch of the outside surface of the tree and is balanced by the same amount of internal pressure, so that the 34 pounds of internal pressure was in excess of the outside pressure; hence, even if the tree is not tapped, there must be moisture passing to the surface through the pores and connecting with the atmosphere until equilibrium is restored, and suction or zero is reached. If certain conditions produce pressure, then reversed conditions must produce suction, the opposite condition. When the tree is neither in pressure nor suction, then its condition is zero. In good sap weather, as a general law, the tree is in pressure during the day and in suction through the night. In poor sap weather zero conditions prevail.

Pressure. What is it? This can only be understood by an understanding of the internal make-up of the tree. It is supposed that there are 100,000,000 cells in every cubic inch of maple wood. These cells are supposed to be like small boxes, with covers, piled one upon another, so that there are two partitions between every box or cell. These cells are filled with gases, air and water, together with some other materials or elements. Now we are prepared to understand the philosophy of the pressure. As the sun warms up the outside of the tree, the air and gases expand in all the cells so warmed up, occupying a larger space, so that the pressure must be proportionate. It is not so much the expansion of the cells as it is their expansible contents. The moisture or watery parts are forced out through the pores of the tree, and if a small maple tree is carefully scraped to the wood, instantly the whole surface will be covered with tiny drops of moisture, showing what is taking place all over the surface. If a tree is bored, the pressure is liberated so much, and if a gage is attached to the tree, it will show it and even measure the amount. Now a vacuum results. As a cool night is coming on, these expansive elements are contracting, doubly increasing the vacuum. Now pressure changes to suction, and the glass tube shows it. The equilibrium of the tree is restored.

CUT OF CANADIAN LOGS.

AN interesting contribution to the discussion of the saw-log trade and lumber duties, is the following from the Lumber World, of Buffalo:

"According to reports from Saginaw and other points in Michigan, the present season will witness the sawing of large amounts of Canadian logs in Michigan mills. The total that will cross Lake Huron from Canada to Michigan this season is set down at 350,000,000 feet of logs. So large an importation of logs, much of them by firms who own mills in Canada would seem to mean that the Americans operating in Canada do not intend to let their American mills fall into decay. It may also mean that they do not find the operation of saw-mills in Canada either so easy, so attractive, or so profitable as they expected to find it. Again, it may mean that they find the transportation of logs by lake so cheap that they find at least as much profit in sawing on this side as they find in the sale of lumber sawed in Canada and brought over by lake and rail. Viewed in any light, the movement is so large as to form an interesting feature of the trade. It is suspected that the Americans operating in Canada do not expect to see the present free lumber tariff standing two years from the present time, and that their expectation of a restoration of the tariff in 1897 or 1898 will prevent them from going to great expense to erect large mills in Canada. With Canadian saw-millers rushing their mills to their full capacity, with many Americans operating saw-mills on both sides of the border, and with American mills cutting about an average of lumber, in addition to the very large amount of scorched lumber that has been and is being 'cut to save it,' there is no immediate prospect of an advance in the prices of any of those lines of lumber concerned in these transactions in the markets of the United States."

SAWS should run at high speed to accomplish the best results. Short, slim teeth can be run on lighter cuts. High-speed saws will stand heavier feed in proportion to the length of teeth than the slower speeds. Long teeth will not hold corners well. A saw properly adjusted at a high speed will not run out in slabbing, nor into the cut after passing the center of the log.

PENDING the decision of the Board of General Appraisers of the United States in the case of dressed lumber, the subject is proving one of discussion in Canadian lumber circles, as well as among lumbermen across the border. An Ottawa lumberman considers the position taken by American lumber journals as very amusing, not to say inconsistent. "No reasonable person," said he, "can doubt that the American government intended that this classification should cover what is generally understood in Canada, as well as the United States, as flooring, clap-boards, or any lumber running through a planer. But with that ingenuity displayed some years ago in allowing canned fish to be admitted free and afterwards imposing a duty on the cans, American authorities now try to twist and distort the meaning of the Act so as to destroy the object for which it was intended at the time. Further, Canadian lumbermen are glad to know that it is a small number of specially interested parties who tried this game, and not the majority of American dealers, who are generally ready to liberally interpret the law and carry out any business they make." Another Ottawa dealer stated that many American manufacturers have taken advantage of the removal of the duty from dressed lumber by the Canadian government, and not a few of them, with their immense facilities and extensive machinery, have been able to send dressed lumber into the Dominion and thus compete with Canadian manufacturers. The impression seems to prevail in Ottawa that the Canadian custom authorities will not levy the reciprocal duties until the decision of the Board of Appraisers in New York is given out.

* * * *

As has been remarked before, if self interest is allowed to guide a decision in this case, it is easily understood the view that will be taken by a certain section of the United States lumber trade. But this is not an equitable or statesmanlike position. And it is a question whether it is the wise and business-like view. United States lumbermen have found already, as a result of the free tariff clauses of the Wilson bill, that a very decent and growing market for what is termed dressed lumber is to be found in Canada. The Timberman tells us that the sale of tongued and grooved yellow pine in Canada has assumed considerable proportions, and if the decision of the Board of Appraisers is sustained it will mean that a considerable market is lost to Southern operators, and a readjustment of trade relations, so far as lumber is concerned, would be necessary. The fact is that it is difficult to say what will be the final outcome of this question, and whilst I am not going to pronounce myself an out and out free trader, it does seem that here is a case that illustrates where free trade best suits two countries. Each finds a market for its particular product in the other country, and why not give things a free swing, and let each, without any customs incumbrances, push trade to the best of their ability.

* * * *

The summer season coming well nigh to a close, I find lumbermen talking freely of the prospects for the fall. One opinion prevails, that July and August have been duller than the average summer months. This has been the case to the extent that lumbermen have queried whether the quietude that has prevailed could rightly be charged altogether to the summer season. My own impression is that this has been the main cause, for, even with commerce generally climbing upwards these months have been dull in every line of trade. The good times we have heard so much of has been in a confidence in the future, rather than immediate activity. And that this feeling of confidence has been well grounded is shown in the turn that the lumber trade is taking as it commences to go out of the month of August. Business for the past week has been a deal more healthy than for many weeks before, and the presence of United States buyers on the market here has furnished further evidence of improvement. A recent visitor was Mr. T. S. McCool, a somewhat familiar face in Canadian lumber quarters. He is now chief buyer for Uptergrove & Bro., of New York. I have reason to know that he did not leave Toronto without making glad the heart of some of our lumbermen by placing orders with them. It would be unwise, but I don't think there is any danger of it, for lumbermen to suppose that any great boom would take place this fall, and as a consequence become extravagant in their operations. But I notice this, that the feeling is gathering momentum, as the change approaches, that not only the worst of the depression has gone by, but that the turn has actually come. Of course, we have been beguiling ourselves in this way for a number of years as each fall season has come around, but there seems good reason to believe that this fall differs from some other falls. A different tone will take hold of the lumber reviews that will be written from this out, an agreeable change from the doleful tune that has too often been played. How true it is that every cloud has a silver lining.

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A brief account in our British Columbia letter of the application of electricity to logging operations in that province furnishes another instance of the extent to which this science is becoming useful for commercial purposes. It almost looks, as a writer in an electrical journal has said, that this will be a world of electricians before many years have rolled by. The butcher, the baker, the candlestick maker, the car driver, the gas lighter, the hod carrier, jack tar and all the rest of humanity will be electricians of some calibre. It will be, I suppose, as with everything else that gets on top, everyone will want to count in, if possible, with the successes that are scored. But all pleasantry aside, electricity is performing wonders in the world of commerce, and even the inventor of the steam engine may fear that his supreme position will some day have to be vacated. There seems to be no reason why for logging purposes, as a means of propelling shortlined logging railroads, and for cutting down and sawing trees, that this new power should not be largely used. It is easier work than can be done by the steel saw for the little platinum wire to take a great tree of the forest in its tender embrace, and with deadly grip fell the giant to the earth. It has been proposed to utilize the wire by stringing it in a straight line, bringing it to white heat by the electric current, and apply it to a tree as we do an ordinary saw. This plan, I am told, has been in vogue for some little while in England. We would hear less then of the sawdust evil, for the sawdust dump would not be in it. Eight trees, it is said, can be brought down by this process in the time required to cut one down by axe or saw.

* * * *

Everybody, I suppose, has read Mark Twain's account of how he edited an agricultural paper. It was left to that American humorist to cause pumpkins to grow on apple trees, and all the other absurd transmogrifications of nature to take place. But I do not know that Mark Twain wrote anything funnier in that sketch of his than what has appeared recently from the pen of one Flora Moon, who, as a woman, tells of the things she saw in a saw mill. She wanted to start at the beginning and undertake to follow a log to the saw and then see a board cut and follow it until it was on the cars. What did she see? In her own language she saw a log coming up on the back porch and pulled on to what the lumbermen call a deck, but what to the eyes of Flora Moon was simply a floor. She saw a man with the awfullest dirty hands yank a piece of iron, and a great block iron fixing came up through the floor and hit the log a pop that knocked it clear across the mill and then it popped back out of sight. She was told by a Swede that the fellow guilty of this act was known as a "steam nigger," but she failed to see any of the African around about and asked the Swede if he supposed she was green. Like the tricks that it is said are played upon the boys who attend the electrical schools in different parts of the country, when they are sent off for a bucket of steam, this young lady soon got the impression that the men around the mill had been posted about her coming, and just lied to her from one end of the mill to the other. They spoke about a dog, and a whole lot of things she knows are not found in any saw milll. She got some information as to what might be done with all the sawdust that accumulated around a saw mill. One considerate gentleman suggested to her that she should agitate for the organization of a company to manufacture dolls, as there was no stuffing so cheap and valuable for dolls. Flora had her experience before she got through with the boys that day.

* * * *

WITH hardwood dealers basswood has been one line in liberal demand this season. The question is raised why this wood should be classified as a hardwood, for it possesses many of the elements that are indigenious to other woods. It certainly borders more closely to the one than to the other. But, after all, it does not make much matter under what classification it comes, so long as it proves a good product for the lumber dealer, and this is the case, for it is coming into increased uses for cheap furniture, carriage bodies, inside finishings, and especially for mouldings and furniture frames. Canada has a good supply of basswood to furnish to all who want it.

FIRING STEAM BOILERS.

IF an engineer must hire the fireman, let him look first for a sober man; next see that he is neat, careful and reliable; next ascertain if he wants to learn something new each day. If the man is a "know-it-all" it will not do to take him into the fire room. No matter what his other qualifications may be, he will not prove a financial success. His introduction to the coal pile will mean a considerable hole in the owner's pocket book. The new fireman, if he understands his business, and especially if he has a new boiler, will start a slow fire. He will be easy on that boiler for a day or two; he will start the fire with wood, if possible, as that fuel can be regulated closer than any other form.

For a medium sized boiler, say 5x16 feet, he will be very lazy in getting up steam the first day. Probably three or four hours will be consumed in getting up the pressure. While this is being done he will have a good look at every seam and every rivet that is within his reach. He will take pains to let the air out of the boiler as soon as the pressure begins to start. This is easily done by leaving a gauge cock or two open, or by raising the safety valve if the lever variety is used.

After the new boiler has been gradually worked up to a pressure, he will let it stand an hour or to, then open the blow-off at surface, and give a chance for all the oil and light dirt to run out. After this the boiler may be put to work in earnest, and if the above directions be followed he will have very little trouble from leaky seams or tubes.—Tradesman.

OBSTINATE THUMPING.

SOMETIMES an engine which usually runs well develops an obstinate pound or thump, which persists in spite of all the doctoring that can be done to the machine. In vain the engineer will go from the wrist pin to the cross head, and from eccentric to bearing. Even the fly wheel and the manner in which it is keyed upon the shaft will be investigated, to see if the thump is located therein. After all these things have been tried in vain, just give the engine a trifle more compression and note the result. Probably it will cure or make it worse. In the latter case change the valve again and give a little less compression than there was before. In nineteen cases out of twenty the change in compression will do the business. The philosophy of the business is this: The compression is too little or too great to allow the engine to run smoothly over the centre; and at that point the piston gives a "yank," which causes wrist pin and connection and sometimes the main bearing to vibrate to the extent of the lost motion, forming the thump or pound, which is so objectionable to the good engine runner.

Christie's mill at Brandon, Man., has finished its cut of lumber for this season.

A very serious bush fire has been raging in the neighborhood of Canyon Creek, British Columbia, and within the timber limits of the Golden Lumber Company.

THE NEWS.

W. Harris has purchased from John A. Bobier the saw mill at Port Talbot, Ont.

—A raft containing 7,000,000 feet of lumber recently passed through the St. Clair river.

—John Philp, of Grand Valley, Ont., has purchased a new 60 h. p. engine for his saw mill.

—An electric light plant has been placed in the St. Anthony Lumber Co's. mill at Whitney, Ont.

—Cameron Bros. have commenced to rebuild their saw mill at Hawkesbury, Ont., which was burned some time ago.

—Chew Bros., Midland, Ont., have a gang of men cleaning out Blair river as a channel for log-driving next spring.

—The Hawkesbury Lumber Co., of Hawkesbury, Ont., recently closed down four of their mills on account of low water.

—The cup presented by the Georgian Bay Lumber Co., to be played for annually by the G. T. R. employees, is valued at $150.

—Mickle, Dyment & Son's shingle mill at Severn Bridge, Ont., is shut down for the season, having made a short season's run.

—Col. F. M. Pope, of Robinson, Que., has placed a new Leonard engine in his saw mill. He has a large stock of logs to cut this season.

—J. O. Gilbert & Son, of Bisaop's Crossing, Que., have added a large planing, matching and moulding machine to their steam saw mill equipment.

—The boom at Moore & Macdowall's saw mill at Prince Albert, N. W. T., broke recently, and released 500 logs, which went down the stream and were lost.

—The second annual celebration of the Arnprior Lumber Mills Association was held on Saturday, August 10th, and consisted of a trade procession and games.

—On the 8th of August, Daniel Cooligan, a saw mill hand of Buckingham, Que., was drowned in the tail race of the mill. He slipped while moving a jam of logs.

—The Anderson Furniture Co., of Woodstock, Ont., has been incorporated by the Ontario Government, to manufacture and deal in lumber and furniture of all kinds.

—The St. Francis Lumber Co., which lately bought the limits of the Brompton Mill Co. and the P. M. Partridge limits, have decided to build a saw mill at East Angus, Que.

—The owners of lumber vessels are petitioning the secretary of war to replace the red second class buoy at the entrance to the cut in the Saginaw river with a Pintsch gas buoy.

—A large quantity of logs and pulp wood have gone adrift and been lost at Portneuf, Que., owing to the high water. They belonged to Mr. Lemay, whose loss will be heavy.

—J. W. Howry & Sons, of Fenelon Falls, Ont., have finished operations on their limit at Whitefish river. They are said to be negotiating for another limit on the North channel.

—At Severn Bridge, Ont., in one day, Traiton Gammon sawed 27,000 shingles on a horizontal saw, and Walter McClelland trimmed them on a saw jointer. Can anyone beat this?

—A couple of sticks of British Columbia pine recently arrived at Kingston, to be used in the construction of a dredge. The sticks were seventy feet long and three feet square. The freight on the timber from Hastings, B. C., amounted to $700.

—Young Bros. & Co's. mill at River Hebert, N. S., has closed down for want of water. Their steam mill at Newville will cut in the vicinity of six million feet of long lumber and *five million laths this season. The output of the two mills for* the season is expected to be about ten million feet of long lumber and eight million laths, which will be the largest cut they have ever made in one season.

—The towing steamer "Daisy," owned by H. Calcutt, of Peterboro', was burned about two miles east of Hastings, on the Trent river, on the 3rd of August. The crew had a narrow escape, having to jump in the water and swim to the end of the drive.

—Mr. Parmelee, Deputy Minister of Trade and Commerce, has issued a circular to a number of leading lumbermen, calling their attention to a letter received a few days ago from a gentleman in Constantinople, with reference to Turkey offering a good field for Canadian lumber.

—The mill men employed by the Ontario and Western Lumber Association, at Rat Portage, Ont., went on strike on the 8th of August for an increase of wages. Last spring wages were reduced from $1.50 to $1.35 per day, and the men demanded that the wages be raised to the former rate.

The Co-operative Sash and Door Factory, of Kingston, Ont., has concluded its first year's business. A division of profits will not be made this year, as it has been decided to carry the funds forward to the end of another year. The profits would have given the employees a bonus of four per cent. on their wages.

—Forest fires have recently done considerable damage to timber lands in the vicinity of Moose Mountain, N. W. T., to prevent which the Dominion Government have decided to establish a permanent reserve there. The Moose Mountain country is forty miles long and thirty miles wide, and contains some valuable timber.

—Two wealthy lumbermen, Messrs. E. M. Fowler, of Chicago, and Arthur Hill, of Saginaw, accompanied by Mr. M. N. Quinn, lumber broker, of Saginaw, visited Pembroke, Ont., a fortnight ago. They own large tracts of timber on the Madawaska river, and their mission was to arrange for getting their logs cut in Pembroke. They were prepared either to erect a mill or give the contract out for cutting the timber on the limits. A valuable mill site was shown them by Mr. Thomas Hale, but the drawback seemed to be the lack of additional railway facilities, which will probably prevent the erection of the mill here.

CASUALTIES.

Louis McAdam, of Stewartville, was killed a fortnight ago while breaking a jam of logs on the Madawaska river.

—R. D. Thuxton, lumber dealer, of Lindsay, Ont., was drowned in the river at that place on the 11th of August.

—Geo. W. Thompson, employed in the sash factory at Desceronto, Ont., was seriously injured recently while running a swing saw.

—H. Newens, an employee of the Cookshire Milling Co., Sawyerville, Que., was killed recently by being caught in the shafting of the saw mill.

—A young man named Henry McNutt, aged 19, employed in a saw mill at Canning, N. S., was caught by the belt and thrown against the engine wheel, receiving injuries from which he died almost instantly.

—Marshall T. Greene, president of the Chicago Lumber Company, was drowned at Highland Park on the 16th of August, while rowing on the lake.

—On the 20th ultimo the boiler in William Gordon's planing mill at Windsor, Ont., exploded, shattering the mill and killing an employee named Thompson.

—While engaged in operating a sawing machine in the Anderson Furniture Co's. factory at Woodstock, Ont., James Manzier had his hand drawn into the machine, completely severing the thumb and third and fourth fingers.

—W. C. Cone and R. J. Pringle narrowly escaped death recently at the Conger Lumber Co's. mill at Parry Sound Ont. Mr. Pringle was working at the friction in connection with the gang saw, and standing on the drive belt when the bell rang to start the gang. Pringle did not hear the alarm and was immediately thrown crossways of the belt when it started. Cone, reached forward to save his companion when he was caught by the moving belt and both were carried forward, falling on the floor in the lower part of the mill. They received severe injuries, but no limbs were broken.

TRADE NOTES.

Mr. Archibald Campbell, of Toronto Junction, who recently purchased one of the Parmenter patent dry kilns for his extensive cooperage works at that place, states that he is well pleased with it. A model of this kiln will be on view at the Industrial Exhibition, Toronto.

The Dodge Wood Split Pulley Co., of Toronto, have been given the contract for supplying the split pulleys, and split friction clutch pulleys for the Ottawa Porcelain & Carbon Co.'s extensive new works at Ottawa.

Mr. F. J. Drake, of Belleville, Ont., has entered into a contract with the Canadian Locomotive and Engine Co., to manufacture his celebrated saw and shingle mill machinery. Mr. Drake will superintend the work himself, and first-class workmanship may be expected.

The Dodge Wood Split Pulley Co., of Toronto, have supplied R. Thackeray, of Ottawa, with a very neatly designed rope drive for the transmission of the power required in the new extension just erected to his extensive planing mills. They have also supplied the required belt pulleys.

The Dodge Wood Split Pulley Co., of Toronto, have in hand two mammoth rope drives, for the E. B. Eddy Co., of Hull, Que., each drive to have a guaranteed capacity of h. p. The drives are used in the transmission of power from new McCormack water-wheels, being installed for the purpose of increasing the pulp grinding capacity of the company. The E. B. Eddy Co. are of the opinion that the rope drive is a long way ahead of any other means of transmission, especially for heavy work.

The Robb Engineering Co., of Amherst, N. S., have been appointed agents in Nova Scotia for the Dodge Wood Split Pulley Co., of Toronto, and will carry a full stock of pulleys in all sizes for immediate delivery. They will also handle the Dodge patent split friction clutches and couplings, special dynamo and motor pulleys, heavy saw mill palleys, rope driving, etc. The Robb Engineering Co., being the leading mill supply people in the Maritime provinces, this will, no doubt, prove a valuable agency for the Dodge Co., and be a great convenience to pulley users in that district.

PUBLICATIONS

The Timbermon, of Chicago, has celebrated its ninth anniversary by the publication of a special and very beautiful edition. Always bright, clever, newsy, and not least of its good qualities, courageous, it has given added emphasis to these features in the issue of 176 pages now before us. Matters of practical interest to the trade of all lands are discussed in its editorial pages, and it abounds in special papers, descriptive of particular lumber districts, and of the markets and trade of all leading sections of the country. It is most creditably printed, and its pages are enlivened with first class illustrations of various matters suggested by the great lumber industry of the continent. To a lumber journalist one of the most interesting features of the paper is the chapter headed Nine Years in Lumber Journalism, being a resumé of the editor's experiences, observations, etc., the article illustrated with portraits of Mr. J. E. Defebaugh, the editor in-chief, and proprietor of the Timberman, and his clever and good looking staff.

An occasional assignment shows that there are concerns yet making furniture that should have quit two years ago.

Makers of veneers and veneer machines report good business. Prospects for fall business in everything connected with furniture making are encouraging.

BEARINGS AND JOURNALS.

CAST iron makes one of the very best bearing surfaces for a shaft if it is never allowed to lack for oil. But if it gets dry trouble is at hand. When a cast iron bearing gets dry it will do lots of mischief in a brief period of time. When it wants oil it wants it real bad, and it wants it right away; if it does not get it it seizes and tears the journal with great intensity of desire, as it were. This is particularly the case during the first few days of use. After considerable use, well supplied with oil, the surface becomes glazed and is not so likely to do damage from a little neglect in the way of oiling. Still the danger is there, modified in degree only. Cast iron bearings are not so much used as they would be but for this ever present danger.

A well-known steam engine builder and mechanical engineer, when he put his now well-known steam engine on the market, several years ago, knowing the value of cast iron bearings, determined to overcome what he believed to be a prejudice, and used it for main bearings and elsewhere about the engine. He was forced to give it up after a year or so of trial, proper attention not in many cases being given to oiling, with the stereotyped results.

When cast iron is used for a bearing the box should be made so as to cut off not less than ⅛ of an inch from each end in squaring up, as the ends are likely to be chilled a little in the mould, and unless cut off for a little distance in there will be a narrow ring of metal that is harder than the rest of the bearing surface, and the journal will be cut. For a similar reason a liberal allowance should be made for boring.

Generally speaking, the bearing and journal should not be made of the same material, although this may sometimes be unavoidable. Cast iron appears to be about the only exception, a cast iron journal and bearing running together nicely, but for the exception previously mentioned, that is, when there is danger of getting dry.

Cast steel does very well if both journal and bearing are hardened, and the same is true of wrought iron when case-hardened. But in both these instances, the journal and bearing are special, that is, they are not such as are made for ordinary purposes, their cost being too great.

Almost the universal rule at the present time is to use some kind of lining metal, of which babbit metal, made according to the original formula, is an excellent example. Many cheap substitutes for this are made and erroneously called babbitt metal, but their chief merit is usually covered by their quality of being cheap. In this respect cheapness oftens covers a good deal of lead and a little antimony. There are, however, several patented alloys for lining boxes, some of which possess undoubted merit.

Babbitt metal proper consists of two pounds copper, four pounds antimony and forty-eight pounds tin.

A substitute for this which is said to give good results is composed of 11½ pounds copper, 15½ pounds antimony, 47 pounds tin and one pound of yellow brass. These are melted together and two pounds of tin for each pound of the mixture is added.

Neither of the above named alloys is cheap except in the sense that what is good is generally the cheapest in the end.

In lining boxes both the shaft or babbitting mandrel, as the case may be, as well as the boxes, should be made quite warm; this will prevent the lining metal from chilling and blocking up its own passage and will also modify to some extent the inevitable effects of shrinkage.

Sometimes, in the instance of brass shells, the surface is tinned, the lining metal then adhering to the tin and preventing the lining from being shaky when cold.

In crank shaft boxes connecting rod boxes and other first-class machinery, the lining metal is stretched after becoming cold by hammering with a round power hammer, then bound to size.

In more common machinery, a babbitt mandrel a little larger than the shaft is used, and the boxes go just as poured.

When it is necessary to babbitt a shaft in place, in order to compensate for the contraction of the metal, a piece of paper may be wrapped smoothly around it and held in place by a fine thread wound three or four times spirally, or, more properly speaking, vertically, around it. This paper, if of the right thickness, when removed after babbitting will leave a good running fit between the journal and bearing. For a shaft about 2-inches in diameter ordinary letter paper will serve the purpose, while heavier paper can be used for larger shafts.

THE man who takes the trouble to invent little tools and jigs for helping along his work is a valuable man to have, and the right kind of a foreman will encourage him by taking an interest in it, suggesting points or other applications, and in other ways showing him that his efforts are appreciated. All jigs may not be economical and all plans suggested for work may not be useful, but the right kind of a foreman will have his men feel free to discuss these questions before the tools are made, and by so doing save the cost of various experiments.—Machinery.