CANADIAN WOODWORKER

Vol. 1.] MAY 1908 [No 3

PRINCIPAL CONTENTS

Canada's Coming Industry.
Influence of Glue on Saws.
Unbalanced Planer Knives.
Importance of the Lathe.
Changes in the Planing Mill.
High Speed Troubles.
Mitre Joints Coming Apart.
Waste in Stave Jointing.
Piece Work on Boxes.
Twists in Saws.
Centre Sawing.
How to Fit Circular Saws.
Filing a Cross-Cut Saw.
Varnishes for Furniture.
Chair and Furniture Dimension Stock.
Belt Drive.

And many other Articles

See Index to Advertisements, page 38.

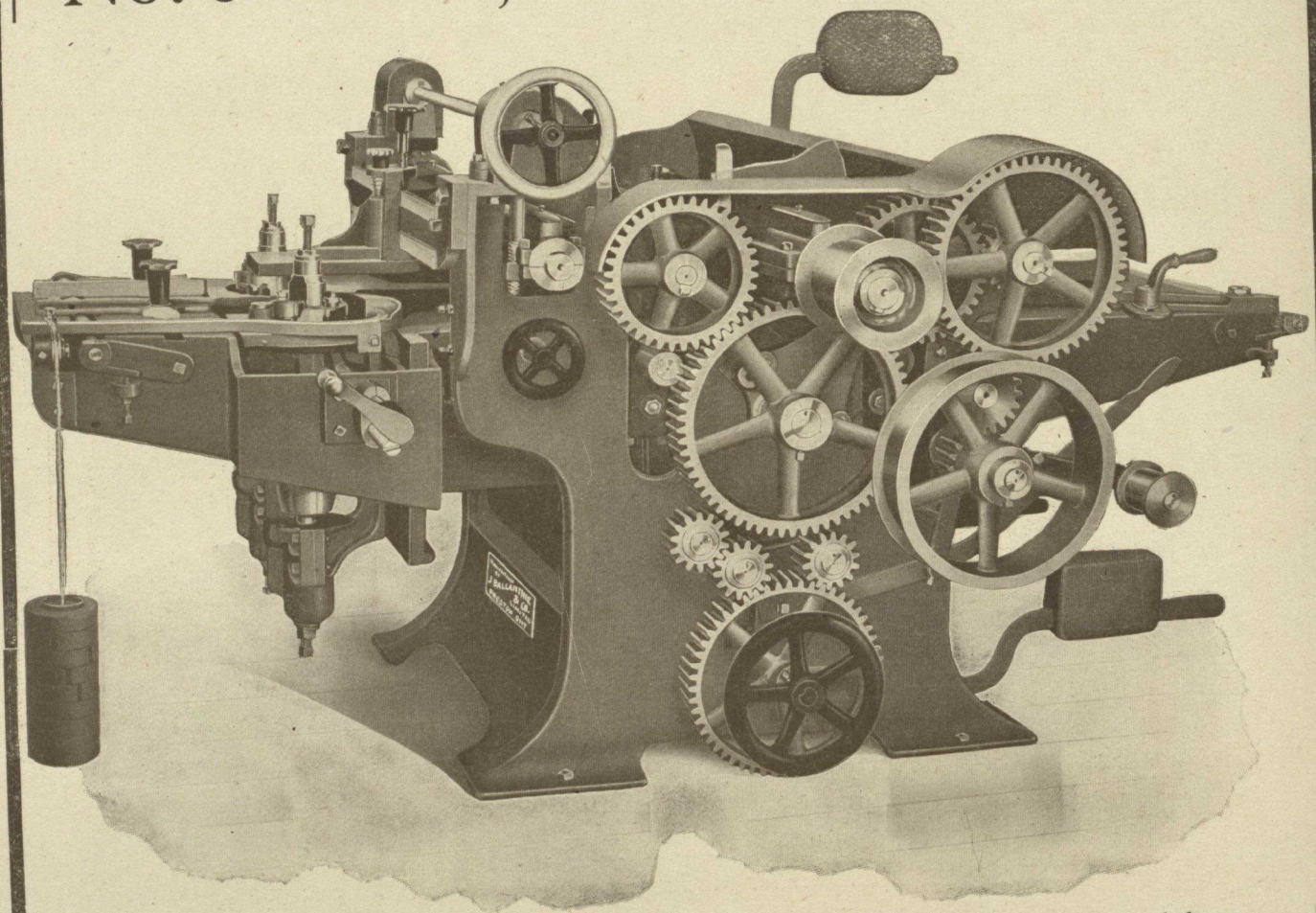
Address all Correspondence to the Publishers.
BIGGAR-WILSON LIMITED
79-80 Confederation Life Building.
TORONTO CANADA

A. J. CLARK

A NEW MACHINE

OF SUPERIOR MERIT

No. 6½ Planer, Matcher and Moulder



Planes 24 ins. wide, 8 ins. thick; matches 14 ins. wide. Table rises and lowers by hand or power. Weight, 4,500 lbs.

This is one of our best selling machines, built from entirely new patterns, heavy and substantial in all its parts and sold at a moderate price. Since being placed on the market it has met with decided favor among millmen and has given universal satisfaction.

TORONTO, April, 1908.

The No. 6½ Planer, Matcher and Moulder has given good satisfaction so far. The work done on it has been good.

PHIPPEN BROS.

HOSMER, B.C., April 1908

Re the No. 6½ Planer, Matcher and Moulder, would say that we have same installed in our mill and wish to state that same is giving universal satisfaction.

THE HOSMER MINES.

For full description and prices of Planers and Matchers or any other wood tools, write to

John Ballantine & Company

LIMITED

PRESTON - - - ONTARIO

MANUFACTURERS OF SUPERIOR

WOODWORKING MACHINERY

X. G. Double Cylinder Surfacer

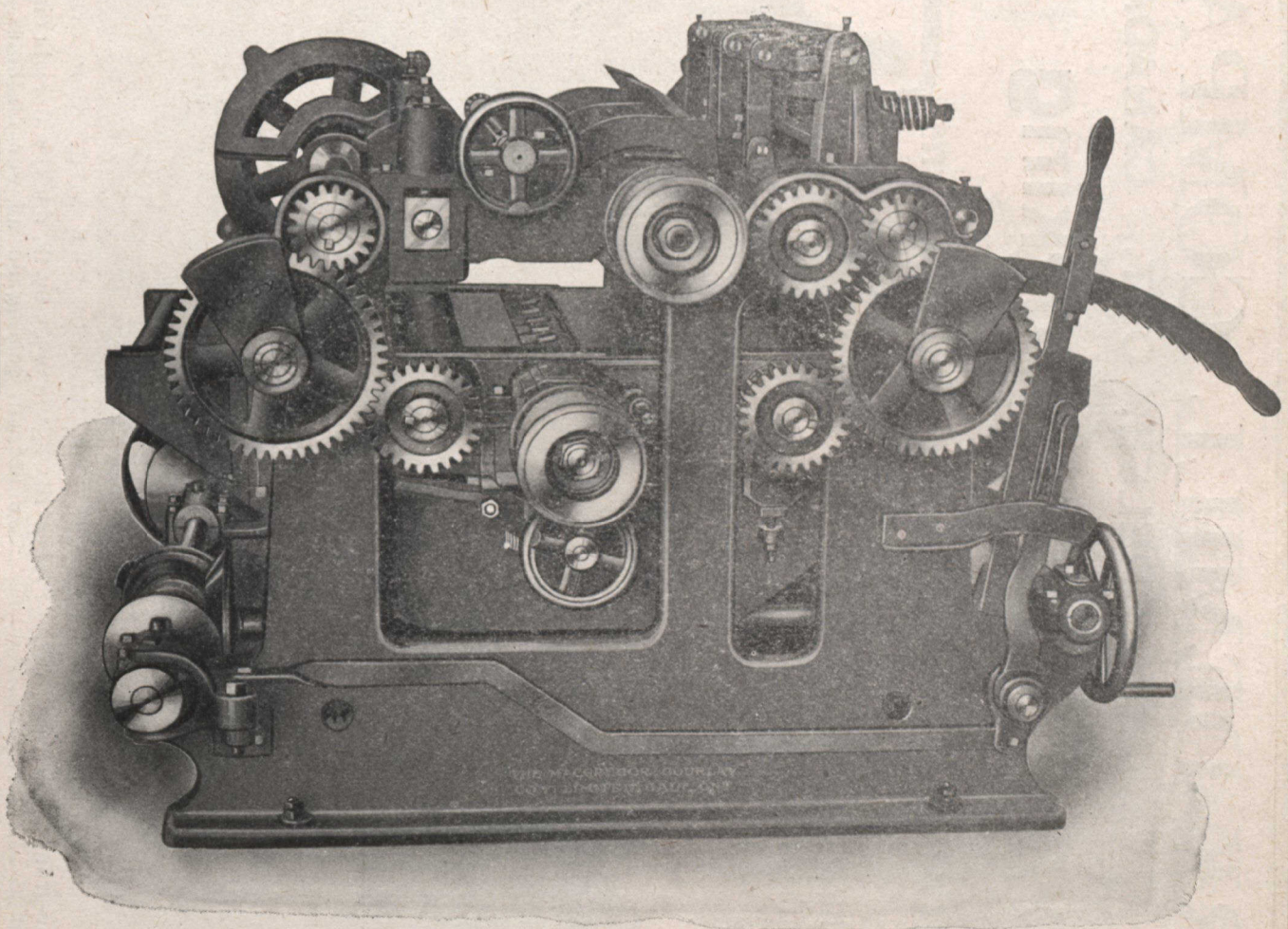
Divided Rolls and Pressure Bars.

Four 6 inch Diameter Feed Rolls.

Cylinders have Four Knives each.

Table raises and lowers by power or hand.

Planes 26 inches wide 10 inches thick; Three speeds 30-45-60 feet per minute.



The MacGregor, Gourlay Company, Ltd,

GALT. ONT. CANADA.

Manufacturers of Wood Working Machinery, Metal Working Machinery, and Machine Tools, Punches and Shears, Presses, Etc.

CLARK-DEMILL COMPANY, LTD.

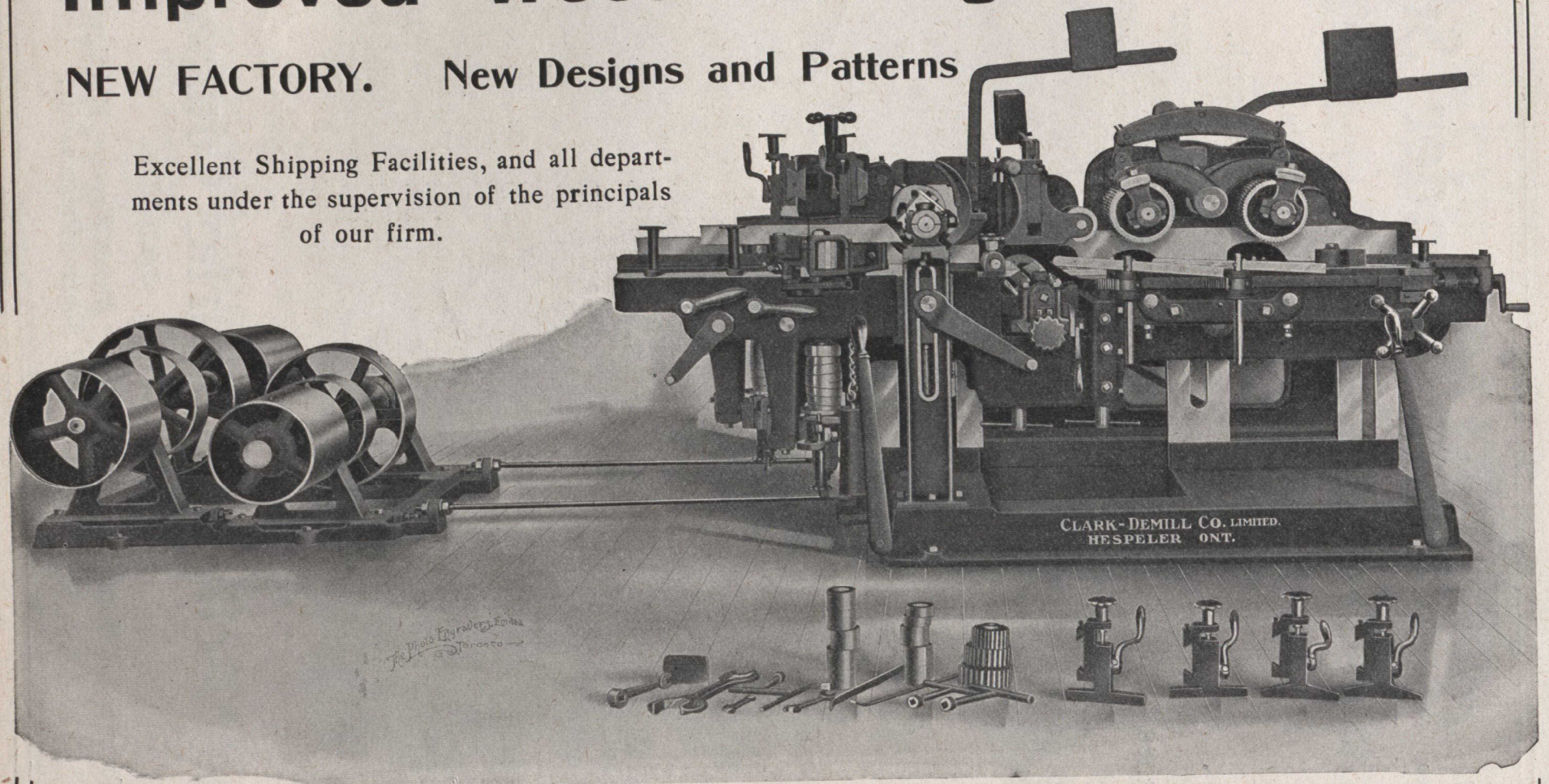
HESPELER, ONT., CANADA

MANUFACTURERS OF

Improved Woodworking Machinery

NEW FACTORY. **New Designs and Patterns**

Excellent Shipping Facilities, and all departments under the supervision of the principals of our firm.



FRONT VIEW OF EXTRA HEAVY MOULDER ON BASE WITH UNDER CYLINDER FIRST.

All journals machine-ground perfectly true. Planes 10," 12," 13" wide by 12" thick, with eight changes of feed 11, 15, 19, 22, 25, 34, 42, 50 running feet per minute. We use cut gearing on all our machines. Try them.

Canadian Woodworker

A MONTHLY JOURNAL
FOR ALL CLASSES OF WOODWORKERS

Vol. 1 TORONTO, MAY, 1908 No. 3

CANADIAN WOODWORKER

A Monthly Journal for all classes of Woodworkers.

Subscription: Canada, United States and Great Britain, $1.00 per year; Foreign, $1.25, payable in advance. Advertising rates on application.
SAMPLE COPIES FREE ON REQUEST.

BIGGAR-WILSON, Ltd., Publishers

Offices: 79-80 Confederation Life Building, Toronto. Ont.
Telephone, Main 6377.

Canadian Woodworker is published by the first of the month. All changes for advertisements, news items and other matter must be in hand by the 15th of the preceding month. Cuts should be sent by mail, not by express.

Practical men are invited to send to the Editor signed articles or paragraphs upon any subject of interest to their fellow woodworkers.

CANADA'S COMING INDUSTRY.

Nature has marked out the forests of Canada as affording the raw material for the greatest industries of the country in the very near future. The development of these industries is certain for more reasons than one.

In the first place the vast expansion of manufacturing brought about during the last century by the invention of modern machinery has made inroads on the forests of the world to such an extent that almost every country except Canada and some portions of the Russian Empire is faced by a timber famine, more or less acute. Public men of the United States, for example, are amazed and alarmed at the conditions there which they have only realized within the past two or three years. Returning from a recent tour of five thousand miles through the various States, Dr. Pinchot, chief of the Forest Service, issued the statement that the forests of the United States at the present rate of cutting would be exhausted in twenty years. When we know what has happened in Michigan and Wisconsin we can believe that this is no hastily-reached opinion of an alarmist. It is but a few years since the official publications of Michigan referred to the forests of that State as "inexhaustible"; but the truth is that to-day the great woodworking industries of Michigan are, as a whole dependent on supplies of lumber from other States to keep their factories running, while the pulp and paper mills of the neighboring State of Wisconsin—which also had "exhaustless supplies" of pulp-wood—have this past winter imported 100,000 cords of pulp-wood all the way by rail from Quebec to keep their mills in operation. From now onward the woodworking industries of the United States, if they are not to decline, will have to depend more and more on foreign timber and lumber. Whence must these supplies be derived? The only commercially accessible source is Canada. While in the case of high-priced woods, such as ebony, mahogany, etc., freight is not a determining factor in drawing supplies from abroad, it is the chief consideration in the common and cheaper woods used by the mass of woodworking concerns. Either because they are not possessed of supplies to spare for the United States market, or because the cost of freight would be excessive, there is no country but Canada that can furnish the United States market with cheap woods for the woodworking industries and construction purposes. Conservation of domestic supplies will henceforward be a problem for United States manufacturers.

These considerations will make it clear that the United States must look more and more to Canada for the means to maintain its woodworking trades. Canada has the largest area of unexploited forests in the world, Russia coming a close second, but with a large percentage of her total forest area situated in regions quite inaccessible under present conditions of transportation.

But the very fact that Canada is to-day the prime source of raw material for the woodworking business leads logically to another deduction—and to us at home this is a most important deduction. It is that Canada will herself, within a comparatively few years, be the greatest wood manufacturing country in the world. This is indicated not merely because Canada has the greatest supplies of cheap timber in the world, but because her people are the most skilful in woodcraft of any people in either hemisphere, and because of the remarkable advantages of the country in water-powers and in floatable streams and navigable rivers. A study of the larger maps of Canada will show a region unique upon the earth for its facilities for transporting timber by water, which is, of course, the cheapest medium by far for the marketing of logs to the place of manufacture.

Capital will naturally seek the place where the margin of profit is easiest and surest, and, as the demand for manufactures of wood continues and the supply of raw material in other countries becomes more completely depleted, the advantage of Canada as a wood manufacturing country will become more and more self-evident. Hence it is as certain as anything in this world can be that this country will be called upon to take the primacy in the woodworking industries.

Whether or not public opinion here will tend towards free trade or protection, it is certain that our

legislators, as practical men, will sooner or later, take steps to conserve and regulate the forests, seeing what a vital influence they have on the flow of rivers and on our agricultural and other sources, and such legislation must give momentum to any industry such as this, which is the offspring of the forest.

As has been the case in almost every other line of trade, American capitalists and manufacturers have been the first to see and the most alert and energetic to take the initiative in, these developments, and the more staid and conservative concerns of Great Britain will come to extend and regulate this progress. The attention of these capitalists will no doubt be devoted in the coming few years to the production of wood goods for the export trade. As the world becomes more civilized these goods will be more in demand, and Canadian prices becoming relatively cheaper as foreign supplies of timber grow scarce, the profits in the Canadian woodworking trade will be more assured. Ups and downs in all trades are inevitable, but, taking such fluctuations into account, there is no field of industry for which Canada has so many natural advantages, and which can be so expanded beyond the conceptions of this generation.

INFLUENCE OF GLUE ON SAWS.

Conditions in the average planing mill have been lately changing to a much more extensive use of glue in woodworking. It is used in making built-up lumber, putting on fine face veneer, and in a number of other ways it is entering more extensively than ever before in planing mill work. It behooves the man who has the care of the various small saws of such a place in charge to make a study of the influence of glue on saws.

We get some of this same thing in the box factory, in fact, frequently more of it than anywhere else, because the lock corner box has grown in prominence at a lively rate the past few years. Where we have lock corners we have glue, and where we have to trim these corners with corner saws we sometimes have trouble. There are two conditions under which lock-cornered boxes reach the trimming saws where the corners are to be smoothed off the finished box and made to look nice and smooth—that is, with the glue thoroughly dry and hard, and the other with the glue rather fresh and sticky. In either case, however, the glue has a certain effect on the saws, and it is essential to make a study of this effect in order to keep the machines provided with such saws as will do the best work and the most of it with the least trouble. This is not as small a job as one might think.

Glue, when it is wet and sticky, which condition arises when boxes are being rushed from the setting-up department to the finishing-room and sent out practically as fast as made, gums up saws something like we get in working an extremely fat pitch pine board, only worse. It sometimes keeps a man guessing, too, to know just how to combat this tendency. The natural inclination is to put more set in the saws, but when we undertake this the result is usually rough work, and that is just what is not wanted. The cornering saw for boxes should do the work so smoothly that there will be no need to take the average box to the sand wheel for finishing. Every time you have to handle a box it costs money, and the combination that comes the nearest to doing the smoothest possible work at this task is what is wanted. It seems that practically the only way to obtain this at present is by using small saws with rather thick blades and extremely small teeth.

The patent-tooth saw made for both ripping and cross-cut work, which has been in times past quite a factor in planing mill work, will not stand up long under the influence of glue. Efforts to make corner-trimming machines with knives for cutters, to do this work, have not proved as successful as desired, because when the glue is wet and sticky it gums the knives up just like it does saw teeth; besides, it is necessary to reverse the box each time instead of cutting straight across to avoid splintering in cutting out. When the glue is dry and hard, the conditions are changed a little, but the trouble is practically as great, for it is practically impossible to keep a keen edge on any tool or point when you put it to cutting through dry glue.

Practically the same conditions apply in cutting glued stock in the planing mill or furniture factory, no matter whether it is at the band saw, scroll saw, or ripping or cross-cutting on a table saw. The question is, what kind of a saw is best for work of this kind? It must be borne in mind that work of this class usually calls for smooth cutting, necessitating rather close set on the saws, and it goes without saying that it is essential to keep the saws sharp enough to prevent tearing out slugs. Another factor that must be taken into consideration is the crossing of the grain in the wood or built-up lumber. Say, for example, when sawing three-ply furniture panels, two pieces of the stock will have the grain running one way and one piece the other, and no matter whether you are ripping or cross-cutting you are cutting with the grain and part of it across the grain, so that it is rip and cross-cut both at the same time; also there is the influence of the glue on the saws to be taken into consideration.

Perhaps the best results are obtained by using the smallest saws and the smallest teeth practicable and filing the teeth as if they were to be devoted entirely to cross-cutting.

Within the last year or two the MacGregor, Gourlay Co., Limited, of Galt, has added important extensions to its works, making them the largest of their kind in Canada. Among these additions are moulding shops, pattern shops and storage building, all substantially built of stone. The new moulding shop is 150 x 210. A new Goldie & McCulloch engine of 450 h.p. has been installed to supply motive power, which is now distributed through the various departments by electric motors. These increased facilities place the Company in a position to fill the largest orders promptly.

Shurly & Dietrich, proprietors of the Maple Leaf Saw Works, of Galt, are now making important additions to their plant in order to cope with the increasing demand from the home and foreign trade. The band saw department will be enlarged by two new buildings, each 160 x 60 feet, and another department by a structure 50 x 40 feet. A new stockroom of stone, 100 x 40 feet, is also being erected. These will be finished in about three months, giving the Maple Leaf Saw Works a greatly augmented capacity. This firm has taken highest awards at some of the greatest of the world's exhibitions, and the saws of this make are sold in every part of the British Empire, as well as in foreign countries in both hemispheres. An evidence of the reputation gained by the Maple Leaf saws is that they sell at a higher price in the United States than American or foreign makes after paying duty in entering that market. There could be no better certificate of high quality.

Planing and Molding

UNBALANCED PLANER KNIVES.

The experienced eye can detect in an instant any irregularity in the running of a planer, matcher or any other machine using several knives. These machines must run with little or no vibration, or they are not running in good order. When any machine begins to vibrate, there is generally a faulty cause somewhere, and it should be looked into at once. If the foundation is solid, then it is evidently in the machine.

We will take, for instance, a large double surface planer. Look at the pressurebars. Very frequently they are the cause of considerable racket. If they are all firm and without rattle, then look over the gearing. Perhaps there may be a tooth or two missing, or they may have become so worn as to slip by without meshing. Perhaps some idle gear has run dry through negligence in oiling or keeping the oil always free from dirt, and it may be grinding around on its spindle. There may be a chip in the gearing somewhere or a knot in the lags.

We generally look for all these faults before we think of looking for the trouble in the cylinder or cutterhead. Why? Because it is only natural, and we don't wish to stop the machine unless it is necessary. However, the machine stopped, we look at the knives and find they have been striking the pressurebar, which has worked down by reason of a loose checknut; not so very hard, to be sure, but enough to turn the edge so as to necessitate changing them. We take them off and weigh them, just out of curiosity, and find them to be of different weights. Here, then, is the fault, and a bad one it is, too. One knife is several ounces heavier or lighter than the other two. Have you ever stopped to consider how much racket or damage can be accomplished by trying to run a planer, making 4,000 or more turns a minute, with a set of knives not well balanced? Even if there is no damage done by a knife being thrown, the bearings will get battered and need to be renewed. The lumber will show bad dressing, nuts and bolts will work loose and drop into the blower pipe, shavings or the machine itself, and goodness only knows what will happen then if not discovered in time.

We will put on another set of knives and be careful to tighten every bolt down hard, for if we should miss one the chances are it would work out before the other set was ready, and planer knives are expensive things. My way used to be to mark, with white chalk, each bolt head, after tightening; then there was no mistake. I once had occasion to learn a lesson from using unbalanced planer knives, and not until then did I realize the utmost importance of having knives perfectly balanced. I was filing and one of the lower knives had struck a large nail, making quite a gap near the end, so I concluded to lay it aside, as it was well worn. I picked out another from a broken set of about the width wanted, and, not having time then to attend to the matter, I stood it beside the box containing the other five, until I could get around and grind it to proper weight. I was attending to another job, and had my mind taken from the matter for several hours, but when I found a chance at last, I discovered the knife, box and all were gone. I made inquiry and learned that the planer man had changed his knives sooner than usual. I went down to see him, and he told me the machine was shaking and making a noise he had not noticed before. We stopped the machine, took off the odd knife and ground it to balance with the one I had laid aside, then put it on and there was no more rumbling.

Another incident came to my observation which made me the wiser afterward. In the cylinder of a rotary-bed planer were bolts and washers. The cylinder was always rolled over so the washers would drop to the head of the bolts, when the knife could be slipped on and be under the washers, then tightened down. On this occasion one of the washers stuck, unnoticed; the knife was put on, tightened down, and, when ready, the planer started. The boards all ran thin at that place, and there was plenty of trouble before discovered.

The pressurebar was raised, but to no purpose, and the knife was taken off. It was then known what the trouble was, and the excuses offered were very profuse indeed. Well, the knife had become sprung somewhat, as the shavings had wedged in the space very hard, so hard that it required a 12-inch monkeywrench and a piece of steam pipe in order to loosen the bolts on either side. After replacing the knife properly and tightening down very hard at that particular place, there was no further bother.

Speaking of gears running dry, I will mention a case which caused a long delay and some expense, just when business was rushing. It was a planer, with a clutch feed and chain sprockets for turning the rolls. The large sprocket wheel was pressed on the protruding bushing of a 3½-inch associate gear, and both turned on a spindle which was bolted to the frame. It was this small 3½-inch gear, which turned the upper rolls, that caused the trouble. For some few hours there were signs of "quitting" on the part of the feed, and the machine was stopped and looked over, oiled, and started up again. When the feed was thrown in, there was a tug in the chain. The clutch refused to slip, and every tooth on the small gear was broken off.

The sprocket gear and spindle were detached and taken to the machine shop, and when the gear, with its bushing, was driven from the sprocket, the oilway was found plugged hard. On driving the spindle from the gear, it was found so dry that powder had formed and the oil channel had to be cut free with a coldchisel. All this trouble was caused by not keeping a plug in the oilhole, as directed. The hole was in the edge of a flanged nut (which screwed into the end of the spindle, thereby keeping the sprocket and gear in place), and led down through the spindle to the centre of bushing. When this had been cleaned out and rubbed well with emery cloth and the new gear put on, it was well oiled and put in position again (after nine hours' wait), and ran as slick as ever. There was special attention given to plugging oilholes after that, and wooden pins took the place of dirt.

As long as I am on the subject of planers, I may as well add, there are too many men running these machines who do not fully understand them, nor how to treat them properly. Why an employer or foreman will put such a man on a large machine and bear the responsibility is more than I can understand, unless it is to save wage expenses. They get such men for $8 and $9 per week, and say "He will do, but keep an eye on him." Ah, but it's not what he does when an eye

is on him, it's what he does when an eye is not on him. He forgets instructions, overlooks important details, is slow to comprehend, and looks forward to six o'clock. When any little trouble occurs, he runs to the foreman to get it fixed, or he may attempt to fix it himself, and generally has it "fixed" before he finally tells the foreman that there is something the matter with the planer. Does it pay to hire such men for important places? Experience has taught that the man who is master of his machine is a paying investment. He bothers nobody and generally sees that nobody bothers him. He also realizes that by keeping his machine in the best possible condition he is saving himself a great deal of possible trouble, and is increasing his worth to his employer.—C. H.

PLANING-MILLS FOR CAR SHOPS.

The following article, which is compiled from a paper read before the New England Railroad Club, discusses planing-mill problems from a railroad car building standpoint, but it contains several points of value to the owner of a general planing-mill:—

The planing-mill is the backbone of the car department (at least while the frames of the cars are made generally of timber, and its construction is of first importance. As it is usually filled with inflammable material, little is saved by using a steel fireproof construction, unless needed for strength in cases where the span of the roof truss is great. Any fire occurring inside of this building would ruin metal trusses, and slow burning construction is cheaper and usually less liable to damage by fire if properly constructed. In fact, we have known of cases where steel work has been incased with wood in order to protect it from the heat of a possible fire raging below.

As a rule the writer prefers slow-burning construction for buildings whose contents are inflammable, as the intense heat caused by the conflagration of these contents distorts the iron work very quickly, while heavy timbers are very slow to ignite. Light joists and rafters, however, are particularly dangerous, and timbers should not be less than 8 by 8 inches, covered with planking about three inches thick, with all material dressed so that no splinters or any light sections are exposed to the possible attack of flames. The construction should be stiff and rigid, however, especially if shafting is to be hung from the roof, because at high speeds the vibration would be very great; the application of electric motors, however, directly to the various woodworking machines reduces greatly the necessity for shafting. and as vertical belts are a great objection in handling and turning long timbers, a two-fold object is accomplished by the direct electric drive.

Large doors and windows are desirable and necessary; doors in which the lower part opens separately may be used to good advantage in order to admit truck-loads of timber without exposing the whole shop to a very severe storm in winter time, and holes in the walls with suitable iron frames may also be used to admit long timbers. A floor composed of blocks trimmed from the excess timber cut from sills, etc., makes a fairly good surface and one that is easily repaired. A good foundation is requisite on account of the high speed at which the machinery is driven. The alternate-current motor is particularly applicable to this class of work on account of its inherent characteristics and sparklessness, which latter is particularly valuable in the inflammable atmosphere of a planing-mill.

The planing-mill should be accompanied by a dry kiln and a dressed lumber shed in convenient proximity, but in railroad shops the latter building is too often overlooked and dressed lumber is forced to lie out in the weather, rendering it very undesirable for working up in cars. The dry kiln requires steam heat at all seasons of the year, and as planing-mills are usually placed at quite a distance from other buildings (on account of the fire risk) it is inconvenient to carry the shavings any great distance, as for instance to a power-house, which should ordinarily be located in the power centre of gravity of the locomotive department. Shavings are always very difficult to dispose of, and yet they have a certain amount of value as fuel if properly utilized. Considering these various points, it has seemed to the writer as if the best solution of the problem were to put a small boiler plant, consisting possibly of one boiler in a wing alongside the planing-mill, and feed this automatically with the shavings. The steam generated can be used to operate the dry kiln, and in winter time also to heat the planing-mill. For this purpose the ordinary run of shavings would no doubt be ample, although they do not make a desirable fuel for the regular power-house, and the small amount of attention which such boiler would need, as no moving machinery is involved, would, we think, be generally preferable and cheaper than attempting to carry the shavings to the power-house (if located as above described), and steam heat back again to the planing-mill and the dry kiln. The shavings can be blown in such a case directly into the furnace by means of a fan driven by an electric motor, and the labor required for operating the boiler would be very small. Fire protection about the mill is very important, and plenty of hose with good nozzles and large supply pipes are necessary. Sprinklers are considered to add a great deal to the efficiency of fire protection and make considerable reduction in the rates of insurance.

The lighting of a planing-mill is best accomplished by arc lamps, but these must be well inclosed to prevent the mingling of sparks and dust. It seems as if the mercury vapor lamp would be an ideal one for a mill, as there is no chance of fire from incandescent particles of carbon or by any incombustible material outside of the glass tube. If incandescent lamps are used they should always be covered with cages, as they are very liable to be struck by timbers which are being handled and turned.

IMPORTANCE OF THE LATHE.

Although modern developments in turning machinery have practically displaced the hand lathe for all work where many repetitions of the same pattern are required; yet it, in almost its primary form, is an essential part of the equipment of every woodworking shop except those exclusively devoted to some special line. Both from the fact of its being the primal machine and from the fact that it gives more scope than any other for skill—both mechanical and artistic—in its manipulation, special interest will always attach to it. To the pattern-maker it is indispensable. Architects are prone o produce special designs which make its use expedient; and, for odd jobs, it is the most adaptable of machines, so it is likely to continue as essential to a machine equipment as is a hammer to hand kit.

Perhaps the mistake most apt to be made, in the selection of a hand lathe, is that of not getting it large enough It is well to bear in mind that the smallest work can be done on a large lathe, if it is properly balanced and fitted with suitable chucks, as well as on a small one; while a small lathe will not handle large work. Probably it is superfluous

to utter a word of caution against buying a wood lathe with an iron cone pulley, as that form is practically extinct. For the high speeds required it is practically impossible to balance such a pulley so that it will not cause a vibration prohibitory to good work. As to whether the small end of the cone should be next the chuck, or the reverse, as in metal-worker's lathes, is a moot question. The former arrangement gives better access to the back side of the work on those rare occasions where such access is required, while the latter permits a more symmetrically rigid construction of the head-stock frame as against the thrust of the tail-stock. It is rarely, however, that one cares to work on the back side of his job; it necessitates a somewhat awkward position and the work is generally capable of being reversed. By using enough iron, the frame may be made sufficienty rigid with either construction, and the writer has found little to choose between the two. The head-stock should be sufficiently heavy for absolute rigidity, with long bearings so arranged that wear may be readily taken up. It is essential that the bearing which withstands the end thrust should be as large as may be, and capable of quick and secure adjustment. For face-plate, or screw-chuck work, the elimination of end shake is vitally essential.

An attachment which rarely comes with a lathe, but which is a necessity for a large variety of work, is a screw-chuck. A very efficient form of this may be readily made by screwing a block of hard wood on the face-plate, turning it up to the desired shape and driving a large wood screw through the centre, from the back. This screw should project an ample distance; in cases where it is too long a part of the length may be taken up by running on a piece of wood of the requisite thickness. There is no objection to this cheap and simple form except that a new one must be made for each different size of screw desired, and that it must be removed from the face-plate whenever one wishes to us that. Care should be taken that, when so removed, it is marked in such manner that it can be replaced in the same position. This chuck has the advantage over the iron ones sometimes sold with lathes, that the screw may be very readily replaced in case of breakage or wear. The writer has found it profitable to have a good machinist's drill chuck fitted to the head-stock by having a small assortment of wood screws with the heads sawed off, he has a screw-chuck of any desired size at instant command. Other uses for the chuck are not lacking.

One should have at least two spur centres, one for large pieces of soft wood and one for smaller work; it is often desirable to run the chisel past the end of the work. Two sizes of tail-centre are often convenient, also.

An iron bed (which, however, is hardly practicable where a long distance between centres is essential) of course gives superior rigidity and is desirable if one's pocket will stand the strain; as also is a sliding, screw-driven, tool-holder. For most purposes, however, ways of well seasoned hard wood answer the purpose satisfactorily.

Discussion has been frequent, of late, as to the proper speed for wood lathes. This is a matter which cannot be arbitrarily fixed. The speeds advised by the manufacturers in their catalogues are probably as nearly correct as it is possible to get in a general way, but the texture of the wood and other conditions vary so widely that each turner must decide for himself as to what speed is best for the job in hand. It is practically impossible to centre a piece of stock so that it will balance exactly and one must not use speed enough to shake the machine unduly, nor, in heavy work, to throw it off the centres. High speed is likely to heat the chisel to such a degree that, though it may not draw the color, it will dull the edge more rapidly than is compatible with economy of time.

The lathe would seem to have been invented before history; in seeking its story one becomes lost in the haze of tradition. It seems to have been the only woodworking machine till, in the latter part of the eighteenth century, one, Bentham evolved the idea of attaching cutters to the head and moving the work against them. The idea of revolving the tool instead of the work apears to have thrown wide the gateway to the invention of crude forms of nearly all the machines that are in common use to-day. Even the lathe, as a machine for the rapid production of work, has had to yield to this principle; though it has made a good fight through the medium of the gauge and variety lathe, the turning machine of to-day is essentially a rotary-feed planer.

The gauge and variety lathes are along the natural line of development of the hand lathe and for the lighter classes of work where great numbers of the same pattern are required there is no immediate likelihood of their displacement. They are "specialists" in the machine line and with them a change of pattern necessitates a new and somewhat expensive knife. Their sphere of usefulness is limted to the class of work mentioned.

CHANCES IN THE PLANING MILL.

For several years now the scenery has been gradually shifting in planing mills and sash and door factories in more ways than one, is the way a correspondent of the Woodworker describes the development of the modern planing mill. Veneer has become quite an element; it enters not only into mill work but quite extensively into the manufacture of doors. But aside from all this there has been a change in the woods themselves used in many mills that is almost equivalent to a complete shifting of the scenery. Some mills that formerly worked white pine almost exclusively, for example, are now using more of other woods than of white pine. Toward the southern end of the country they are turning to yellow pine and in the northern half of the Mississippi valley there has been a great invasion of west coast woods. One of these is spruce, and the factor that spruce has cut in the door business is probably larger than many have any idea of. It has taken time, however, and an adjusting of operations to suit the changed scenery.

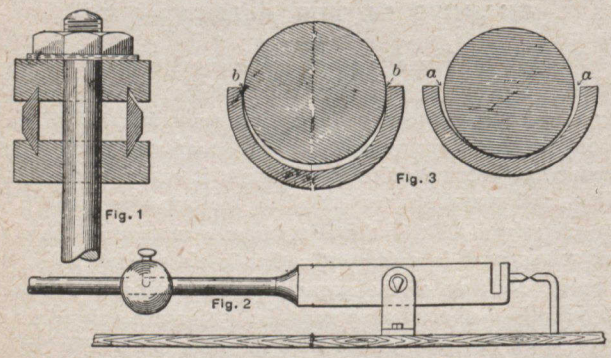
The first efforts in working spruce among white pine factories were productive of some trouble and dissatisfaction, but gradually the mills have adapted themselves to the change in woods, have come to understand how to master the new material and are now in many instances better pleased with it than with their old product, because they find that every wood has its peculiar qualities, many of them really superior, and the thing to do is to study, understand and use it to the best advantage. In hardwood flooring as the maple gives out we learn that beech, while not exactly the same in color, is fully as good, if not better in some respects, and gradually the scenery is shifting there until to-day the market value on the two woods is practically the same; and to-morrow, so to speak, it will be beech and we will forget that we were ever wedded to maple.

This shifting about puts good workmen on their metal and gives them a chance to show what they are made of and what ability that can develop when occasions require. It also furnishes a chance for the man who does not keep up with the times to get left in the race. At times the men in the sash and door works and planing mills may think these changes in woods work unnecessary hardships on them, but they don't.

They just furnish them new problems to solve. The only class of woodworkers they seem to come down hard on are the patternmakers. Patternmaking is one class of work in which it is extremely difficult to get a wood to satisfactorily take the place of white pine. Cherry is good, but it is as scarce as hen's teeth. It looks like there is nothing for it but a choice of west coast woods from among the offerings in spruce, fir and soft pine. It is hard to get the patternmakers to decide in favor of any of these woods, however, and in the meantime they are paying all sorts of prices for white pine and using stock they would not formerly look at.

HIGH SPEED TROUBLES.

An ailment that afflicts many planing-mill men is hot boxes. The mill man has his share of this at the best. His machinery runs at high speed and requires small pulleys and tight belts. The velocity of the belts causes them to air-cushion, consequently they have to be very tight. No one thing has caused so much annoyance as matcher-head and shaper spindles. Some men will have no trouble, while others think they are on the same track but have constant worries. The point is just here. They do not have things



in the same condition. One day a shaper spindle will run cool and the following day this spindle, on a different style of work, will run hot and give any amount of bother. He takes out his spindle but finds nothing wrong. The same is true of matcher-heads. The writer, many years ago, was in touch with such troubles and is glad to say that he is not like the man who knows a thing is the same as it was yesterday when it ran cool and nice. I want to impress on the fair-minded planing-mill man that things in like condition will give like results.

A short time ago the writer had a shaper spindle come in a large shop to be straightened. New babbitt was put in the bearings. The next day the job came back. Now this shaper had not given any trouble until the cutters were changed. I tried to explain to this mill man, but it was useless.

It is shown in Fig. 1. You will notice where he has one cutter a trifle wider than the other and one is also longer than the other by one-eighth of an inch. It was useless for me to tell him that this difference in width bent the top of the spindle when the nut came down tight on it and that the short cutter also threw the machine out of balance. Just think of one of these heads running four to five thousand turns and out of balance and the spindle not straight.

Some years ago the writer had to make shaper cutters and always found it good practice to plane the two up in one piece on an iron planer or shaper. Then he was sure to have them alike.

Small plants that do not have a knife balance could use a weight scale, one that would turn on a slight variation in weight. This is not so good as a regular knife balance. One can make a balance as shown in Fig. 2 which will answer all purposes if care is used in the matter of construction.

In refitting bearings, they should be relieved as in Fig 3, free on the edges at a. Just as sure as you pour a bearing and do not relieve these edges it will run warm. As soon as any heat is generated the bearing will pinch on these edges at b and wipe the oil off. If the bearing is relieved on these edges by the use of a scraper or a half-round file it allows the oil to flow around the journal. There is no one thing that causes a broken planer cylinder quicker than unbalanced knives.—H. C. R.

FACE VENEER.

The trouble with putting a thin face veneer on a solid core, even when it is built of strips running crosswise to the veneer and carefully glued together and sande ddown, is says Veneers, that there will be a certain amount of swelling, shrinking and warping, and it only takes a very little bit of this to spoil a fine mahogany face; and the mahogany, being so thin itself, has very little strength to help keep the core straight. On the other hand, if the core wood runs lengthwise the same as the veneer, and then it is crossbanded on each side with poplar or something else, say 1/16-in. thick, this veneer crossbanding relieves the face veneer from being directly affected by any slight swelling or shrinking of the center core, and the center core, being crossed on each side with this veneer, gives strength and stiffness both ways, so that it stands nicer and there is very little likelihood of the face veneer coming loose or blistering if it is properly glued down. This is important with any fine face veneer, and particularly so when one is using fancy crotch mahogany that probably has cracks in it, but if properly glued and held down will face up beautifully; while, if it isn't nicely glued down, it shows these cracks plainly like defects in the figure. These are what might be termed the finer points in veneer work, which have been gone over long since by piano manufacturers, but must be taken into consideration by planing mill people and others who expect to use fine face veneer and do justice to the work.

VENEER FOR DOOR.

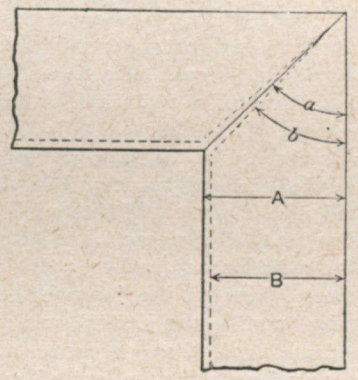
The best combination where one is afraid of trouble, as in the big single panel for a door that is to be finshed with mahogany, is to crossband the core on both sides; that is, have the core wood running lengthwise the same as the face; on both face and back cross this, say, with poplar veneer, then on this put your face mahogany. If you are facing both sides you will have a natural balance; if one side is faced with oak and the other with mahogany, use the oak comparatively thin, so as to keep it in better balance with the mahogany face.

This may sound to the average planing mill man like too much sugar for a cent, and that he ought to get a good door panel, even for a large single-panel door, by building up his center core with poplar strips running crosswise, matched or glued together, then faced on both sides with mahogany or whatever veneer is used. Still, if this same planing mill man will only go among the piano manufacturers he will find that to get a really excellent job of veneering one must crossband on the solid core and then face with mahogany or whatever

veneer is used. It may be difficult to see the point without experimenting with it, but experiments have demonstrated the necessity for taking this extra pains in work where really fine finish is desired, and the maker of doors with large crotch mahogany panels will generally find it cheaper in the end to go to this extra pains; because if he does not, he may have now and then a door condemned by the architect, and thus lose more than it would have cost to take more pains.—Veneers.

MITER JOINTS DRAWING APART.

Why do the joints of mitered joint frames, such as picture frames, so often gap on the inside corners? If the reader will take the trouble to look at a wide picture frame having mitered joints he will find that while the outer corners are close together the inner corners are almost invariably gaping a distance of anywhere from 1-32 to 1-16-inch, or more. When the frame was fitted up a perfect joint, of course, was made, but as the wood seasons the drawing apart of the inside corners is an almost invariable result. The cause of this action has been the subject of considerable discussion among patternmakers and other woodworkers, and a variety of reasons have been assigned. The true explanation is very simple, and is illustrated in the sketch given here-



with. It will be noted that the wider the frame the greater the gaping. This is caused by the fact that wood shrinks very little in length, the shrinking being almost altogether confined to the width. In the sketch the full lines indicate the original outline of one corner of a mitered joint frame, and the dotted lines the shape it takes after having seasoned. Inasmuch as the wood shrinks very little, or not at all, in length it follows that the outside dimensions of the frame remain practically unchanged, but the narrowing of the width A to B changes the angle a to b, as indicated by the dotted lines, so that the result must be a separation of the joint at the inner corners.—Machinery.

REMOVING SAW FROM MANDREL.

A good many do not like the use of a hammer to take the burr off in removing a saw from the mandrel. I have no use for a wrench for this purpose. When I was a small boy and just beginning to work in the mill, my father was induced to join our mill to that of another, and we moved the machinery to the other factory. One of these machines was a medium-size saw table. When they got ready to use it, the foreman of the upper floor, where this saw-table was, came to father and told him he was unable to remove the saw from the mandrel. He said they had secured the largest wrench there was in the mill, and had a large force trying to hold the thing from turning while they wrenched. Father turned to me, handing me a hammer, and said, "You take the saw off." The foreman looked disgusted, but followed. It was no trouble for me to take the burr off with the hammer, and what the foreman said was, "Any fool could do that." I never use a wrench for removing saws, and we have two machines on our mill floor that have the saws removed very often, and the same burrs are on them that were when they were first set up, sixteen years ago.—A. L.

THE MODERN MILL.

Many a man who might make money out of a good plant is struggling along with old machinery in an unsuitable building. This is all wrong. The man who makes money to-day is the man who does not allow anyone to get ahead of him. If you have to stop and jack up some part of your building occasionally, and line up your shafting and machines six times as often as the other fellow, yet not half as often as you should, you are going to have a pretty hard time to keep him from going on and leaving you behind. It always seems to me a great pity to see modern machinery placed in an old rattletrap of a building. Take it in the instance of a band mill. If you put modern machinery in a mill where the alignment is changed every time a different wind blows, you are not going to get any satisfaction, even with a good man looking after it; but under such conditions the good man is not often found looking after the machines, for once he knows the conditions—and it does not usually take him long to find them out—he will not stay, and then the machines are subjected to all kinds of abuses by the transient throng which follows. If we would be found anywhere near the head of the procession, give us a modern mill, equipped with modern machines, run by men of modern ideas under modern management.

SPRUNG CYLINDER.

A sprung cylinder is a common occurrence in planers and matchers, just when you cannot spare the time to send them to the machine shop to be trued up. Should the above trouble ever occur with you remove the cylinder and cut the babbitt out just under the spot that is sprung, and the same with the cap. This will remove the friction and save the journal from running hot. "B."

—The Canadian trade agent in Bristol, Eng., says there is a demand in that district for broom handles made of best basswood or poplar, and good business might be done by Canadian firms exporting these goods to Great Britain. Specifications are: Size, 50 in. x 1⅛ in.; 50 in. x 1¼ in.; approximate price, 13c. per gross, 16s. per gross; packing, 144 in case, 72 in case. One firm states that they could do with 1,000 gross of poplar handles per month, delivered Lodon. There is also a demand for maple skewers for the use of butchers, specifications of which are: Size, 6 in., 7 in. and 8 in. x 9-32 in.; 4½ in. x 5-32 in.; packing, 20,000 in case, 80,000 in case.

Boxes and Cooperage

A HEADING PLANER EXPERIENCE.

It was with considerable pride and elation that I accepted a position to look after and repair four small planers in a slack barrel shop. A slovenly-looking fellow was pouring oil over the various bearings of one of the heading planers, and the machine certainly looked as if it never had a cleaning; it was covered with dirt and grease from one end to the other, and as I watched the feeder sloping the oil around, sometimes managing to get it in the proper spot and again missing it altogether, I made up my mind that there would be a change made in the methods of oiling, provided I made good and kept the place.

The whistle blew to commence work, and I heard the shrill note of a slipping belt as the heading planer was started, and pretty soon above the din of the other machines could be heard the thumping and pounding of that planer.

Filled with dismay, I turned half around, expecting to see the machine coming my way, but my fears subsided somewhat when I saw that the bolts were still holding it down despite its frantic endeavors to get away. Even as I looked at it a light film of smoke started to rise from one of the cylinder boxes.

The foreman told me I was to have a free hand in placing this machine in order, also the others if I succeeded with the first one. I remarked that it seemed as though there was no time like the present to start in, and after I had got inside of my jumper and overalls I motioned to the feeder to stop the machine, which he did. I then had him run the belt off, and took hold of one of the cylinder pulleys and gave it an upward pull, and up it came nearly ⅛-inch. Going around to the other side I found the bearing there had nearly as much play as the other. I then removed the caps of the bearings, and found that enough babbitt metal had carried over to fill all the oil grooves and nearly filled the oil holes, so that scarcely any oil could work its way through. The babbitt metal was also very loose in both bearings, while the journals were badly cut. I decided that it would have to go to the machine shop and have the journals turned up and any possible kinks taken out of it.

I took off the knives, and, judging by the weight of each that they were not of the same weight, started to look for a knife-balance, to find there was no such a thing in the shop. The foreman laughed when I asked him, and said, "Good Lord! What do you want such a thing as that for? We never had any, and you're the first one who has ever asked for such a thing." He also informed me that the millwright ground all the knives. I asked him to show me where the knives were kept. He led the way to a workbench, near the engine, and, pulling out a box of knives from beneath it, showed an assortment of knives from which it would puzzle anyone to find two of the same weight that would run together. They were all thickly coated with rust. Some were ground wide at one end and narrow at the other, some were hollow in the centre, and others were full in the centre and narrow at each end. I put my rule on them all, and no two were of the same width. I told the foreman to have them sent back and have them ground so that both knives of each set would be uniform in width, as I would not use them in that condition. He did as I requested, but the millwright refused to grind them again, saying they were good enough, and no arguments had any effect until I brought a written order from the general manager, which straightened him out in a hurry and he did as requested; but he let some of them get hot enough to blue them back about ¼-inch on the cutting edge.

There were several pairs of dull knives on hand, and these I took over with a hint that in case they were not properly ground I would apply for another order from the office. This settled that difficulty, and I had not further trouble in that direction. I made a rough sort of knife-balance which answered the purpose very well, and corrected any difference in weight of the knives.

As to the planer, I levelled the rolls and bed and gave the machine a thorough overhauling, by which time I received the cylinder back from the machine shop. I got two short pieces of old shafting, heated them red-hot and laid one in each bearing, from which I had removed the old metal, and placed the cap over it to get warm also. I took some heavy wrapping paper and wrapped it once around the journal, bringing the lap to one side, where the liners would hold it down straight. Around this I wound some heavy twine spirally in each direction. Next, I cut some liners out of good, heavy cardboard, cutting several deep notches in one edge of each piece.

I then put the new metal in the ladle and put it over a slow fire to melt, while I placed two small blocks of even thickness on the bed of the planer. On these I placed the cylinder, after taking out the pieces of shafting. After adjusting so that the cylinder was in line and high enough to allow sufficient metal beneath the journal, I placed my liners with the notched edge to the journal, put on the caps and screwed them down hard, then cut some washers out of cardboard to fit over journal at the end of each box, to keep the clay from crowding in between the journal and boxes, and which allowed the metal to come out flush with the ends of the boxes and make a neat job when finished. I then put on the clay, using great care to cover every opening that would possibly allow the babbitt to escape, leaving a small vent at each end of each bearing to allow the air to escape. When I poured the metal, which was just hot enough to brown a dry pine stick, I let it run from the ladle in a steady stream and as fast as I could without letting it overflow before the bearing was completely filled.

The results were certainly pleasing, the bearings being as smooth as could be asked for, without any blowholes or other defects. After removing the paper from the journals, I placed the cylinder back in the boxes, without a bit of scraping, replaced the wide-notched liners with some plain ones ⅛-inch narrower, cut an oil channel in each cap and fitted each one with an oil cup, placed caps in position and adjusted them nicely, then put on a sharp pair of knives, and that machine was ready for business.

When everything was ready to go, the machine was started. The foreman came to watch how things went. I was really nervous, fearing that possibly something had been overlooked and would cause trouble, this being the first occasion where I was compelled to rely upon my own judgment entirely, having been more used to helping repair than

to taking the lead myself. The machine, which was speeded at 4,800 r.p.m., ran very smoothly, and as it held together all right my fears subsided, and I motioned the feeder to feed in some pieces, and while they were passing through I adjusted the pressurebar. Then I threw the feed lever down to the last notch, the feed being a variable friction, and the way the heading went through that machine certainly wasn't slow.

After watching things a while the boss turned to me with a gratified smile and said: "By gosh! young fellow, I never would have believed you could do it; but that old trap (it was only about two years old) is doing as good work as when it was first installed." Realizing that it had been only a lack of proper care, and not the machines which were to blame, I started in to fix up the others along the same lines as the first, and in a short time I had the others going to the limit and doing good work.—T. C.

THE VALUE OF STAVE INSURANCE.

At a recent tight stave meeting the question come up incidentally, among a group discussing stave matters, of stave insurance, that is of staves when piled in the woods, as a protection against loss by fire. It developed that the majority of those in the discussion carried insurance on their staves after they were finished and piled at the railroad, but there was only one man who carried insurance on his staves all the time, from the minute they were cut out in the woods until delivered. It seems that there is a method of covering staves with insurance pretty much as one protects furniture in a house with a general blanket insurance, which covers it in such a manner as to take care of addition and changes in the course of time to the extent of the policy, which is usually made large enough to cover all normal conditions.

Generally stave manufacturers have gone on the plan that green staves in the woods are not likely to be destroyed by fire, not in any large quantities, at least, consequently it is not considered essential or really desirable to carry insurance. Still, there are times in the spring of the year, when the leaves get dry and forest fires start, that it seems well to have some protection for staves in the woods, because nowadays stave timber costs too much money for one to afford to lose much of it even when it is yet piled in the woods, for the cost of the timber and the expense of getting it out make an item big enough so that it doesn't take much of a fire to make a big hole in the year's profits on the business. There are not so many forest fires as there used to be, but there is some trouble on this score and the time of the year is coming when we will have this trouble, the late spring and the early summer, when farmers are inclined to burn off their fields and sometimes the wood lots and occasionally let fire get out into the commons and spread. These fires are not generally severe enough in the hardwood belt to seriously damage standing timber, but when it comes to a pile of staves that have been cut out and dried somewhat they usually take fire and burn. So this subject of stave insurance is worth looking into, and, if it doesn't cost too much, stave manufacturers might even safeguard their staves from the stump by covering their material with insurance.—Packages.

WASTE IN STAVE JOINTING.

The shrinkage of staves in drying may amount to $1.25 to $2 per 1,000, which, in the course of time, is quite an item in the account of the stave factory. There is another item of loss, too, and that is the loss incident to jointing.

While talking with the proprietor of a slack stave factory one day, the subject of jointing came up and incidentally, too, that of the waste due to carelessness on the part of the jointer. The proprietor said that whenever he caught a man jointing that was careless and took off an unnecessarily heavy listing he first cautioned him about it and then, if he persisted in it, he always felt that the sooner he got rid of that jointer the better, because any careless jointer can easily waste more timber in a day than it would take to pay his wages. Take a slack stave jointer with a capacity of 10,000 a day, and let the jointer cut off just 1-16 more than he should on each joint, there being two edges to each stave, this would make ⅛ in waste on each stave, or about 1,250 inches in a day. This is a little over 300 staves, and on the basis of what might be termed an average price f.o.b. mills, would amount to something like $2. With four slack stave jointers, which is about the usual crew, the loss would amount to $7 or $8 a day.

In tight stave jointing there is exactly the same chance for loss in waste that there is in slack stave jointing, about the only difference being that high grade tight barrel staves are of more value and every inch of wood wasted amounts to more than in slack staves. Of course, it takes something to make a joint on and there is such a thing as carrying it to an extreme in the way of economy, so that there will be time wasted and probably poor joints made, but between the two extremes of wasting time and wasting timber there is a happy medium. Probably the main sources of wasting time and timber in tight barrel staves jointing comes from having the jointer knives set a little rank. This is a point that careful cooperage people watch very closely and as a rule they would prefer to have the jointer knives set a little close, and have to take a little more time with the jointing, than for the jointer knives to be set so rank that there is danger of wasting from ⅛ in. to ⅛ in. on a joint. There are about 16 joints to a barrel and two faces on each joint, so that it doesn't take much waste to each face to make the staves come up to average width. It is easier to joint tight barrel staves, that is, easier on the man operating the jointer, to have the knives set out far enough to cut freely, but it is always a temptation to cut away a little too much wood. It takes vigilance to economize in these things, but it is worth the price because good staves, after they are dried, are worth too much to be carelessly wasted by the indifferent setting of the machines or careless handling of the stock. It is not always wise to depend on the operator to watch out for these things, either, but the foreman or superintendent should see to them and keep the man keyed up and doing the work just as it should be done, and then it don't hurt the proprietor to take a look into things himself occasionally and impress on everybody the importance of economy in timber as well as in time.

FUTURE OF THE BARREL.

With the advance in timber and the necessarily increasing cost of producing barrels of various kinds, a good many people have qualms of apprehension about the future of the barrel. The question is frequently asked: "Will the higher prices serve to curtail the consumption of barrels so as to affect the trade?" This question is more frequently asked among the slack cooperage fraternity. The slack barrel has always been regarded as an essentially cheap package. It is understood that its existence is largely dependent upon the ability to furnish it cheaply. It must in many lines compete with bags and various other packages, and looked at from the standpoint of a competitor with bags there is room for

some fear that any great increase in price will injure the trade.

It seems, however, that the danger threatening the barrel is more imaginary that real, for, while a part of the trade may be lost here and there, there are at the same time new branches springing up and old ones enlarging, with the result that to-day there are more barrels used than ever before, and there is not much room for doubt but what the use of barrels will continue as long as there is material out of which to make them.

There was a time when manufacturers were almost panic stricken about the introduction of steel oil tanks for shipping oil.

Some saw in this the death knell of the cooperage business, and their fears were made into practical certainties by the appearance of steel packages of various kinds for handling oil in smaller units. Yet, notwithstanding all of this and further conditions along the same line in the way of steel tanks, there are more oil barrels being made now than ever before. Moreover, if the steel tank had not been put into use it would have been impossible to supply barrels enough to meet the demands of the oil trade, if all the coopers in the business had made oil barrels and nothing else. When the steel wire hoops made their first prominent appearance, backed by that strong combination, the steel trust, the manufacturers of wooden hoops for slack barrels were wrought up considerably. They discussed the matter at association meetings and, for a time, it looked as though the majority of the trade thought that the wooden hoop business was ruined for all time, but see the difference! Since that time there has probably been more money made in the wooden hoop business than ever before in the same length of time. There is always something coming along to disturb the calm of the industry and shake it up and make us "sit up and take notice," but the cooperage industry has survived this too many times and is too old to be shaken off by any combination of circumstances so long as there is timber to be had for making barrels.

As to competition between slack barrels and bags, there really is no competition. Bags are cheaper and meet a certain demand, but they do not answer the same purpose as barrels, though sometimes the same products may be packed in both. It is not so much a matter of price as other things which determine the kind of package. Flour, for example, is put in wood for best security against contamination, as well as waste, and is put in wood by the mill not from preference, but because the consumers so demand it. During some years the call for barrels is in excess of what it is at other times. When the people are prosperous all over the country there is a noticeable increase in the quantity of flour barrels used, because, with more money at hand, the people buy in larger quantities; buy full barrels at a time instead of one-fourth or one-eighth of a barrel in bags. The same thing is true of sugar and some other products, and when the reverse conditions come there is a demand for the smaller packages. Queer as it may seem the smaller packages are in great demand when the country is suffering most keenly from financial depression. It is then that people buy in smaller quantities and the smaller quantities call for smaller packages. That it is not the price by any means that makes the demand for barrels has been demonstrated through the past few years. The object lesson furnished by this contains logic that applies just as much to the trade in slack barrels as in light packages, and it may safely be said that the future of barrels is not so much a matter of price as it is a matter of finding timber out of which to make them. There may be times, in the future, as there have been in the past, when they are more in demand than at other times, and there will be other packages entering as competitors from time to time, but there is a steady growth and general enlargement of the country that will amply repay any trade lost to incidental competitors.

PIECE WORK ON BOXES.

One can see from the way the wind blows, says "Packages," that box manufacturers are drifting toward the idea of piece work. There are probably a number of reasons for this, one of which is that, theoretically, the piece work system, where it can be properly figured out, is the ideal one, and another is the desire to get some stimulant to effort, which manufacturers think is sometimes absent in the box factory because there is no pace setter.

It is true that in the sawmill the sawyer is the pace setter, and one can afford to pay a good sawyer a high price, because the entire movement of the mill depends largely on him, and, if he sets a pace, the others must follow or else become cumbered with accumulations. Also, in the sawmill the machinery is generally designed and arranged so that each successive step has practically the same capacity as the other, and, when the sawyer is doing his duty, every man in the sawmill must necessarily do his duty. In many factories, and probably in box factories, too, it seems difficult to have such an effective pace setter as the sawyer in the sawmill, because there is not always the same direct connection between the different steps of the process. The work is frequently varied and scattered out, and usually the only basis for figuring on, when a man is doing a fair day's work, is from getting out of the history of past records what others have done.

Even this is difficult, however, because while in one factory the cross-cut man will do a certain amount of work, probably enough to keep one rip sawyer busy, in another factory the cross-cut man may do enough to keep two rip saw men busy.

. . . . . .

Naturally, if the basis of piece work were figured out, it would bring with it a certain stimulant to action on the part of employees, as remuneration for their services would depend on their capacity. There is no doubt, either, but what in some factories doing light work the piece work system would be an advantage, but taking the general box factory, it is an open question, and one that furnishes room for an abundance of argument both ways. In fact, it opens up a field for discussion that might well occupy the entire time of a meeting of the Box Association, and then the subject might not be fully covered. There are so many different points and factors that crop out in putting this kind of theory into practice, some good and some bad, that it is difficult to sum it all up briefly. However, the box trade is gradually drifting toward this piece work idea, and it is time to thresh it out both in discussion and through some experimenting, so that the trade may arrive at some actual, definite knowledge of the results of piece work as compared to day work in the average box factory.

. . . . . .

There is another question in connection with the piece work system, and that is the question of waste. No matter how finely you may figure, the question of waste finally depends largely on your sawyers, the men who cut and rip the lumber. Now, it is but natural to suppose that, if these

sawyers were paid by the thousand feet instead of by the day, they would be more interested in getting quantity than in saving waste, and any arrangement in regard to the piece work system, to be satisfactory on this point, would have to carry with it some provision against excessive waste. This, in turn, would probably lead the sawyers into fighting strenuously for only the best lumber. Instances are known where employees in the factory have remonstrated so strongly about the lumber being used, about some cheaper wood being substituted, that it was found advisable to make a change. This is a sort of humoring the men, and if one takes to this piece work system, it is likely to become more of a factor than it is to-day, and when one has a chance to buy some scrap stock cheap, it might involve complaint, if not active protest, and a claim for higher prices on the part of the men who work it up.

HINTS TO THE FOREMAN.

To the Editor of Canadian Woodworker:

Sir,—In my last article, which you were kind enough to insert in your columns, under the head of Good Advice to Young Woodworkers, I aimed my shot at the young. I shall now aim at the woodworker of riper years, and hope to hit someone. My experience leads me to feel that we need a little cooling off once in a while. Many a good mechanic stands in his own light by supposing the new beginner to be there. He wants to convert him into a master hand, and in order to break him in will give him all the slop work for a start and make him feel that he will not be of use until he has learned just what he knows—no more or less.

This is a mistake, for no more can one man be a counterpart of another than an evening star can be a new moon. Men differ. And the boy should be encouraged and helped. In any well regulated shop the machine, which is only another name for tool, should be placed to the best advantage. And where order prevails success is bound to come. Teach a boy order, show him his work, and if he has ideas try to bring them out. If you do this you will get the best results, and some day you may discover in the boy an idea that may be just what you have been looking for. And it may mean dollars to you and to the firm also. Oil is necessary, and a little oil in the word of reprimand is not lost on a good boy. It costs little and prevents friction. Order then should be the point to remember. Avoid language you would not have your sister or your daughter or wife hear and that boy will respect you, possibly like you. And if that boy is a success your employer will like you the more for it.

The workman, the apprentice, and the foreman are but machines when all is considered, and all should endeavor to give best services, submitting to circumstances as they may arise. Make the best of them, and remember to kiss the hand that feeds you, by faithfulness, honesty, and respect, and one day you will reap a rich reward.

V. Lightheart.

TRADE INQUIRIES.

The following inquiries relating to the Canadian trade have been received at Ottawa. The names of the firms making these inquiries, with their addresses, can be obtained upon application to Superintendent of Commercial Agencies, Department of Trade and Commerce, Ottawa, or publishers "Canadian Woodworker," Toronto:—

280. **Furniture.**—A South African firm of wholesale and retail general furniture dealers desire to communicate with Canadian manufacturers and exporters of household furniture of all kinds.

281. **Office Furniture.**—A South African firm of wholesale and retail furniture dealers wish to correspond with Canadian manufacturers and exporters of office furniture.

282. **School Furniture.**—A South African firm of wholesale and retail furniture dealers desire to be placed in touch with Canadian manufacturers and exporters of school furniture.

283. **Church Furniture.**—A South African firm of wholesale and retail furniture dealers desire to communicate with Canadian manufacturers and exporters of church furniture.

371. **Office Furniture, etc.**—A Manchester firm of cabinet-makers desires to get into communication with Canadian manufacturers and exporters of roll-top desks and general office furniture. They are also in a position to do trade in turned wood (chair legs, dowels, mouldings, etc.)

416. **Oak Planks.**—A timber firm in the North of England is open to receive lowest prices from Canadian manufacturers of wagon-oak planks and cabinet oak planks; two inches thick and upwards.

420. **Timber Goods.**—A London firm of general merchants and importers desires to be placed in touch with Canadian exporters of timber goods (flooring, wood excelsior, wood handles, wood mantels, door sashes, turned wood, etc.)

443. **Maple Wood Blocks.**—Inquiry has been received from a firm in Holland for the names of Canadian exporters of maple-wood blocks.

444. **Furniture.**—A London firm of general merchants and importers wishes to hear from Canadian exporters of furniture (particularly bentwood chairs) and timber.

529. **Glues.**—A Manchester firm asks for prices and samples of glues in cakes and powder c.i.f. Liverpool or Manchester.

534. **Wood.**—A Manchester firm asks for prices of soft white wood for box-making in sizes 10 x 7 x ¼ inches, also 24 x 16 x ¼ inches, from Canadian manufacturers.

535. **Clothes Pegs.**—A Manchester firm asks c.i.f. prices of clothes pegs from Canadian manufacturers.

536. **Bungs.**—A Manchester firm asks for samples and prices of compressed and other bungs from Canadian manufacturers.

539. **Box Shooks.**—A Manchester firm asks for sizes and c.i.f. prices of box shooks from Canadian manufacturers.

What the cooperage industry needs more than anything else is to educate the consumer—the people who buy barrels. That's where the money must come from for both the stock manufacturers and the barrel maker. Buyers can be educated both in price and quality. Everybody can. The average dealer in any line is prone to think that if he keeps what the public calls for he is a live dealer. He is mistaken; he is a "dead one." The live one goes to the buyers in some way; creates a demand for his goods because they are a little better quality, or he has a little better way of selling or a little higher price. Perhaps it sounds strange to some when we say a little higher price will sell manufactured stuff, but if you stop to think it over it certainly can be done, and it is done in every line of business. The proper kind of publicity helps to do it.

Saw Mill Department

ABOUT TWISTS.

Many filers, finding a bend in a saw, imagine it is a twist. There is a big difference between a bend and a twist. For a good illustration of this, take a piece of light-gauge band saw steel about three or four feet long and bend it straight across your knee. Then put it on the leveling block, bent side up. You will find that both ends rest firmly on bench. Now take the long-face hammer and hammer down the high places on that side only. You will find it will lie level without striking a blow on the other side. After doing that, take hold of it with both hands; hold it steady with the left hand, and with the right hand twist it to the right or left as far as possible. Now take another hold with left hand about three inches farther up, and twist again, with right hand, proceeding thus until you come to the end.

Now you have a typical twist. Put it on the leveling block and you will find that the opposite corners will not lie down; on one end the tooth edge will touch leveling block, and on the other end the back edge will touch leveling block, and the other two corners will stand up. To remove that twist you have to hammer at an angle from one corner on one end to the corner on the other end, both sides of saw, and if you will remember that you can't knock down the high corners of a twist, but can raise the low corners, you won't have any trouble in removing it.

I will try to make it clear why I think the steel back gauge is better for testing the backs of saws than a three-pin rig.

We will take a saw (an easy one) that has not met with any accident—just the ordinary work—with back drawn out and tension equalized, as customary. We level it, then examine back and tension. If tension is pretty well out, and back also, we proceed to get it in the best possible condition Some filers roll all round; others roll in short sections. But that doesn't make any difference in the question at hand. Now we will take the stretcher, that has a screw to put the pressure on rolls, as that one is more apt to stretch the steel alike. Taking a space the length of back gauge, after making four or five rolls, we examine back of saw to see what changes we have made, also tension. I think nine times out of ten you will find the tension pretty good, but the back will perhaps have to be drawn out more in some places. Then we proceed to draw out those places that do not touch gauge, equalizing the tension as much as possible, doing the same all round the saw. That shows that saw steel will not stretch alike.

With the latter method, after making four or five rolls all round, the saw will be stretched more in some places than others. How in the world a man can tell the condition of his saw with that three-pin rig is a mystery to me. To make it clear to the reader why I don't think he can, I will number his pins on the bench, First pin to left hand, No. 1; pin to the right hand, No. 2; centre line, 3-16 crown in 12 feet, No. 3. Now suppose his saw touches pins 1 and 2, but does not touch line 3. He marks it where it left line, also where it touches line again, and draws that space out until it touches line 3. The saw then touches the three points.

We will mark saw at those three points the same as pins are numbered on bench, and move saw so that mark No. 3 on saw is opposite pin No. 2 on bench. You will then find that mark No. 1 on saw doesn't touch line 3 on bench. It was all right before we moved saw, as it touched three points. We draw that space again, and so on all round saw, but when we go around the second time we have to do some drawing on the tooth edge, as there will be too much back in some places. That is doing double work, besides stretching the steel unnecessarily; so I think the steel back gauge the best to work by.

A friend who cuts resinous pine is having trouble with his band resaw, and wants to know how to fit his saw. He thinks the gum on the saws has a great deal to do with it. So it has, but to keep a saw free from gum it has to be fitted up pretty nicely and run with very little set. There may be some other filers have the same trouble, so I will try to make it clear how to fit up a resaw that will cut any kind of lumber.

Assuming you have a filing room outfit, place a saw below the bench. With a short straightedge examine for lumps, bends and twists. One good way to find cross lumps is, take a piece of waste, pour some kerosene oil on it, wipe saw with it, then take short straightedge, holding it lengthwise of saw. Draw it across lightly from tooth edge to back edge. You will be surprised to see it has marked every cross lump. Knock them down with the long-face hammer. Continue this all round saw. Now go around again, holding straightedge across saw, moving it at an angle, first one way and then the other. That will show you all dished places and twists. Hammer them down also. Then place saw above bench and give it the same treatment on the inside.

Now it is time to see about the tension. Try the back of saw with back gauge, 1-16 in 6 feet. Examine back of saw. If it doesn't fit gauge, mark where it doesn't touch. Take tension gauge for saws 6 inches wide or less—a gauge ground to a 32-foot circle will be about right. Examine tension, marking where it is out. Try to put the back in saw and at the same time equalize the tension. Continue all round the same way. It would be well to look it over again with short straightedge to see if there is any leveling required, because if there are any dished places you can't tell the exact amount of tension there is there.—J. H.

CENTRE-SAWING.

The operation of centre-sawing consists of making a saw cut through a log or block that extends the full length of the log and from the outer edge to the centre at all times.

The practice of centre-sawing in the making of spoke bolts is comparatively new and marks the passing of the old hand-splitting method of making spoke blanks to the more modern application of power-driven machinery for cutting them out. This entering of machinery into the field of spoke and handle billets has been over hard fought ground, so to speak, because for years those who make and favor the split stock have successfully contended that the only way to get the best that is to be had, to get absolutely straight grained stock in the spoke or handle blank, is to split it with

an axe or wedge. Splitting has its drawbacks, however, and it involves hard work and a deplorable waste of good material, so though the trade has apparently fought against it for years we have gradually gotten into the habit of sawing these blanks and we are now finding out that a man who knows his business and will apply himself properly can get straight grained blanks out of a handle or spoke bolt with a saw and do it easier and save timber.

In sawing the large blocks, say from eight inches up, the practice has been to take this short log or block, split it through the centre with a large saw, then turn it down and split the halves into quarters, after which the quarters were worked into blanks so as to carry the grain of the wood through them the same as if they were quarter-sawed. It might be said, too, that this same practice prevailed in regard to the smaller bolts, down even to five and six-inch hickory. It was found, however, in practice, that while this sawing is some improvement in the way of economy in timber over splitting there was still too much waste, especially since hickory has become so scarce and high in price, and it was then what is known as centre-sawing was introduced.

To understand centre-sawing as applied to small hickory, say running between five and eight inches in diameter and the reason for it, let us assume that this stock was first split in half, then into quarters and afterwards these quarters into blank sizes; it will frequently be found that they do not work out even and there is a piece that goes to waste on the edge of one quarter and one on the edge of another, which if put together would make a blank. Now, then, in order to avoid this waste and make sure of utilizing all that it is possible to in the circumference of the block, the trade resorts to what is known as centre-sawing, that is, they take a saw table—any ordinary rip-saw table that the saw can be adjusted in will do—adjust the saw so that it will just reach up to the centre of the block, sawing through that way, then have a saw cut into the centre of the short log, and that's where we get our name of centre-sawing. Then the block is turned enough to get a piece big enough for a spoke blank sawed from the circumference into the centre again, cutting V-shaped sections, and so on around until the block is all worked up.

In other words, instead of splitting the block into halves and quarters it is simply split into the centre all the time. For hickory spoke bolts the usual size required is that which will make a finished square 1½ by 1¾ inches.

This method of sawing up small hickory stock gives what is known as the high-grade white hickory spokes, and the blanks after they have been cut out in this way, that is, blocked out by centre-sawing, are put on to a truck and run into a steam box to loosen up the bark. When they are taken out of box the bark is peeled off with a hand axe, a lick on the other side easily blocks the heart off out of the way and leaves a finished high-grade spoke blank made by the saw in which there is a nice, straight grain if the timber was straight enough to split, and more is secured out of the block than could be got either by splitting or halving or quartering it with saws.

One practice of centre-sawing applies to the making of clapboards out of short logs, the preferable size being 16 inches to 20 inches in diameter, and four to six feet long. In the preparation for this work the logs are put into a lathe and turned to a uniform diameter or rounded up, in which process the bark and dirt are removed, then it goes to an automatic clapboard-sawing machine. This machine consists of a saw that will reach to the centre of such logs, and a frame which supports them and travels back and forth on a track. These sawing frames are usually provided with self-acting reverses and set up so that after a log is put into the machine and the saw started it works up the log automatically.

A full set of these clapboard machines for centre-sawing and dressing such lumber as weatherboards or bevel siding, consists of a lath for rounding the logs, a crane for swinging them into and out of the machines, a clapboard-sawing machine, planer and jointer, and a butter or trimmer.

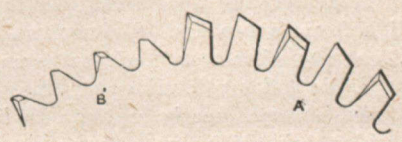
The product of these machines no doubt would look like short stuff to some people, but, on the other hand, they make a claim of quality, in that they are quarter-sawed; a claim of economy in working; in that they use up practically all the log after the bark and uneven places are taken off with the lathe, which they are able to do by making the thick edges of the clapboard of the outer circumference of the log in the natural course of events, giving a good board quarter-sawed at a very nominal waste of the material in the work. It may be that there are other methods of what is termed centre-sawing, or rather other uses to which the practice of centre-sawing is put.

FILING TEETH FOR SAWING FIR.

The Douglas fir, useful as it is, is quite different in texture from any of the eastern woods; and, to one used to these, is very disagreebale to work. The hard grain is so very hard and the soft grain is so very soft that it requires very sharp tools to work it satisfactorily; but, at the same time, it dulls them very rapidly. The difference in the density of the grains makes it tricky to drive nails in; and, together with its inelasticity makes it split very easily.

A form of saw-tooth which the writer thinks good for sawing this kind of wood is shown at A (see f cut), which is rather similar to the form used formerly in whip saws and spoken of by old-time writers as good for circular saws. It gives substantially the same effect as the ordinary cut-off tooth point, while having greater strength, rigidity and lasting qualities.

The front side of the tooth is filed less fleaming than is the usual custom—thus allowing it to carry away the sawdust with less crowding to the side—while the necessary acuteness



for cutting the grain is attained by giving the top a longer bevel. The top is given a very obtuse angle with the front—thus giving stiffness and wearing qualities—then ample throat room is provided to carry out the dust.

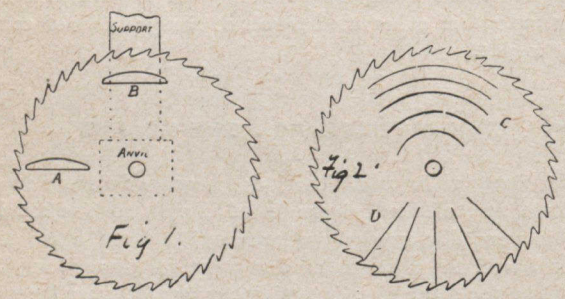
It would seem that practically the same results might be attained by filing the common tooth as shown at B. In fact, it does not appear that the form A is much better than B except that there is more throat room in the former. This difference is doubtless important, but could readily be removed by the judicious use of an emery wheel. If makers and users of cut-off saws must have the teeth all alike, there is doubtless much merit in this method of filing.

HOW I FIT CIRCULAR SAWS.

With a long straightedge that reaches from eye to rim, a beginner will think he has tension evenly distributed if it shows open in the centre, but let him take a short one, and I

think in nine cases out of ten the tension will be mostly in a 6-inch strip about half way between eye and rim, and the short straightedge will rock if applied clear out to the teeth, and also near the eye. A saw in this shape will run worse than one that shows perfectly flat. A saw properly hammered ought not to show any high places, even if tested with only a 6-inch straightedge applied at right angles from its supports.

I don't believe in standing a saw perpendicular when testing it for lumps. After hammering it until I am satisfied, on both sides, with test as shown at A, Fig. 1, always trying from eye to rim, I test it for lumps at B, Fig. 1, moving always from rim to eye. Any high place I find I hit as nearly as possible right on the head. I have met old saw experts that talked about "tire" (a flat space 6 to 8 inches wide) in a circular saw at the rim, and notice that band saw

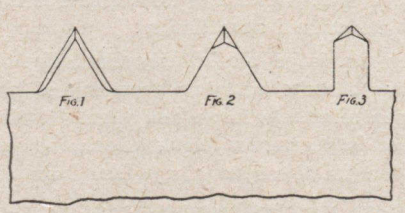


men also want tire. I don't know anything about tire, and am sure that I don't want more than 2 inches at most, if any at all. I try to get an even tension from outside the collars clear up to the teeth.

I run my saws with just enough tension that you can shake the centre when saws stand on the floor and you take hold with both hands on top, whereas the old filers were compelled to use so much tension that with the saw standing on the floor it could be tilted to an angle of nearly 45 degrees before the centre would fall through. A saw in proper shape will cut frozen and unfrozen timber, hard or soft wood. It is often simply out of the question to think of sorting the logs; one customer may have all basswood, and the next one maple, with oak or hickory, or what I consider the toughest and worst of all, soft or swamp elm. As long as the saws are sharp they will cut any of this stuff without even adjusting the guidepins. I do all my leveling on the anvil, and use the round-faced hammer nearly always. In hammering for tension, the blows should be opposite as nearly as possible. Laying out a saw as shown in Fig. 2, in circles or segments C and D, will help get the blows over each other.—C. H.

FILING A CROSS-CUT SAW.

There are various ways of filing a cross-cut saw. Some men who cut timber for from five to ten years can not keep a saw in respectable condition, and, no doubt, never will be able to do so, no matter how long their experience. Such men need hardly try any other way of filing a saw but the one they are accustomed to, for no matter if they bevel a saw much or little, no saw will cut for them, for a saw must be filed with care to do good work. It must also be understood that if one wishes to do a large day's work with a saw, he must buy the right kind of a saw to start with, and not look for a saw that has only cheapness to recommend it; a good many prefer what is known as the "Tuttle" tooth. Usually this saw is filed the whole, or nearly the whole length of the tooth, the only difference being in the amount of bevel put on the tooth, which brings it to a needle-like point, as shown in Fig. 1, and which will cut fairly well for a time, but will not cut as fast nor hold its points as long as the same tooth filed as shown in Fig. 2. To file as shown in Fig. 2, the file must be held at an acute angle; this will bring the point



Cross-Cut Saw Teeth.

down thinner, and more like a knife blade. Some prefer the "Diamond" tooth for this style of filing, as this tooth is nearer the shape as it comes from the maker, as shown in Fig. 3.

No matter which way a saw is filed, it will not cut fast unless the cleaners are filed just the right length. We usually expend twice or thrice the time on them that we do on the cutting teeth, for if your cleaners are just a trifle too long or too short it will make a difference of from 25 to 50 per cent. in the cutting of your saw, and for hardwood, of which we cut by far the most, they must be just so that you can nicely see daylight between them and a rule placed edgewise on the two cutting teeth next to them, one on either side, and all of uniform length.

Nearly all men, after filing a saw, will side-dress it by running a file along the teeth to take off the wire edge, so saw will cut smoothly. But this not only takes off the wire edge, but also makes a flat surface on the cutting tooth, which means more friction, and consequently more force to pull the saw through the log. All saw teeth should be the widest at the extreme points, and by such methods of side-dressing this is not possible. A fine, small file, taking one tooth at a time, and holding the file at the same angle of the tooth, is a very nice way of side-dressing, depending on the sense of touch when it is time to stop, by feeling with the finger on side of saw away from one, and thumb on side near one. Do not rub finger up and down the tooth, for if much of a wire edge is there it might cut your finger; but simply touch it; one soon can tell if there is any left or not.

HOW TO FIGURE LUMBER.

There are several ways of keeping account of material used in the shop, but the following method is given as one of the best and quickest we have seen:—

The usual way to figure the number of feet board measure in a plank is to take the length in feet, times the width in inches, times the thickness in inches and divide by twelve. This requires considerable figuring. If we should express the width in feet also we would cut out the division and make the problem a simple one which with a little practice can be calculated mentally.

First size up the width in inches and change it to feet, thus six inches equal ½ foot; 8 inches equal ⅔ foot; 9 inches equal ¾ foot; 10 inches equal 5-6 foot; 14 inches equal 1⅙ feet; 15 inches equal 1¼ feet; 16 inches equal 1⅓ feet; 18 inches equal 1½ feet, and so on. For example, a board 16 feet long, 15 inches wide by 3 inches thick is 16 × 1¼ = 20, and 20 × 3 = 60 feet. A board 15 feet long, 8

inches wide and 2 inches thick is 15 × ⅔ × 2 = 20 feet. Another 16 feet long, 18 inches wide and 4 inches thick is 16 × 1½ × 4=96 feet. A board 14 feet long, 14 inches thick is and 2 inches thick is 14 × 1⅙ = 16, and 16 × 2 = 32 feet. In the latter instance, as in many other cases, we have dropped a fraction and by adding one foot to the total we cover the loss.

Where one of the terms is twelve we read the other in square feet and multiply by the thickness. For example, a board 15 feet long, 12 inches wide and 2½ inches thick is 15 × 2½ = 37½ feet. And a board 12 feet long, 14 inches wide and 1½ inches thick is 14 × 1½ = 21 feet.

There are instances where it is easier to read the length as inches and the width as feet. Of course the product will be the same in either case. A board 18 feet long, 16 inches wide and 3 inches thick is assumed to be 18 inches long and 16 feet wide, thus 16 × 1½ × 3 = 72 feet. The case of a board 16 feet long, 13 inches wide and 1½ inches thick is handled as 13 × 1½ = 17, and 17 × 1½ is about 26 feet.—Exchange.

RESAWING GREEN LUMBER.

An important point is that of resawing lumber before it is dry. It would be difficult to estimate the amount of dry lumber that is resawed, and some of this work probably we can not get around. For example, in the making of bevel siding it is necessary in the present order of things to dry and dress the stock before resawing. But, go into box factories, agricultural implement houses and various other places where lumber is resawed to get thin stock, and you will generally find them resawing dry stock. What's the difference? you may ask. One difference is, it takes more than twice as long to dry one-inch stock as it would to dry the same stock were it resawed. But the other, a more important difference, is that the quality of thin lumber is decidedly better if it is made thin while it is green than if it is resawed from thicker boards after it has been dried. The Hardwood Manufacturers' Association of the United States has been persistently warning the manufacturers of oak on this point. There is often an unusual call for thin stock in plain sawed oak, furnishing a temptation to the manufacturer to resaw inch lumber and to supply the demand for this material. This won't do, because it will warp and impair the quality of the product so generally as to make it impracticable. To get thin plain oak and have a satisfactory product, the only thing to do is to make it thin while it is green, either by thin sawing primarily or resawing before piling the stock to dry.

ABOUT WOODSCREWS.

T. P. Battersby, in an article in a recent number of the English Mechanic, pointed out some objections to the ordinary type of woodscrew, which seem to possess considerable truth. He starts out by saying that anyone who has attempted to insert a screw into tough wood with a short driver, or, worse still, with a brace and driver-bit, will have a lively recollection of the ease with which the edge of the driver slipped out of the slot in the head of the screw. The principle is obviously all wrong. The bottom of slot in screw-head is a straight line; the edge of the screwdriver is also a straight line (not quite in the Euclidean sense, of course). Now, two straight lines can touch each other throughout their length if one be exactly superimposed upon the other; but if the slightest deviation occurs, the lines fact that the top of the head would not be flush with the surface of the article through which the screw might be inserted. will only touch at a point. In fact, most of the time during which a screwdriver is turning a screw, as now made, the position of affairs is that one corner of the edge of the driver is touching the bottom of the slot, and a small, triangular portion of the driver-edge is actually usefully engaged. Consequently the driver slips about in a most annoying way, and wears round at the corners.

The remedy is obvious—namely, to make the bottom of the slot a concave curve, and the edge of the driver a convex curve of similar curvature. The writer had a circular cutter made, by the use of which the concave curve could readily be cut in the slot already existing in the heads of a few large Nettlefold screws. A screwdriver was easily made of similar convexity. This would be of especial value in the case of large screws used in metalwork, where it is probable that the curved slot might admit of the use of a cross-handled screwdriver for extraction.

Another way in which woodscrews might be improved is by carrying the principle a little further and hollowing out the heads. As the centre portion of the slot takes very little of the strain, this will not perceptibly weaken the head; and when such screws are inserted into wood up to the edge of the concave heads, the latter can be most conveniently filled up with putty or other filling, which will have a good hold, and with which a level-surface finish is easy.

Finally, as the body of a screwdriver is almost everlasting, it is surely in accordance with common-sense to make the working edge a separate piece, fixed by a rivet, and easily replaced.

He adds: Thinking over the various experiences I have had with woodscrews I should be inclined to offer even another suggestion as more essential than the others thus far enumerated. Of course, I refer to some means of strengthening the metal so that both halves of the head will stay where they belong and won't have a weakening at the neck just when the woodscrew has gone pretty close to the place where it should stay. Anything more irritating than a headless woodscrew deeply sunk in an otherwise neat job is hard to imagine.

All commercial woodscrews have already concave bottoms to the slots, i.e., the centre of the slot is deeper than it is at the ends. There are, it is true, certain hand slotters made for cutting grooves in screw heads, where the screw head passes in front of a rotating cutter or mill having a fixed axis; in other hand slotters the revolving cutter passes by the head of the screw and of course in either case the bottom of the groove for the screwdriver tip is flat, or nearly so, sometimes a trifle convex rather than concave. These contrivances are used most commonly for slotting machine screws, etc., and it is safe to say that all woodscrew machinery that produces screw slots automatically and commercially makes the bottom of the groove concave.

What might properly be suggested would be the use of a smaller cutter in order that the centre of the groove could be much deeper midway between the ends than it is now. It is not unlikely, however, that there are some mechanical difficulties in the use of the smaller cutter than would put this expedient out of the question.

The writer cannot now recall any concave topped head to a woodscrew except one having a bar across it instead of a slot. The screwdriver tip to fit that woodscrew was convex in form and had a slot to suit the cross-bar and the concavity of the woodscrew head. The combination called for a different size of screwdriver for each diameter of woodscrew and this was a considerable handicap to the introduction of the scheme in everyday usefulness. An even more serious disadvantage from the consumer's point of view, and this also applies to one of the suggestions now proposed was the fact that the top of the head would not be flush with the surface of the article through which the screw might be inserted.

Furniture and Cabinet Making

TREATMENT OF GLUE.

Ordinary shop tests for glue, which may be employed by all, are quite sufficient to insure fairly satisfactory results in many cases, but when the quality and standard of the glue used are very important the most careful tests and chemical formulae are used. The following suggestions by a firm who use large quantities give an idea of some of the more complex requirements:—

First of all, a glue cannot be judged solely by its cost. A skin or hide glue, which, as a rule, is higher in price and stronger in tenacity, might be entirely unsuited, for various working reasons, for the purpose intended, while a bone glue or other stock might be infinitely better adapted for the work. In other words, the working strength of glue should be regulated by the particular kind of work to which it is to be applied.

In determining this the following proportions should be considered:

1. Tenacity and adhesive power.
2. Elasticity, or slight yielding without fracture.
3. Covering power. This is controlled largely by the amount of water it will take up.
4. Keeping qualities. It is to be rejected if it quickly turns or sours; this sets up a rotting action which destroys all other qualities.

We use mostly lump or sheet glue, quite transparent and of a golden color. It is made on our specifications which may be varied to suit the conditions of use. We use but little ground glue, as our gluing operations, except in one instance, are not continuous, and the glue cookers do not require constant replenishing.

Aside from mechanical tests, we use the water-absorption test largely. It affords a good indication of the quality and fitness of the glue intended for certain work. The amount of water a given weight of glue will absorb is a very important factor, as it affords a good indication of the economy in use, etc. By this test many will doubtless be surprised at the great difference in glues in this respect, some absorbing only one and one-half to twice their weight of water while others will absorb from eleven to twelve times their weight. The method is very simple. To determine the amount of water a glue will absorb, a definite weight of glue is allowed to stand 12 hours at a constant temperature of 70 degrees Fahr. with about ten times its weight of water. Then the excess of water, if any, is poured off and the glue and water are weighed. The difference between the original weights is the weight of water absorbed.

We swell our glue in this manner in quantities sufficient for an ordinary day's run. This operation is in charge of an expert, whose duties include glue cooking, general gluing operations, temperature of working rooms, glue supply, etc. Our stock supply is cooked in large steam-jacketed copper tanks. These tanks are covered and locked, and are provided with a thermometer and hydrometer which show both temperature and density of contents at all times. The temperature is maintained around 165 dgrees Fahr., and is not to exceed 175 degrees Fahr. at any time.

A mixing wheel is attached to each cooker, and the contents may be thoroughly stirred without removing the cover. This checks evaporation and precludes any possible interference with the stock glue, and such as disposing of "pour back" from bench pots, etc. Our bench pots are made of copper and each bench is provided with a stationary steam-heated jacket in which these pots are kept for use. After a day's run the cookers and pots are emptied of their contents and scrupulously cleaned. This "pour back" or excess glue is disposed of at once to be used in less important operations than body making, etc.

Attached to each large cooker, a closed hot water reservoir is provided, from which pure hot water is supplied for mixing, etc. This is very important as rusty or dirty water used for thinning purposes is often the cause of very serious results in gluing operations. We find great advantages in extreme cleanliness and a daily fresh supply of stock glue. All users of glue know the evils that result from long standing and frequent cooking of glue; this should be avoided if good results are desired. Aside from attending to our stock cookers, our glue expert reports the temperature and density of all bench pots every two hours of the day.

We make frequent shop tests, such as gluing standard ash blocks, face to face, and noting the grain fracture, but the most satisfactory of all in this line is the following procedure:

We use maple section 1 inch square and 6 inches long. These are glued together, end to end, under pressure. When set they are pulled apart in a testing machine which records the weight required to break the glue joints. It is practically the means employed to determine the tensile strength of metals, and we find it to be of great practical value.

Good glue will require a pressure of from 800 to 2,600 pounds to wedge the joints apart.

VARNISHES FOR FURNITURE.

Having obtained a good, smooth surface upon which to lay the finish, great care should be exercised that the material used is right. Some people are of the opinion that by buying prepared finish almost anyone can finish a piece of furniture and have it look right,, but this is not the case. In the first place, the filler must be properly mixed to the right consistency. If there is a stain to be applied, it is generally best to mix it with the filler, though it is applied first in some cases. After the stain is thoroughly mixed, if it does not prove to be dark enough, it may be darkened with a little burnt umber. Care must be taken not to have the filler too thin, as it will strike right in without properly filling the grain of the wood.

Wood that has an open, porous grain, requires heavier filler than a close-grained, hard surface. Filler that is to be sanded off must be given sufficient time to become thoroughly dry before sanding; then it should be sanded off with very fine paper, using a very light, quick motion; as by bearing on, the heat caused by the friction, acting upon the oil in the filler, causes it to gum in patches on the paper, and then it is useless and the small patches will scratch the surface. With a filler that has to be wiped off, care must be taken that it does not stand too long before wiping, as it become dry and hard; then it is impossible to wipe it off. The rub filler is

considered the best for most purposes, but it makes more work than the other, as every bit of it must be cleaned off, every corner wiped out, which takes more time than it does to sandpaper the surface lightly.

The proper handling of varnish is quite a science in itself. The varnishing room should be kept at a proper temperature —75 degrees Fahrenheit is about the right thing. If the room is cold the varnish will thicken, will not spread evenly and will not harden properly. Light and ventilation are also absolutely necessary to facilitate drying. A room that is dark or damp will spoil the varnish, and a room that is excessively warm will keep the varnish soft. Barrels of varnish should not be stored in a very warm room, as the heat will open the joints in the barrels, and the varnish, which will be quite thin owing to the heat, will leak out. In summer, varnish should be stored in a basement where it is cool

Turning white is caused by the action of water or dampness. The better the grade of varnish and the more elastic it is, the less liable it is to be affected by moisture. In applying two coats of varnish, neither should be heavy, more especially the first coat. If it is, it will not generally get thoroughly dry at the bottom before the second one is applied, and the result will be disastrous, as it will cause the last coat to crack, wrinkle, or sag, as it is called. Another bad result of not giving varnish time to dry will be noticed by the last coat deadening or sinking away. This is caused by the undercoat not having been allowed sufficient time to dry, resulting in the finishing coat becoming absorbed while in the course of hardening.

The varnisher must be careful that there is no oil on the surface to be varnished, as it will cause pitting, or little hollows in the varnish. When varnish is so thick it does not spread well, it may be thinned by adding a little turpentine, but care must be taken that it is thoroughly incorporated in the varnish, as if it is not this will also cause pitting. A long-haired, pliant brush is best with which to apply varnish. It should be spread with long, steady strokes, drawn in a perfectly straight line lengthwise the grain of the wood. Oil japan or liquid dryer should never be added to good varnish. Each coat of varnish should be given three or four days to harden before another coat is added or before the last coat is rubbed, if a rubbed surface is required.

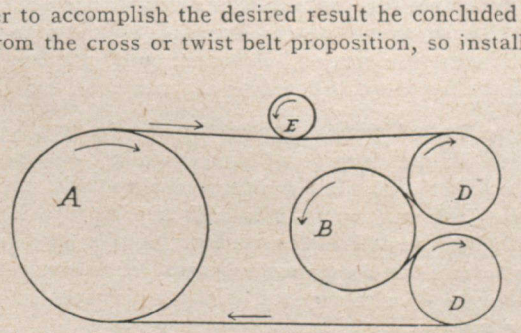
FUTURE OF THE MISSION STYLE.

I think that the Mission style is short-lived and will drop out of sight quick some day. This sort of furniture has always been angular and uncomfortable and I cannot see an excuse for its existence. The Canadian people like ease and comfort and grace, qualities which you would never think of looking for in Mission stuff. The Colonial style has gained a hold in this country that will abide long. As to finishes, I like the wax over golden oak, which is being brought out by the manufacturer in a tentative way. I have never liked the Antwerp, and the weathered seems to have run its short course.—J. D. R.

Machinery and Mill Equipment

BELT DRIVE.

Lots of trouble is experienced sometimes trying to make a twist belt do heavy duty with close centres; the following will explain how one man drives a large 30-inch gang edger, without any trouble. The shafts are very close together and the countershaft had to be driven in the opposite direction from the line shaft. To use an 8-inch double leather belt on a twist would be nothing more or less than to court trouble. In order to accomplish the desired result he concluded to get away from the cross or twist belt proposition, so installed the



Belt Drive.

system as per accompanying sketch. A represents driver and revolves in the direction of the arrow; B the driven and the direction it runs; C represents the belt; D D the idlers, and E a light-riding tightener which keeps the tension always the same. If any repairs are needed, the tightener can be raised and the belt easily removed and returned to place by even a boy. This belt in question has been used about four years, is in perfect condition to-day, and looks good for ten years more, barring accident, which is practically eliminated. If a cross or twist belt had been used, it would have lasted but a short time at best.

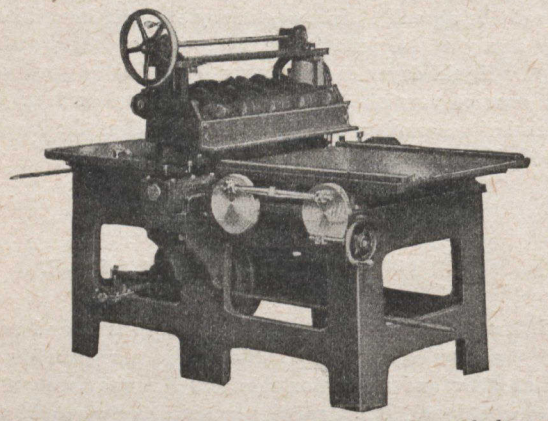
FALLS UNDERCUT PLANER.

Woodworkers will welcome this new tool put on the market by the Falls Machine Company, Sheboygan Falls, Wis., for the safety it affords operators, to say nothing of the reduced cost of the work due to the tremendous output of a machine as compared to hand operation.

The cutter-head is mounted in extra heavy dust-proof bearings, which are yoked together, and adjustable, below the tables as in the ordinary hand jointer. The frame is massive and heavy, and is cast in one piece, milled and planed true, to which are attached the tables and feeding mechanism. The tables are mounted on a special and patented adjusting device, which keeps the edge of the tables the same distance from the cutters at all times, no matter where the tables be adjusted; the motion of the adjustment coincides with the circle described by the cutters in their rotation, so that although the tables are very close to the cutters, they never strike them or are carried further away. The tables also draw apart in a straight line from the cutters, so that a wide opening is made for the sharpening and changing

of the knives, but when pushed back, retain their former position.

The feed-rolls are independently mounted and driven, so that a variation of 3-4 inch in the stock being worked does not affect the one alongside or increase the pressure on the operating roll. They have an automatic horizontal adjustment, so that on boards that are of different thicknesses at the edges, the roller bears evenly on both edges. The feeding mechanism is a very simple yet practical method for carrying twisting and crooked stock over without pressing it down in front of the cut and thus taking off a cut where none is wanted. In its operation the workman pushes the board over the cutter a few inches; then the rollers take hold of it, carrying it forward in a straight line, just as though it were being pushed by hand, the board being carried forward on the front table in its original position so that the cutters operate on the high places, producing the same results as hand operation. The sectional rollers enable the operator to keep a number of boards going at the same time, and make it possible, with less exertion on his part, to do about four times the work of a hand-feed machine. By loosening one clamp screw, the entire feed works swing clear of the table, and a fence furnished with the machine allows any kind of hand work to be turned out the same as any hand jointer, even (owing to the very accurate adjustment of the tables) perfectly straight or spring glue joint work, rounding edges or most anything.



Undercut Planer made by Falls Machine Co., Sheboygan Falls, Wis.

The safety guard makes it impossible for the operator's hands to come in contact with the cutters or feed-rolls, and this feature alone will attract much favorable comment among practical men.

Any thickness up to six inches can be run, and any length of stock. It is built regularly 24 inches wide, but can be built any width desired. It is put out on trial and fully guaranteed as to quality and quantity of work turned out.

ENGLISH AS SHE IS WROTE TO THE LUMBERMAN.

January—

Mr.....

i under stan you ar long to her from me i thot i wood of seen you befor now but times was very dul last year wich i sopose you noe on the count cheese been so loe and i had som bad luck with my cattle so i did not do noting towards bildn but times loks beter this cmin year so you ned not be a frad of me your money is soure i expt to dell with you this comin year maby more then before as i found you all right and maby a nother party
if you can get along it will oblige me
i will call on you the first time i will go down i moust thank you for the time that you have me

QUERY

Which is the best way to run a belt, the joint to meet the pulley on the inside or outside of belt, and is it the right way to run the rough side of belt to the pully?

Answer.—(1). The better way is to have the joint meet the pulley on the inside, as the air would affect it considerably if it were put to the outside.

(2). For actual holding put the flesh or rough side of the belt with dressing applied, next to the pulley, but for quick results put the other side.

—A man who makes gluing appliances says he frequently has inquiries for competent young men to take charge of glue rooms in good factories, but that such men are hard to find. He suggests that ambitious young men would do well to fit themselves for this work.

—Several English firms manufacturing boot and shoe machinery have informed Canadian trade agents that they would be interested in maple last blocks. These blocks require to be kiln-dried. Present prices in the United States range from $33 to $51 per thousand in car-load lots.

—We acknowledge receipt of a copy of the new revised catalogue of R. H. Smith Co., Limited, St. Catharines Saw Works, St. Catharines, Ont. The forty years' experience of this Company in the manufacture of high-class saws, together with the high reputation they enjoy in all parts of the Dominion, are sufficient guarantee of the quality of the goods turned out by them. All their saws are tempered by the Simonds patent process. Readers should send for a copy of this catalogue.

—The "Yankee" Tool Book for 1908 is the title of a neat little brochure issued by the North Bros. Manufacturing Co., Philadelphia, Pa., which describes, with illustrations, some of their well-known up-to-date labor-saving tools, especially ratchet screwdrivers, spiral screwdrivers, automatic or hand-drills, etc., besides several more recently invented. These tools seem to live well up to their reputation as being the newest, cleverest, and quickest selling tools of the kind ever offered to the trade.

—The United States Forest Service has established a laboratory for the purpose of investigating the structure of woods, so that architects, builders, dealers, and users may determine just what a wood is and to what use it is best adapted. The necessity of something of this kind is being more and more felt by the trade because of new woods being introduced to take the places of the older ones so rapidly growing scarcer.

—A correspondent of the "Michigan Artisan" says glues used in the woodworking industries are not always made from hoofs and horns, as generally believed, but principally from the sinews and hide trimmings of animals whose hides possess sufficient value to make them articles of commerce—dogs, cats, rabbits, etc., being on the list. He says further that the average manufacturer knows less about his glue than about any other material he uses.

Woodworking News from all Canada

Readers of the "Canadian Woodworker" are cordially invited to forward to the Editor items of interest to the trade, particularly those relating to the erection or extension of woodworking establishments.

Thos. Rehill has started a lath and shingle mill at Peterboro', Ont.

* * * *

John Davidson, of Smith's Falls, has bought out Code's planing mill at that place.

* * * *

Pink's lumber tool factory at Pembroke, Ont., was damaged by fire.

* * * *

Smiley, Cohen and Croker are building a lumber mill at Cloverdale, Alta.

* * * *

F. Caddy and W. Viles are putting up a sash and door factory in Vancouver.

* * * *

T. Todd, of Walkerton, Ont., is about to erect a sawmill and planing mill at Guelph.

* * * *

The Sumner Company's sawmill at Bathurst, N.B., has been burned down with a loss of $25,000.

* * * *

Barrett Bros' shingle mill at Ottawa was damaged by fire to the extent of $,500, covered by insurance.

* * * *

Steele's planing mill at Smith's Falls, Ont., was badly damaged by fire last month. Partly insured.

* * * *

Walter Tench, a well-known lumber dealer and sash and door manufacturer of Waterford, Ont., died last month.

* * * *

Emmanuel Prevost, a young man working in the sawmill at Wakefield, Ont., was terribly mangled by falling on a revolving saw.

* * * *

A small fire broke out at John Ballantine and Company's factory in Preston, Ont., and caused a slight amount of damage.

* * * *

McLaughlin's sawmill and other buildings at Buctouche, N.B., have been destroyed by fire with a total loss of $45,000. Insurance, $12,500.

* * * *

Frank Fretz's sawmill at Jordan Station, Ont., was burned to the ground a few days ago. How the fire started is a complete mystery.

* * * *

A. E. Augustine recently purchased the planing mill of Augustine & Sons, Port Colborne, Ont., and will conduct the business in his own name in future.

* * * *

Messrs. Thompson & Griffiths, Parry Sound, Ont., have erected a planing mill and boat factory there. They will manufacture lumber, sashes, doors, boats, canoes, etc.

* * * *

The Chilliwack Manufacturing Company, Chilliwack, B.C., recently organized, with D. B. Hall, president, and A. J. Robertson, manager, will manufacture fruit boxes.

* * * *

The Union Lumber Company, Winnipeg, will build a large sawmill in that city. The capital is $10,000,000. J. S. Hough, and G. F. Galt, of Winnipeg, are interested.

W. T. Glover's basket factory at Burlington, Ont., was totally destroyed by fire with a loss of nearly $8,000, insurance $2,900. It is supposed to have been the work of an incendiary.

* * * *

The Studebaker Bros. Company will establish a branch factory in Toronto for the manufacture of automobile bodies and parts. It will be under the charge of Knight Neftel.

* * * *

The factory and plant of the Cornwall Furniture Company, Limited, have been sold to M. F. Beach, of Iroquois, who will start operating very shortly.

* * * *

Jules Joannisse, of Sturgeon Falls, Ont., and Mr. Paquette, of Buckingham, Que., will establish a sash and door factory at Cobalt.

* * * *

S. J. Doolittle, of Preston, will erect a woodworking shop at St. Mary's, Ont., the municipality having decided to grant him a loan of $6,000.

* * * *

The Gouliais River Land and Lumber Company, Limited, who own some 3,000 acres of mixed timber land near Belleview Station on the Algoma Central and Hudson Bay Railway route, will establish sawmills. Thos. Kirby, of Sault Ste. Marie, is president, and N. W. Kirby, of the same place, manager.

* * * *

Robert Vanston was operating an engine used in propelling a circular saw cutting wood near Brockville, when the large fly wheel, becoming loose, was hurled some distance from the engine, and struck the young man about the right hip. He died after a few hours.

* * * *

Albert Cotton's new shingle mill on False Creek, B.C., to replace the one burned down last July, has now started operations. Its present capacity is 175,000 shingles every 10 hours.

* * * *

The Whitman and Barnes Manufacturing Company, makers of planing knives, St. Catharines, Ont., has been authorized to do business in the Province of Quebec. Its chief place of business, in the province, is at Montreal, with R. McK. Haldimand as representative. The St. Catharines factory unfortunately was burned down recently with a loss of $150,000.

* * * *

The paragraph in last number relating to the Stratford Manufacturing Company, Limited, Stratford, Ont., should have stated that this company manufacture, not kitchen furniture, churns, etc., but hay slings, hay carriers, Boyer's gliding settees, ladders, lawn swings, suspended porch seats, etc.

The Guelph, Ont., branch of the Canada Furniture Manufacturers, Limited, reopened a few days ago after a close down of nearly three months.

* * * *

The Can. Shipbuilding Company has completed arrangements for continuing its business, concentrating work at Bridgeburg, Ont., until such time as there is sufficient business to resume at the Toronto yards.

* * * *

There is disagreement among British Columbia lumbermen, between those of the coast and those of the mountain section. The latter threaten to reduce prices of rough lumber to $8 per thousand, if the latter go on cutting.

* * * *

H. Murphy, of the Chatham Bent Goods Works, met with a serious accident when superintending the raising of a number of logs. The tackling gave way and one of the logs slipped down the slide and struck him before he could get out of the way. The log rolled up on his body as far as his chest. He was rendered unconscious, and was badly bruised.

* * * *

A timber deal involving two hundred and fifty million feet of lumber within twenty-four miles of Vancouver was closed on the 8th ult. by D. VanWagner, mining engineer, London and New York, and J. G. Fitch, a California capitalist. The tract is situated on Manquin Creek, Squamish Valley. The sum of $700,000 will be paid for the timber, and a $400,000 mill will be erected next month.

* * * *

The B. F. Graham Lumber Company has sold its lumber and sawmill business in Victoria, together with extensive holdings on the San Juan and Gordon Rivers, British Columbia, to J. O. Cameron, of Carlsband; and Judge A. A. Freeman, of New Mexico, and other new Mexico and Seattle capitalists, for about $100,000. A dry kiln will be erected at once, and other extensive additions made shortly. Moses Pattison, one of the original incorporators in the Taylor-Pattison Company taken over by the B. F. Graham Company a year or so ago, will be manager.

NEW COMPANIES.

The following is a list of lumber and allied companies have been recently incorporated, with capital authorized, names of those interested, etc.:—

Home Lumber Co., Dundurn, Sask.

Western Lumber Co., Limited, Strathcona, Alta.

Alberta Lumber and Hardware Co., Limited, Cardston, Alta.

Port Elgin Lumber Co., Limited, Port Elgin, Ont.—Capital, $150,000.

Burchard Lumber Co., Saskatoon, Sask.—Capital, $100,000. E. E. Heiner.

Seymour River Lumber Co., Limited, Vancouver.—Capital, $500,000. To build sawmills, etc.

Valdes Lumber Co., Limited, Victoria, B.C.—Capital, $75,000. To erect sawmills, etc.

Herron Timber Co., Limited, Vancouver.—Capital, $50,000. To manufacture lumber, shingles, etc.

Naas River Lumber Co., Limited, Vancouver.—Capital, $300,000. To acquire timber limits, erect sawmills, etc.

Patterson-Eckert Lumber Co., Limited, Chilliwack, B.C.—Capital, $20,000. To manufacture lumber and woodenware, etc.

Dominion Carbolineum Works, Limited, Vancouver.—Capital, $100,000. To operate sawmills and sash and door factories.

Maynooth Manufacturing Co., Limited, Maynooth.—Capital, $40,000. To manufacture lumber. G. E. Weaver and Geo. Flynn, of Maynooth, Ont.

McFall, Limited, Toronto.—Capital, $100,000. To purchase the business of A. McFall in Bolton, Ont., and carry on a saw and planing mill business.

Fischer Lumber Co., Dryden, Ont.—Capital, $100,000. L. A. Fischer, Buffalo, N.Y., and R. V. Le Sueur, of Sarnia, Ont. To manufacture and deal in lumber.

Ballantyne Lumber Co., Limited, Toronto.—Capital, $40,000. To manufacture lumber. W. J. Foster, of Hawkestone, Ont.; W. S. and T. N. D. Kelly, of Bridgenorth.

S. Knechtel Wood Turning Company, Limited, Southampton, Ont.—$40,000. To manufacture all kinds of furniture, moldings, grill work, chairs, etc. Solomon Knechtel and E. Oppertshauser, of Southampton.

St. Mary's Wood Specialty Company, Saint Mary's, Ont.—$40,000. To manufacture lumber and products of wood. S. J. Doolittle, Geo. Brown, J. A. Johnson, Michael Tevlin, and J. W. Peart, of Saint Mary's; and W. Burnet, of Galt.

CHAIR AND FURNITURE DIMENSION OF STOCK.

By F. W. Webster.

If we, as manufacturers of hardwood lumber, expect to get the best results from our efforts and investments, then we should look very carefully into the question of utilizing that part of the product of our logs, which at this time goes to the boilers or to the hogs, that is suitable for the manufacture of profitable and saleable dimension lumber. When we carefully consider the difference in expense of manufacturing our best slabs and edging into dimension lumber, and the getting of such slabs and edgings out of the way; and from the mill, we will find the difference very small, and the revenue derived from the sale of such dimension material quite enough to warrant taking care of it.

Now as to the manufacture of dimension stock for furniture and chair purposes, I shall treat the matter under two heads.

First:—The manufacture of such part of the slabs and edgings from logs which we are daily cutting up into lumber, as are suitable and profitable to manufacture. There should be in the mill an intelligent, energetic, wide-awake man, whose duty it is to watch carefully every slab and edging that leaves the saws, and see that every piece that can be used profitably in dimension is cut into such lengths as will make the most profitable and saleable dimension material. When this is done these pieces should be conveyed by the most economical way to a place about the plant provided with good machines, and there made into such dimensions as will bring the best price. Keep these machines in good order and see that the operators of the machines make the pieces the proper sizes, and run no worthless slabs or edgings through the machines; but throw such material into the wood pile. As to the proper sizes, if making squares, we think all pieces under 2 inches should be cut ⅛-inch full; from 2¼ to 4 inches cut 3-16-inch full, so as to allow them to be full thickness when they are passed through the dry kiln. In cutting dimension boards green, cut from ¼ to ⅜-inch full, according to the width of

the boards; and ⅛-inch thicker than dry sizes required. Do not allow stained or damaged sap to be put into oak dimension and expect to get first-class prices for such material. A small quantity of poor material in a car will create trouble and cause dissatisfaction with the whole car-load.

In the manufacture of plain oak squares, especially in long lengths, the saws should be kept in good fix and in perfect line with the table or carriage of the machines, and there should be no end play in the boxes of the mandrils. Otherwise, the squares produced will be poorly manufactured, not square, scant at one end, and no one to blame, but the manufacturer.

Second:—The manufacture of dimension material for furniture and chair stock from bolts cut for this purpose (or an independent dimension factory not in connection with a saw-mill).

In cutting a plain oak, such as squares, etc., cut bolts as long as can be handled, and the timber will allow, taking into consideration defects and the crooks in the timber. Long squares and other plain oak dimension bring more money than short, and in slabbing up the bolts cut any defect out and still have the short stock. It is my opinion that the most profitable plain oak that can be made from small bolts is squares, and the longer and larger they can be made, the more can be realized from them. Begin by cutting the largest sizes you have sale for, and if any are found that will not make perfect squares in the sizes cut for, cut them down to fit sizes that can be used. After the squares have been cut to proper lengths, have them piled on yard, throwing out all poor ones, and piling them crosswise, allowing as much as an inch air-space between each of them, and putting good foundations under them. We pile them out in open air and think we dry them quicker, and as well, as if under sheds. Leave two feet space between all piles or squares. When dry enough to ship, take them down, inspect them carefully, tie them up in bundles of suitable number to each for handling, and load them as tied up. If not ready to load and room is needed, cover them well when tied up, as they will damage after being bundled if the rain is allowed to fall on them.

In the manufacture of quartered oak dimension lumber from bolts, such as chair backs, seat stock, table tops, etc., our experience is that it is best to cut the blocks into the lengths required for the bill, for the reason that we are surer of getting absolutely straight blocks and avoid twisted grain blocks, as satisfactory figure cannot be produced out of twisted grain logs. Cut them as long as possible, to get blocks of straight grain and free from defects, on account of price for long lengths. We invariably get more of the short and narrow pieces than we can take care of. Never put a piece of partly plain dimension into shipments when figure is wanted all over the boards. Do not allow stained sap in shipments. It will reduce the quality and standing of your dimension and get you as a manufacturer in bad repute with the consuming trade. Especially is this the case in quartered stock, which goes into high-class articles when finished. Never allow shipments to contain red oak where white oak is specified. Make pieces all full enough, both in thickness and width, to dress as required after kiln drying and suit the purpose for which made and sold.

In other words, make your stock right, put up a fair grade, get a price that you can afford to manufacture and sell at, for a fair profit, load it out right and insist on the payment of invoices without deductions. If you are dealing with a fair consumer you will get what is due you, and if you do not get what is due you which you will learn by experience, pass your customer up and look for those who will do the right thing. There are plenty of them. I know from what I have seen that some manufacturers of dimensions are not half as careful, as they should be with their grading and manufacture. If the pieces have not been cut thick enough, and the man loading discovers this to be the case, send them back for remanufacture, and save freight and the giving away of poor pieces. Likewise is this the case with regard to faulty or defective pieces. I saw on a consumer's yard not many months ago a car-load of squares that were poorly manufactured and defective, which the consumer had turned down for good cause, and would not have the shipment at any price. The same consumer showed me another car of 2½-inch squares, containing about 12,000 pieces, of which only 25 pieces had been culled. The balance was entirely satisfactory. He made no claim for cullage, but gave the shipper full settlement; and gave him an order for 15 cars of squares at $8 per thousand above the price at which the other party wanted to sell. I mention this simply to show the difference in results of properly manufactured and graded stock and that which is otherwise.

WOODS FOR VEHICLES.

The United States Forest Service has been conducting a series of tests on vehicle woods. These tests were made on three manufactured parts; spokes, wagon poles, and axles.

The material tested was of the grades in common use. Buggy spokes were of the grades A, B, C, D, E, and culls, for the Sarven wheel. In this selection, the primary object was to determine whether the grading system was compatible with the strength and toughness of the spokes, and also to ascertain the relative strength and toughness of white and red hickory spokes. Five hundred spokes constituted the series. The poles were of two grades of oak and one grade of Southern pine. Part of the common oak poles were trussed. Forty poles were tested. The axles were of hickory and maple of three designs, thimble, skein, thimble skein trussed, and long sleeve skein trussed. There were eight axles of each species and each design, making forty-eight in all. The object in this series was to obtain the comparative strength of the two woods and of the different constructions.

The results from the spoke tests show more than 50 per cent. error in the present grading system, which is largely due to the traditional prejudice and consequent discrimination against red hickory. No red spokes are now allowed in the A and B grades, yet these tests show that a large proportion of the red spokes now included in the lower grades should be, because of their strength and toughness, included in the highest grades. The resilience factor which is determined by maximum load and toughness varies directly with the weight, showing that best criterion for judging the utility of spokes is the weight. It is also shown by the tests that, weight for weight, the red and mixed spokes are fully as strong as the white ones. Of defects serious enough to affect the strength those near the centre of the spokes are considerably more damaging than the defects near the ends. A study of the tested spokes as they now appear at the Purdue University laboratory would give much practical information to commercial graders. These tests will be supplemented by another series on spokes mancfactured of sound dead hickory which occurs in considerable quantity in the South, and is not now used for this purpose.

The tests on the wagon poles brought out several important points. The present manner of attaching poles could be much improved since the construction at the hounds is much

weaker than the pole itself. The present style of trussing is of little value because the truss is applied along the neutral axis of the pole. The Southern pine pole will support a greater maximum load than the common oak pole but is not as strong as the select oak pole. With reference to load at elastic limit, the Southern pine ranks first. The failures in the oak poles generally occurred near the hounds and were fibrous and localized. Fractures in the pine poles, on the other hand, extended over distances of five or six feet, long pieces often breaking off where a fracture occurred. These poles were not of the best grade of Southern pine, most of them having the appearance of shortleaf pine and being largely sapwood. The exact species will be determined later, yet, for commercial purposes this is comparatively unimportant because the Southern pines are largely sold under the name of "yellow pine" without distinction as to species.

Results from the axle tests have not been sufficiently correlated to warrant definite statements regarding them, but it can be said that there is considerable room for improvement in the present method of trussing.

Further testing work along this line is to be carried on. A series of shaft tests on hickory and red oak will be made, a number of eucalyptus axles, and some on cultivator poles of red fir and long-leaf pine.

GETTING THE BEST WORK OUT OF EMPLOYEES.

Nothing is more important to the employer of labor, large or small, than that he have the conscientious and undivided service of his workmen. How to get this service is a question hundreds of employers have attempted to solve; few successfully; a condition of affairs that can be attributed to the failure of the average employer to remember that his employees are not merely single units in an integral machine but individual characteristics, and must be treated as such to give satisfaction.

There are many ways in which an employer may gain the loyal allegiance of his workmen, says G. Agassiz, in the "Michigan Artisan." First of all, he must be very careful to make the men's labor as pleasant as possible, and, by ridding it of any semblance of servility, promote a disposition on the part of the men to take more than a passive interest in their work. In his dealings with his men he must above all things practice fairness, evincing at the same time a willingness to recognize, appreciate, and reward any particular interest manifested in the work of the factory by an individual. Fairness is another great essential, for nothing will so degenerate the working capacity of a large factory as a too easy-going "boss."

The comfort of his help should be a very important matter to an employer, and in this connection he should see that his factory is well lighted, well ventilated, sufficiently heated in winter, and that its system of sanitation is adequate to the demands of the number of men employed. In the arrangement and decoration of the factory itself, much can be done to promote the health and comfort of the employees. Harmony of color arrangements should be assured, and all machines placed where the workmen can operate them most comfortably. Some large employers of labor in the United States have fitted up elaborate bath and wash-rooms in connection with their factories. These are fitted with numbered lockers, spacious enough to accommodate a complete change of wardrobe for the workman, thus enabling him to go to and from his work without having to advertise his occupation to the public.

A noon lunch and reading room is another very advantageous adjunct to the factory for by keeping the men within doors at noon time it tends to keep their minds upon their work—an effect which the diversions of the street would render impossible. The serving of a cup of hot coffee, especially in the winter, to men who are unexpectedly required to work overtime is another little and inexpensive attention which many employees would reciprocate by a more diligent application to duty. During the summer months, ice water might also be placed within easy reach of all the workmen. In very large factories this innovation would probably be objected to on the ground of expense, but the expense, distributed as it really would be, among a large number of employees, would be comparatively insignificant.

The question of holidays is an important matter in the relation of employer and employees. Workmen who had seen a year or two years of steady service, might well be rewarded with a week or even ten days' holiday at the firm's expense—the holidays extending throughout the summer months on the principal followed in large clerical offices, the New York offices of the Standard Oil Company, for instance, where thousands are employed.

The question of shorter hours and Saturday half-holidays is also worth considering, for while many employers of labor are unalterably opposed to any such movement, others who have introduced it acclaim its unqualified success.

Unquestionably the surest way of gaining the allegiance of one's employees is to let them participate in their factory's success. This can be done by allowing them to subscribe to a small percentage of the company's capital stock or by giving them an annual bonus, the amount to depend wholly on the year's returns. This means that each employee becomes in a sense a vital part of the institution and, having a direct interest in that institution's success will be only too willing to do his level best for it. Of course, there is always a certain element in every factory which regards loafing as its peculiar prerogative. This element, however, no up-to-date employer of labor can afford to tolerate.

Another very good way of gaining the workmen's interest is the "idea box" to which all employees are asked to contribute some practical idea for improving the capacity and efficiency of the plant. Every good idea is reward in some way and the originators of the best ones are frequently promoted. Still another plan of promoting the efficiency of the workmen is an informal monthly dinner, to which the heads of all departments are invited and at which matters relating to the factory's welfare are discussed.

WASTE IN THE HANDLING OF LUMBER.

We wish to call attention to the wasteful manner of caring for seasoned lumber, particularly hardwood. When it is received from the mills or yards it is in good condition, but of mixed lengths of from 12 to 16 feet. Often, after being delivered, it is allowed to lie exposed to the weather, sometimes for days, finally being piled by men whose height of ambition is measured by the height of the pile; for men of ambition and energy soon graduate from the roustabout list. The pile is generally started in the most convenient place, without any reference to its future use, with any kind of foundation nearly level. Let me repeat it, nearly level. This is one of the marked peculiarities of a poor pile. This lumber is generally piled as it is picked up, with most of the long boards near the bottom. As the pile goes upwards numerous ends are seen projecting 2 to 4 feet. The top is covered with knotty, shaky scrap, picked up from anywhere and fastened down

with a couple of cross pieces and stones. Let us note the result with such a constructed pile. A good share of the long boards, after six months' exposure to the sun and rain, have from 2 to 4 feet of firewood attached. It is profitable for the laboring man to cut up such piles at any time; in the winter they can use part of it for fuel to warm the shop; in the summer, where wood is sold to the men, their wives can use it to cook their dinners. If any one is skeptical is to these statements, let him take a piece of hardwood and expose it to the weather for a short time. The results will prove the statements.

Now let us look to the cover and see its results. Being of almost anything that but a short time ago were good boards, this cover has been shifted by the wind, leaving the lumber exposed to the rain, snow and sun. Where the piles are nearly level this is a serious matter, as the top lumber will become very wet in winter. I have seen four and five layers of unstripped lumber frozen together. This was taken into the shop and worked up; the pieces with the most ice on were thawed out around the stove, and all completed together. After two weeks' time the finished articles were found to have shrunk more than ⅛-inch. Rivets had to be reriveted, and the whole was unsatisfactory.

KILN-DRYING HARDWOODS.

In curing or air-drying, and also kiln-drying, hardwood lumber, quartered plain oak especially, the nature of the wood requires altogether different treatment from all kinds of soft woods. Not being as pliable, hardwood is very sensitive to extreme changes of temperature. For this reason heat should not be applied too suddenly nor to an extreme degree.

As for the question of air-seasoning lumber before it is kiln-dried, that is a matter of opinion, and depends largely on whether you can carry a sufficient stock to allow of it. I do not consider it a necessity, as lumber can be dried as well green, if done properly, and without checking, but under ordinary conditions and with the appliances generally in use, a few months outdoor seasoning is beneficial; but this depends largely upon the season of the year the stock is piled, as lumber will season much faster during the spring and fall months than in the summer, owing to the wind, which draws the moisture from the pores of the wood and leaves them open, not shrinking the stock as much as does the heat. Of course, this air-drying helps the lumber when placed in the kiln, as the sap and much of the water is gone from the wood and the heat doesn't contract the cells or pores quite so much.

The great trouble with hardwood lumber in drying is the tendency to honeycomb, which is due largely to the contraction of the pores on the surface before the moisture is released from the centre. This is accomplished in air-drying because there is no extreme heat to close the pores, which remain in their natural state. You will readily see that if we keep the pores of the wood open until the moisture is drawn from the centre, we avoid honeycomb or checking. The greener the stock the more apt it is to check. Oak is probably the worst of all hardwoods to honeycomb, owing to the coarseness of the grain and consequent amount of sap and water it contains. Maple is more apt to have what we call blind checks.

One thing that I think is not properly considered is proper sticking of hardwood. The sticks should be narrow and project slightly over the ends of the lumber, each length piled separately and not too tight, keeping the sticks directly over each other. Then each pile should be well covered from the weather, pitch enough being given to the pile to shed rain easily. Lumber stuck this way rarely checks far at the ends and will come out bright in color, which is the main feature in fine finish.

Lumber air-dried fairly well should not take over five or six days to thoroughly dry, if heat is kept on continuously (which is preferable). Hardwood can be dried in less time, but I should not advise it under the ordinary conditions, as it requires close watching and better facilities than most plants are equipped with. There are few men who make first-class lumber pilers, and that accounts for a great deal of crooked lumber. Great care should be taken to pile it straight, not too tightly, using as narrow sticks as possible. Lumber properly stuck will dry with much less danger of checks or honeycomb.

As for the methods of drying, there are many that are good, and the time varies according to treatment. I have dried perfectly green stock in six days, but had specially arranged equipment for it. I will take the most ordinary method at present and give some points for consideration. I think the ordinary blast-kiln very satisfactory under ordinary conditions. I would advise a long kiln, cars to be loaded at one end and unloaded dry at the other. By making the kiln long enough for eight or ten cars of about 2,000 feet of lumber each, you can take out one or two cars daily, if partly seasoned before putting in the kiln. One advantage of such a kiln is that the lumber is moved forward to the higher degree of heat gradually. In filling the kiln I should fill only two or three cars the first day, allowing only about 100 degrees heat at first, then fill a couple of cars each day, letting the others down until the kiln was full, then increase the heat from 130 to 140 degrees.

When the kiln is full the air is partly laden with moisture before it reaches the fresh stock, and does not check it so badly. If there is still a tendency to check the lumber, I should have steam pipes put in, with a valve opening in front of the hot-air inlet, by which I could let on live steam to moisten the air as it comes into the kiln. This keeps the outside pores open until the stock is dry. If you were to try this where you have been troubled with checks and honeycomb you would be surprised at the beneficial results, as the lumber is not case-hardened, but soft and more easily worked. It does not require much steam. If lumber can be given a good steam bath before turning on heat it hastens the drying. Of course, the thicker lumber requires a longer time to dry. I have taken twenty days to dry 4-inch hard maple, but it came out in first-class shape, free of checks and as wide as 16 inches.

One thing that is very essential is the regularity of the heat. Lumber, to obtain the best results, should not be allowed to cool after the heat is applied. Be very careful in regard to the piling on the cars. Use stickers one inch thick. Size them on the planer and rip them 1½ or 2 inches, then place them in line from top to bottom of the car, with at least three for 12-foot lumber and four for longer lengths, putting one close to each end of the stock. Don't crowd the heat too high, but keep a good, steady blast of about 120 degrees.

I do not approve of the old-style kiln with pipes in the room for heat and no draft or blast of air, as the wind dries and carries away the moisture, while the other simply bakes the lumber, making it hard and brittle. If I knew the facilities the inquirer has for drying I might be able to suggest points more beneficial.

OIL LUBRICATION.

Perhaps nine-tenths of all the lubricating oil used serves no other useful purpose than to aid in getting the other tenth where it will do effective service, a purpose which might be better served by a little care.

It is true that the waste of a little oil is immaterial compared with a hot box, but aside from the waste, oil has many disagreeable features when unconfined; a barrel of it, poured on a box in which the oil hole is full of dirt, will do very little good, while a drop, put in a clean hole, will be all that is required.

In an ordinarily constructed bearing, a few drops of oil is all that can possibly be effectively utilized at any one time, and if more is applied it must either run through, only partially used, or else run off unused. It is as essential to the well-being of a bearing that the used oil shall have a chance to get away as it is that the new oil should be applied, and therein lies a serious weakness in most "self-oiling" devices.

Probably the ideal oiler for bearings is the chain, or ring, oiler, provided the reservoir is deep enough to allow ample space for the sediment below the chain or ring, and provided that it is attended to and the sediment drained off each time it is filled.

It is also essential that any oiling device should be accessible, so that one may be able to see, at any time, just how it is working; for reasons entirely beyond the ken of any operator, two boxes working under what appear to be exactly the same conditions, may act very differently in the matter of oil consumption.

The writer has two bearings in mind, one of which, according to all rules and theories, ought to require a great deal of oil and attention, but which has never asked for oil yet, and to all appearances would run indefinitely without it, while the other, which, according to theory and ordinary practice ought to run with very little oil, requires constant attention and never runs satisfactorily.

Whatever the oiling device, it is essential that any bearing should be kept under constant surveillance, and no device can be made which will take the place of or eliminate the need of care. One proprietor, who thought it better to waste a little oil than to have a hot box, used, every time he entered the shop, to take a gallon can of oil and dope every box within his reach, with the result that the boxes generally ran cool, though the "oil bath" didn't always have exactly the same effect on the employees. The loose pulleys, however, were mostly beyond the "old man's" can, and were all out of commission.

A loose pulley, for all its malodorous reputation, generally doesn't require as much oil as the bearing alongside it, but the difficulty lies in getting the oil to the right place at the right time, because of the fact that oil put in the oilhole tends to be thrown out immediately, rather than to run in and spread on the bearing, as in ordinary boxes. The ideal way to oil a loose pulley is through the center of the shaft. A device for doing it in this way was patented some twenty years ago, but was found impracticable by reason of the expense and difficulty of applying it; so, though it did the work to perfection, it was never much used.

A great many "self-oiling" loose pulleys are made with an oil reservoir in the hub, and all, so far as is known to the writer, work satisfactorily except for the fact that the hole connecting the oil chamber with the bearing is difficult of access and liable to become clogged before one is aware of it, while the spent oil is thrown out into the reservoir and used over and over, there being generally no convenient way of getting it out, the net result being that some day they will act like that once celebrated clock—"stop short, never to go again." A loose pulley which is a close fit, if it runs dry, will often "set" on the shaft as suddenly as though some one had shot a key into it. Any one who has had this happen just when he was setting the knives on a molder, for instance, is likely to look to his loose pulleys thereafter—or take up some line of business not requiring the full complement of fingers.

Any device calculated to keep a bearing lubricated for a great length of time is apt to lead to neglect, and so induce the very trouble it is intended to avoid. The most important factor in any oiling device is accessibility.

BELT LACES.

Hardly a month goes by but you see some man making fun of the "shoestring" method of "bootleg," or some other form of simple lacing. Just what forms of lace they mean by shoestring and bootleg lace is not as clear to me as I would have it, but if they refer to the simple form of lacing, I want to say that while I do not use them myself as a rule, still there are certain points in favor of these methods of lacing that should not be overlooked.

Some time in the earlier days of belting, when they had a lot of belting tests at some institution, there was also included incidentally a series of tests on lacing and various other forms of belt joints which brought out some peculiar facts. One of these was that a simple form of lacing—that is, a form that would leave the lace string free to slip through the holes in the belt and adjust itself so that the strain would come evenly all over the joint—made the highest record in pulling tests. The explanation for this is found in the fact that in the various complicated and lock-stitch laces the lacing would not pull through and adjust itself to get the strain even all across, and as a consequence some of the strands would break earlier than with the simple form of lacing. Some of your older readers can probably recall some of these tests and their records, and, if they can, you will find some interesting data on the relative strength of belt lacings, and also find that test records are practically in favor of the simple forms of lacing.

Theoretically, therefore, and considering the one point of strength, the simple lacing is best for the belt, Just as the simple life for man looks best from a theoretical standpoint, but when you come to put belts into service and apply the tests of practice, the result is materially altered. Let us say, for example, that we have two laces in operation, one of the simple form that shows up best under a pulling test and another with interwoven or locked stitches. By and by there will come a time when the strands of these laces will wear through and break, and when this happens to the simple lace it is only a matter of seconds until your belt is in two, while in that one where the stitches are locked or interwoven the belt may be run for a number of days yet before showing an inclination to come in two. It is for this reason that I prefer the more complicated lace. It does not cause as many stops in the middle of the day, to make repairs; in fact, if given anything like the proper attention, it need hardly ever cause a shut-down, as it can be attended to at the end of the day's work, while if it were one of those simple laces that unravel instantly when a strand is broken, it means a shut-down the instant you get warning your lace is giving way.

While having this preference, however, I do not feel like condemning, unheard, or making fun of the simple forms of lacing, because they have certain points of advantage, and should be given credit on this score, even though we may prefer to use some other form for special reasons. I want to call attention to this matter because I think there is more in the subject of laces than some of the technical writers think there is. It should be fairly studied from all sides, and the various points of advantage and disadvantage found in the different laces also studied in connection with the special work required of the belt.

CASTOR OIL FOR BELTS.

Castor oil is of some benefit to a belt if used sparingly and at a time when the belt most needs it, but the way some men have of slapping it on in huge doses, and at frequent intervals, is certainly amazing. It is a mistake to put cold castor oil on a belt which is cold, hard and glassy inside from dust slipping. From what I have learned by experience and hearsay, it is my belief that castor oil must be very warm and applied evenly and sparingly with a brush, in order to do the most good. I have heard men say they would not use it at all, as they could not see its virtues. They claimed it gummed up and spoiled a belt in short order. The belt won't absorb castor oil as readily as it will neatsfoot oil, as its consistency is too heavy, but if it is to be applied at all, it should be very warm. Neatsfoot oil is much more preferable and should be warm when applied, to soften up a belt. Too much is worse than none at all.

Now, it would seem as if a belt would continue to stretch as long as it remained soft, and would therefore need shortening occasionally, but that is a matter of opinion under varying conditions. If belts are thrown off the pulleys Saturday and allowed to remain off until Monday morning, they will shorten themselves, and do so more effectively when coated with warm neatsfoot oil. Belts allowed to remain permanently on the pulleys will never contract and are more apt to slip, whether treated to oil or not.

It is customary for some men to treat slipping belts in this manner, viz., slap on lots of castor oil and "chuck the rosin to it." Not fine, but lumps, which the belt has to crush. It may be effective for the moment, but does not last, and certainly does not improve the belt any. There is nothing much worse than rosin for leather, yet it is the most commonly used. The sooner mill men graduate from the habit the better it will be for the belts, and the less it will cost for belting, oil and rosin.

METHODS OF MAKING VENEERS.

The most expensive veneers we have are those that are quarter-sawed. In furniture, mantel and a number of other kinds of woodworking to-day the favorite veneer is the quarter-sawed oak. Of course we have, too, the quarter-cut oak and plain rotary-cut oak veneer, and the claim has been made by some manufacturers of cut veneer recently that they can now make quarter-cut veneer that is equal to the quarter-sawed article, not only in appearance, but also in the soundness of grain. It will be a big thing, not only for the veneer manufacturer who accomplishes it, but for the veneer-using trade as well, when the quarter-cut veneer can be shown that is equal to the quarter-sawed article, but to the veneer user that point does not look possible of attainment.

It is not only a matter of disturbing the grain of the wood in cutting that enters into the handicap to cut veneer when compared in quality to the sawed article, but it is claimed that steaming or boiling the wood to put it in shape for cutting opens up the pores until, when it is bent around a column or something after drying out, the face will not finish up smoothly as sawed veneer. I do not know that all users of veneer make this point, but in going over the subject with a prominent mantel manufacturer recently, he said that after repeated efforts to use cut veneer for column work he had finally concluded that it was not possible to make a cut veneer that would not open up in the pores when used in this class of work. This, he claimed, was not prejudice on his part, as he would much prefer to work cut veneer, not merely because it was a cheaper article, either, but because it requires less work to finish the face.

Sawed veneer is rather rough on the face, and it is quite a laborious task to sand out the saw marks and get a smooth face, while in facing up cut veneer this task is comparatively light, because the knife cuts it much smoother than the best saws can make it. In addition to all this, there is still another handicap to cut veneer, in that it only has one good face; that it, no matter how good a machine the stock is cut on, or how well the work is done, the knife side of each sheet will show up poor as compared to the face. The grain will rise a little, and this not only calls for care in using so as not to put the wrong side out, but also sometimes interferes with matching up.

Suppose, for example, you desire to match up panels showing crotched figures, etc., which call for the reversing of each alternate piece of veneer. This is work that can readily be done with sawed stock, while there is some uncertainty of carrying it out successfully with cut veneer Not only does the sawed veneer come in better in this work, but by having the two faces equally as good it gives one a choice of the two sides to use in veneer at all times, and this is frequently a material assistance, as sometimes a fault will show on one side that does not appear on the other.

Speaking of costs in veneer, notwithstanding the fact that we all know it to be a much more expensive proposition to manufacture quarter-sawed veneer than to make cut veneer, still one sometimes runs across some remarkably low prices in quarter-sawed oak. Ordinarily we would figure that quarter-sawed veneer should be worth practically twice as much as cut veneer, because the process of manufacturing it is not only slower, but the waste in the saw kerf is generally as much, and even more, than the wood left in the veneer. In other words, roundly speaking, we only get half as much veneer out of the flitch when we saw it as when we cut it, and the work of sawing ordinarily costs more than to cut it.

The manufacturers of cut veneer are getting the price down to a finer point every day, and the cut veneer of to-day is a much superior article to that of several years ago, and modern machines can also cut exceedingly fine. In fact, I have seen oak veneer cut as thin as 1/100-inch, and while this naturally looks too thin for practical use, it raises the question of how thin it is possible to work oak veneer. On flat work it is not important whether it is thin oak or thick, as it is only a matter of cost, but in veneering columns and other shaped faces, the thinner the veneer the better—that is, as long as it is not cut too thin for practical use—for it is not only easier to manipulate, but there is less danger of breaking and splitting the veneer in working it on. There are some denser woods that can be worked remarkably thin, as thin, in fact, as 1/100-inch, but in oak, when you get it too thin, the glue comes through the pores and the ceneer becomes almost useless as a face wood.

I would like to know if any one has ever established the point, by actual test, of just how thin it is practical to work oak veneer. This is a question, too, that should interest others, plenty of others, these days, for the use of oak veneer is becoming so general now that not only furniture manufacturers, but planing mills and all cabinet-workers are interested in it. The price question, too, is an interesting one, and it looks like the time is about ripe for manufacturers of veneer to begin to make public their prices, so that veneer users may be informed on the market value of this product as they are on lumber values. There are a number of other interesting questions, too, that could be discussed to advantage, but those already mentioned probably are enough for one time.

Condensed Advertising

Advertisements under this head 10 cents per count line for single issue, contract rates on application Black face headings and names in caps count 2 lines each. Advertisements for "Help Wanted" or "Positions Wanted" given two free insertions for any subscriber to the paper, and replies may be addressed to a box care "Canadian Woodworker."

For Sale—Lumber and Veneers

15,000 ft. Hungarian Ash Veneers.
2,500 ft. Rosewood Veneers.
47,000 ft. Bird's Eye Veneers.
750,000 ft, Mahogany Veneers.
65,000 ft. Mahogany Crutch Veneers.
15,000 ft. Cedar Crotch Veneers.
40,000 ft, Long Figd. Walnut Veneers.
30,000 ft. Figd. Walnut Butt Veneers.
63,000 ft. Curly Birch Veneers.
475,000 ft. Qtd. Sawn Oak Veneers.
43,000 ft. Qtd. Sliced Oak Veneers.
35,000 ft. Circassian Walnut Veneers.
5,000 ft. White Mahog. Lumber 5/8 in. & up
150,000 ft. L.R. Cuban Mahog. 1 in. to 4 in
375,000 ft, Afr. & Mex. Mahog. 1 in. to 4 in

RICE VENEER & LUMBER CO.
Grand Rapids, Mich

For Sale—Second-hand List

1 Coe, Extra Heavy, 52 inch Knife, 52 inch Swing, Veneer Lathe.
1 Coe, inch Knife, 32 inch Swing, Back Roll, Veneer Lathe.
1 Coe, 52 inch Knife, 42 inch Swing, Veneer Lathe,
1 Coe, 48 inch Knife, light pattern, Veneer Lathe.
1 Grand Rapids 88 inch Knife, Veneer Lathe.
1 Pony, Veneer Lathe, 10 inch Knife.
1 Sawn Hoop Machine.

MERRITT MFG. CO.
Lockport, N Y.

WOODWORKING IN CHINA.

Naturally pre-eminent among the skilled craftsmen of China, the carpenter still maintains the leadership. Though almost invariably wedded to the use of the tools of his ancestors and to their methods, judged by his results he is more efficient in his line than are the average of the foreign trained fitters and machinists in theirs, though a constant diminution of the difference is in progress.

In judging the performance of the native workmen, it is almost impossible to avoid the popular bias that addiction to their own methods and tools invariably bespeaks fatuous conservatism. Though this is in many cases true, it will often be found on careful observation that what has passed for a stubborn blindness to the virtue of innovation, is in reality a keener perception of comparative merits than the judge himself was aware. This is particularly true of Chinese carpenters. While most of their commonest tools differ in some radical way from our own, it is never safe to assume the superiority of the Western product. Their small axe, for example, is a beautifully balanced tool, and they are remarkably adept in the use of it, being able to work as true a surface therewith as can be obtained with an adze in the hands of the white man. On heavy work it is customary for two to hew together on opposite sides, striking alternate blows. Both hands are used and the recover is over the shoulder, alternate right and left. There is a freedom of swing with an accuracy of delivery that is a treat to watch, and the rapidity of blows is almost bewildering.

With the introduction of the nail into his craft, the Chinest carpenter was in need of a hammer. His axe is provided with a sort of hammer face, so he came to use that. Though a good axe, the tool is a bad hammer. However, a large proportion of the hammers first introduced from the West by importers were poor imitations of what a hammer should be, and the Chinaman rightly judged it no better than his own, so generally repudiated it. Here was another evidence of so-called obduracy. At a venture, I secured a small consignment of thoroughly good claw hammers for trial with my own men. Shortly thereafter a man chanced to lose his axe-hammer at a juncture where it was very badly needed in the latter function. I presented him with one of the new lot. He "hefted" it and swung it with a grin of dawning satisfaction. When I made the next round he was wielding the new acquisition with energy.

In the course of a few days there occurred again the loss of a native tool, which resulted in the presentation of another of my hammers. At the third occurrence of the phenomenon my suspicions were slightly aroused. Upon the fourth, I decided it was time to begin an investigation. These hammers seemed the source of a rare satisfaction. There are many cases which go to show that among the Chinese working classes there are men without foreign training who are fully capable of taking active leadership in the industrial regeneration of China.—Engineering Magazine.

ADVERTISERS' INDEX

Armour Sand Paper Works	41
Ballantine, John & Co., Ltd	2
Batavia Clamp Co	42
Bradstreets	38
Clark - Demill Co., Ltd	4
Courtney, D G.	39
Dominion Belting Co	38
DeCew. J. A	42
Dominion Heating & Ventilating Co	11
Falls Machine Co	8
Garland, The M. Co	44
Goldie & McCulloch Co., Ltd	12
Grammes, L. F. & Sons	8
Holden, Henry S. Co	41
Jones Safety Device Co	7
L. G. McKnight & Son	7
Maple Leaf Saw Works	8
Macgregor, Gourlay & Co., Ltd.	3
Markley and Miller	41
Merritt Mfg. Co	40
Mengel, C. C. & Bro	39
McLaren, D. K., Ltd	42
Munderloh & Co	43
McKnight, L. G. & Son	43
Nartzik, J. J	41
North Bros. Mfg. Co	40
Ober Mfg. Co	41
Ohio Blower Co	43
Oliver Machinery Co	6
Porter, C. O & A. D	11
Rice Veneer & Lumber Co	38
Rochester Cooperage Co	10
Robinson, J. J. Co	42
Shurly & Dietrich	8
Sidney Tool Co	40
Smith, R. H. & Co., Ltd	9
Sheldons, Ltd	9
Waverly Oil Works	40