CANADIAN WOODWORKER

Vol. 1.] DECEMBER 1908 [No. 10

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TORONTO CANADA

John Ballantine & Company
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PRESTON, - ONTARIO

MANUFACTURERS OF SUPERIOR

WOODWORKING MACHINERY

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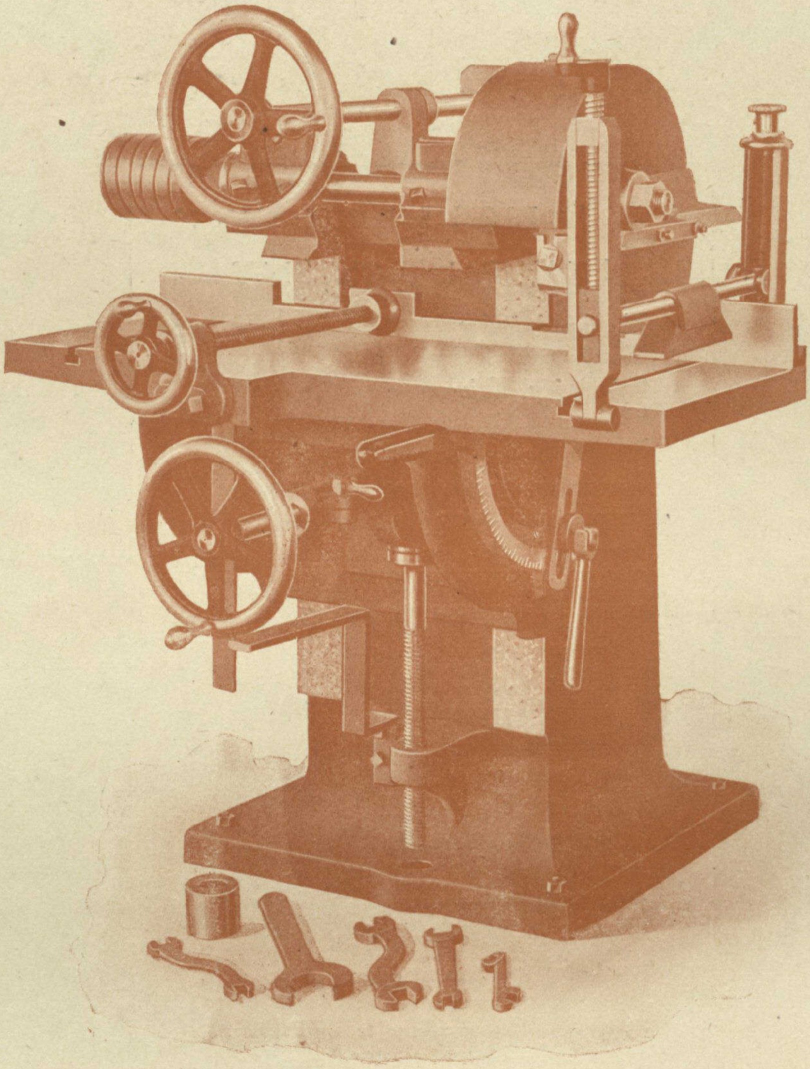

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A new and strictly high grade tool designed for carpenter, agricultural and car shop work. Furnished with improved expanding head to cut gains from ½" up to 6" wide. Weight of machine 1750 lbs.

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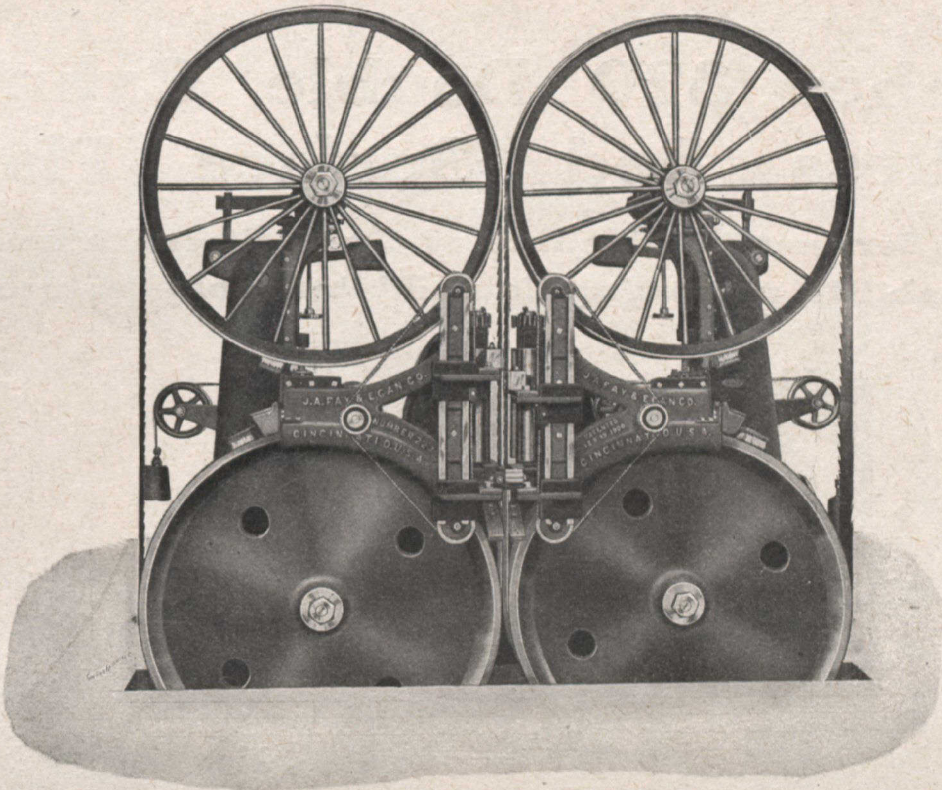

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Our Twin Band Resaw is rapidly displacing the single machine in many of the leading planing mills, box factories, etc., all over the country.

This is due to the fact that its economical production and double output over the single machine is being readily appreciated by progressive manufacturers.

ECONOMICAL PRODUCTION AND DOUBLE OUTPUT

are the results of our Patent Knife-Edge Straining Device, which permits of running the thinnest gauge blade at twice the speed of any other saw without danger of breaking.

CAPACITY

This machine will resaw timbers 24 inches wide and 10 inches thick. It will saw a board into three pieces each 3-16 inches thick, or three of any other thickness up to 3 inches each. It will saw one piece 3 inches, one 6 inches, and one 1 inch—or any combination less than these. By adjusting the movable saw out of the way, the machine may be used as an ordinary resaw, sawing up to 3 inches on one side and 6 inches on the other.

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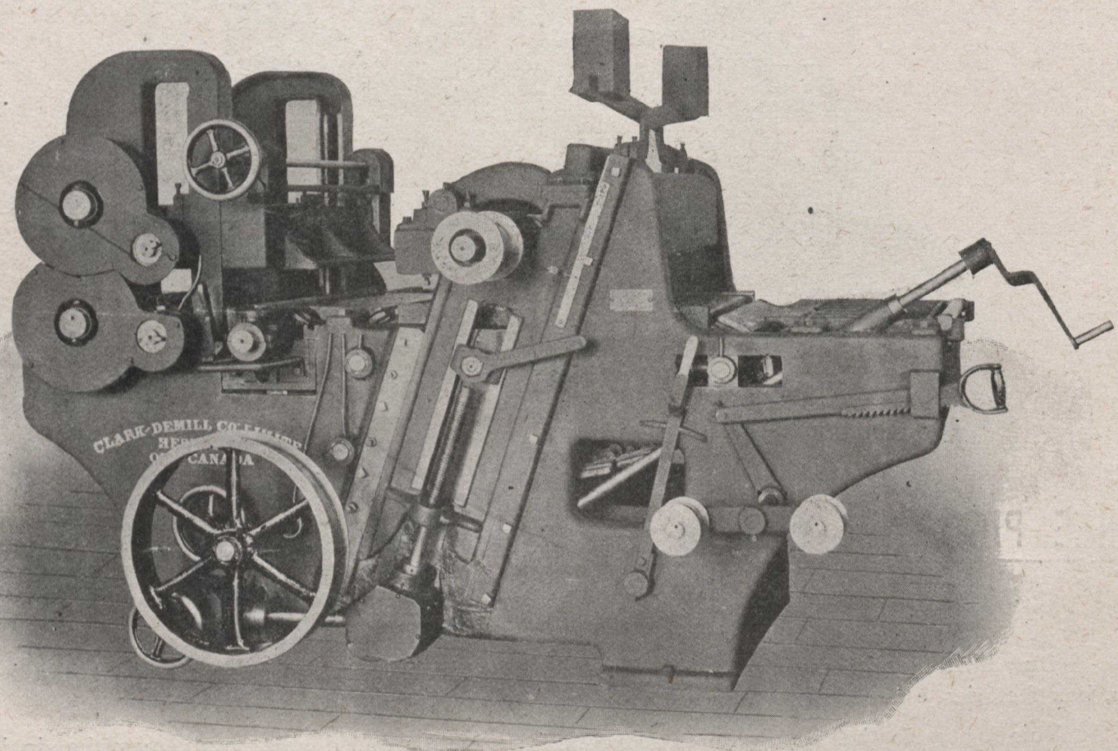
Number 320 Double Cylinder Endless Bed Surface Planer

A Serviceable Machine of Great Strength and Stability, possessing New and Desirable Features



Built to Work 26 Inches Wide by 12 Inches Thick

This No. 320 Double Cylinder Planer is very simple and easily handled, fully up-to-date in design, with a complete system of numbering and lettering applied and available when repairs are necessary.

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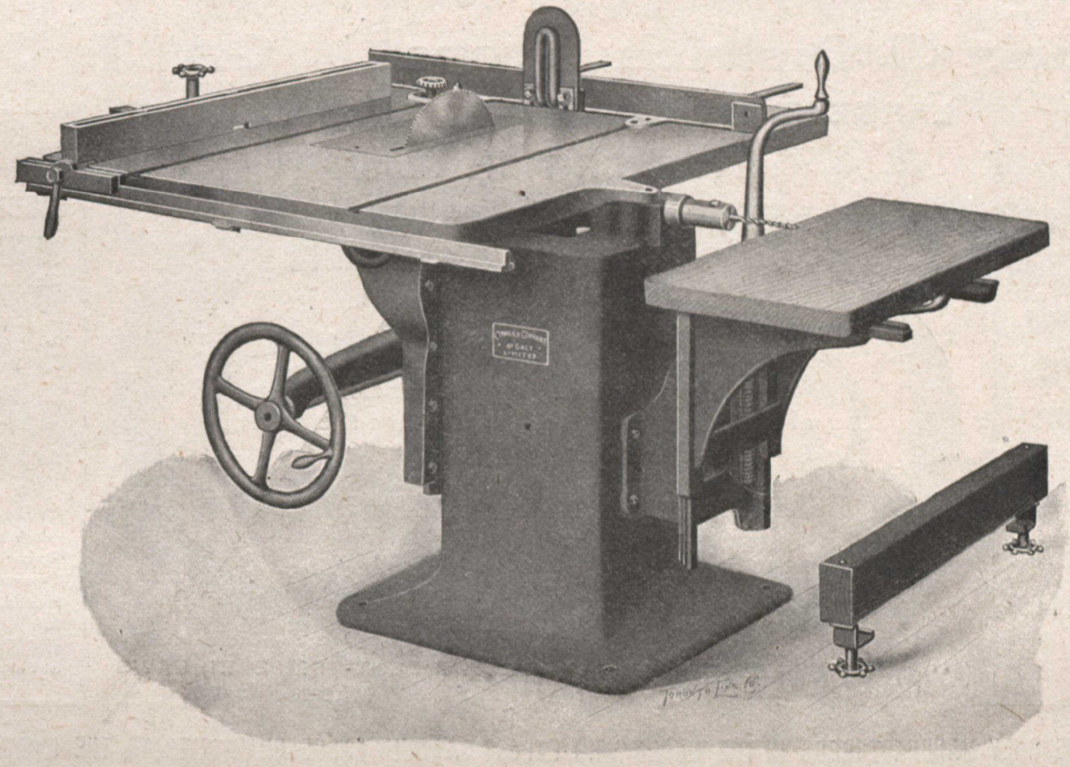
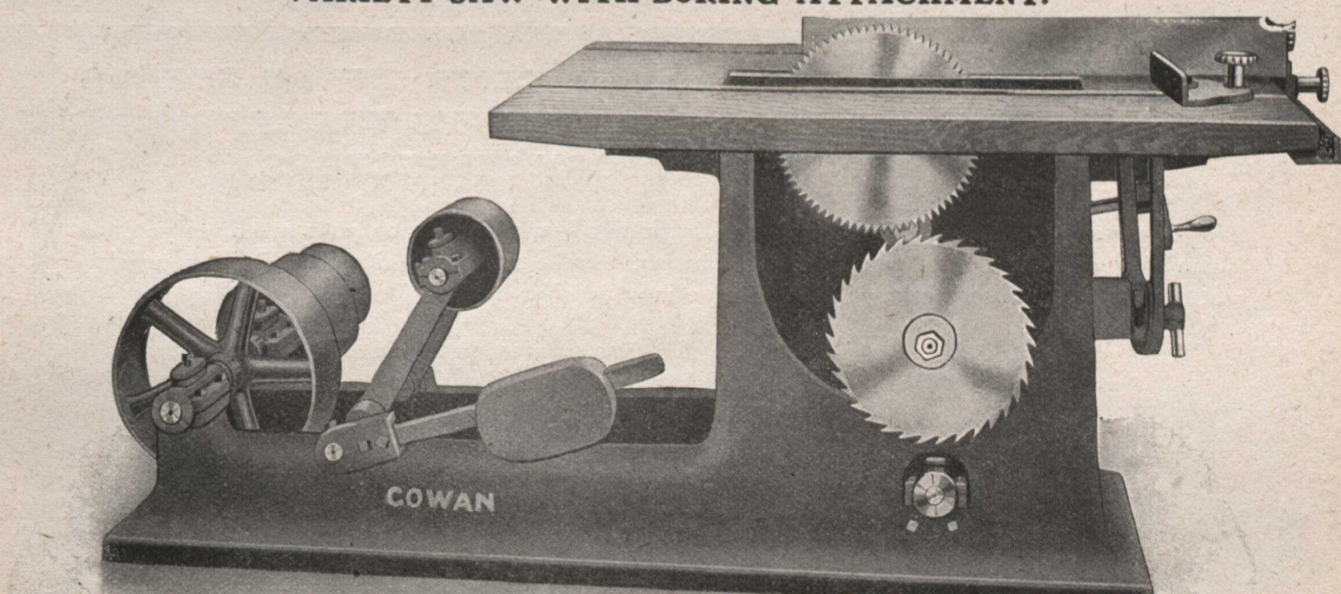


VARIETY SAW WITH BORING ATTACHMENT.



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We make a Specialty of Machinery for Pattern Shops, Industrial Plants, etc. Our line of light machinery such as JOINTERS, BAND CIRCULAR SAWS, PLANERS, BORING AND MORTISING MACHINES, MOULDERS, etc., embraces all th new ideas of the most advanced mill practice.

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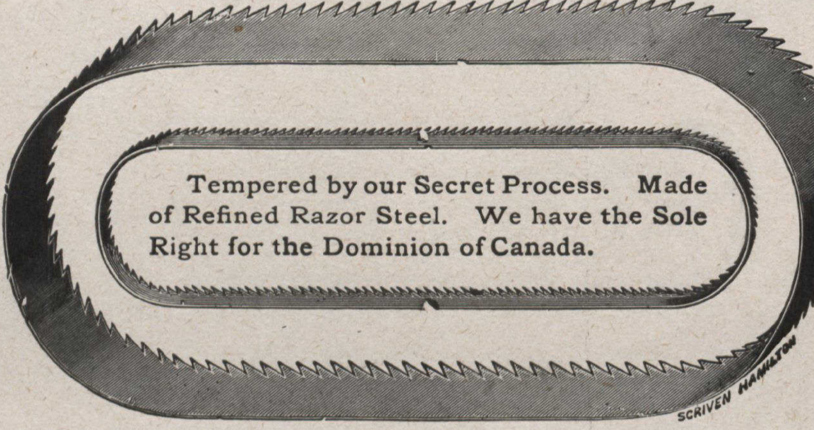

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WE manufacture HIGH-GRADE
BAND SAWS
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These Saws are made of Refined Razor Steel, and Tempered by our Secret Process; for Fine Finish and Temper are not excelled

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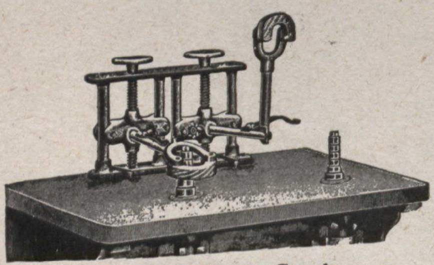
"UNGUARDED SAWS CAUSED 20 PER CENT. OF ACCIDENTS IN ONTARIO MILLS AND FACTORIES." SO SAYS THE LAST ANNUAL REPORT OF THE FACTORY INSPECTORS.

Don't you realize that every day you delay in putting Jones Guards on your machines you are submitting yourselves to the danger of costly law suits as the result of accidents. Besides, you are not protecting your best werkmen from being ruined for life.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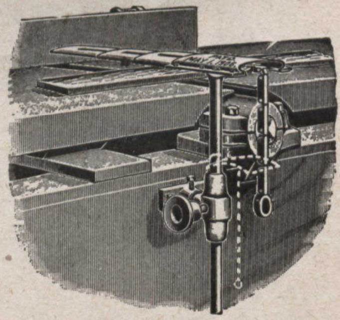
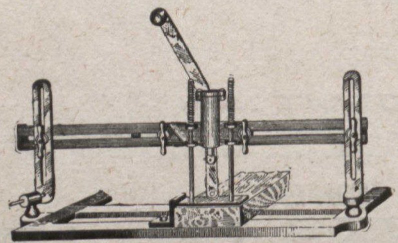

Jointer Guard
Dotted line shows it at side of machine for rabbiting.

The Jones Jointer Guard
Is the Acme of Perfection and Simplicity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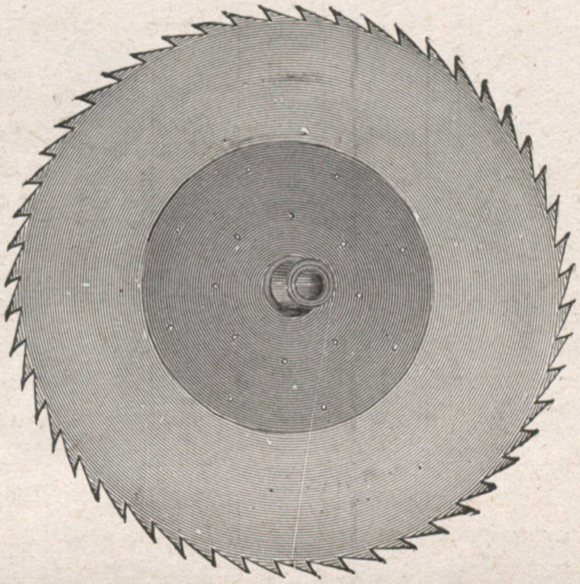

We make Every Kind of Saw required in Saw Mills, Planing Mills, Furniture Factories, Piano Factories, Carriage Factories, Etc., Etc.

We have been manufacturing for the Canadian trade since 1855, and have maintained the same high standard of excellence. Let us know your saw requirements.

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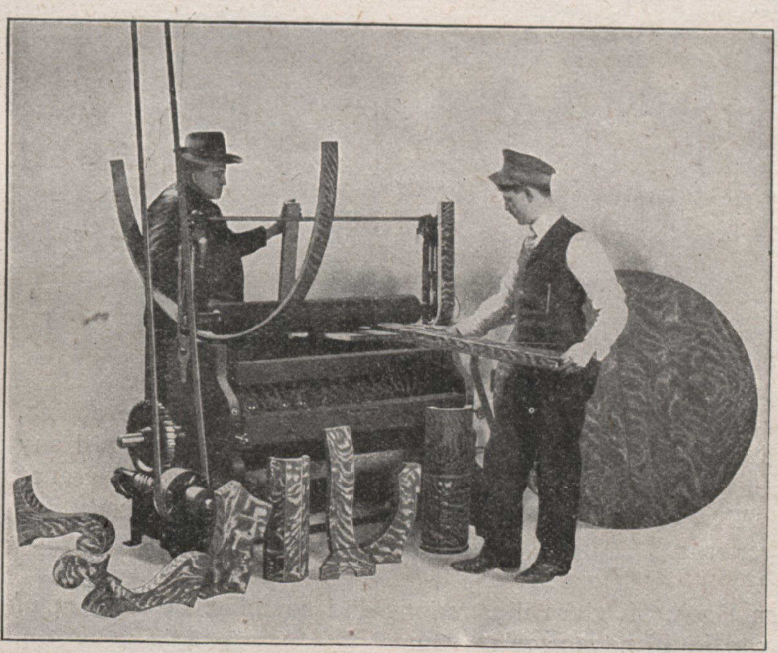

¶ It makes **a perfect imitation** of any open grain because it uses the wood itself to print from. One operator and a couple of boys can do more work with it than 12 men with any other so called machine on the market. That's why it's a money maker.

¶ It imitates perfectly **plain or quartered oak, mahogany, walnut, elm, ash** or any other wood with an open grain.

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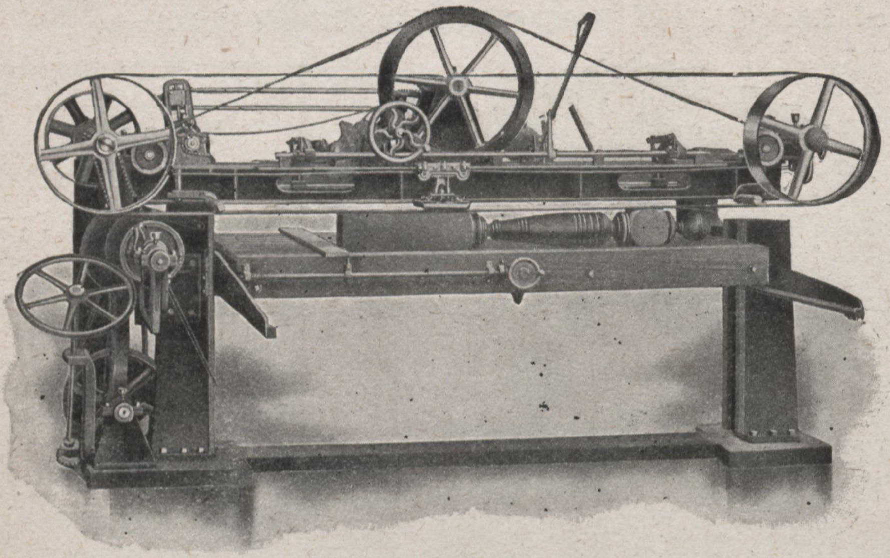
DETROIT, MICHIGAN

The New Fisher Automatic Variable Speed Sander Combines all the Best Features Known to the Woodworking World



VIEW OF SANDING MACHINE

Takes either veneered or solid stock direct from the press and finishes **without any hand work** ready for the varnish room. The Variable Speed of pressure shoe prevents blistering or burning of stock. Owing to the open end the operator can sand material double the length of the table and can sand out any flaw in stock without reducing the thickness of edge. Operator has full control of all adjustments while machine is in operation.

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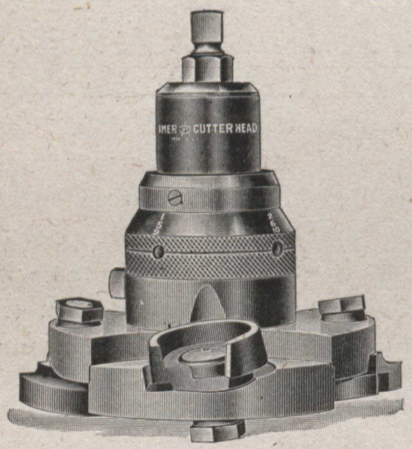
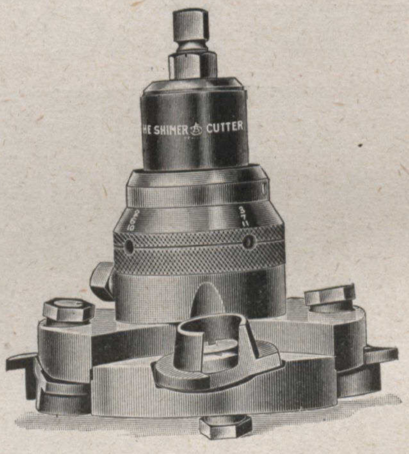


THE SHIMER CUTTER HEADS SAVE TIME AND TROUBLE



THE SHIMER CUTTER HEADS for flooring, ceiling, siding, ship lap, jointing, double ceiling, doors, sashes, blinds, etc., do more good work with less labor and expense than will any other. The Bits are securely bolted to convex seats that give to their cutting edges a clearance peculiarly suited for FAST CUTTING AND SMOOTH FINISH. They are ever ready for service and turn out positively uniform patterns. A fine adjustment for the Cutters is provided for by the Expansion feature.

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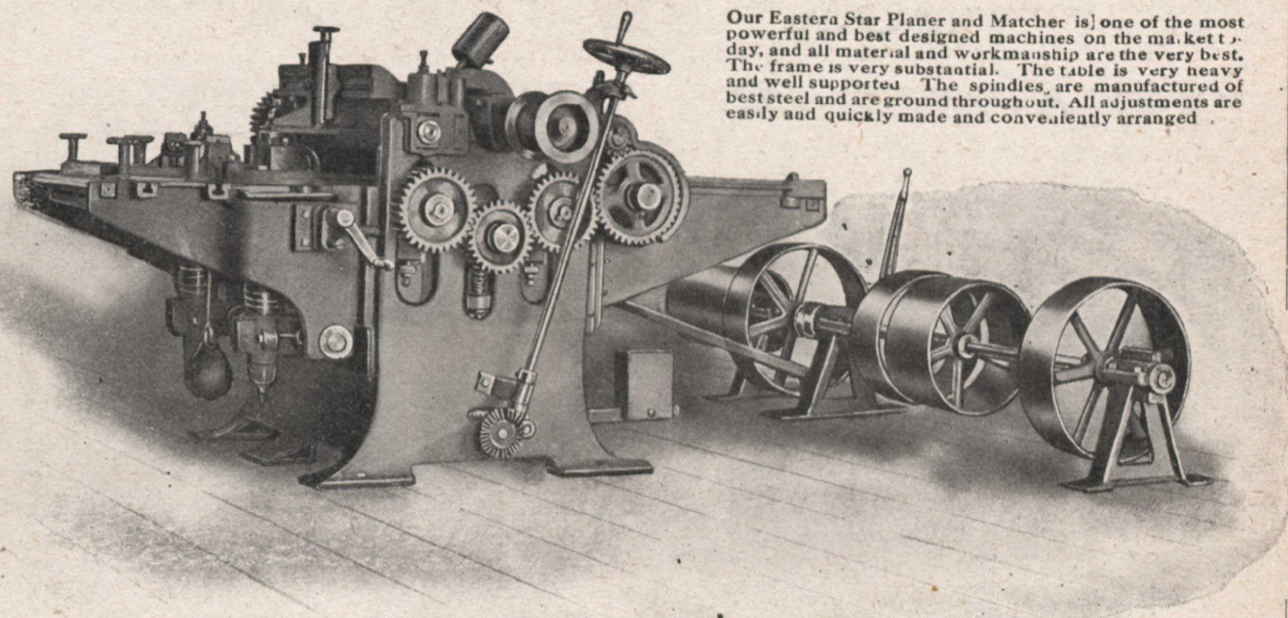
Our Eastern Star Planer and Matcher is one of the most powerful and best designed machines on the market to-day, and all material and workmanship are the very best. The frame is very substantial. The table is very heavy and well supported. The spindles are manufactured of best steel and are ground throughout. All adjustments are easily and quickly made and conveniently arranged.



We carry a complete line of Woodworking Machinery in stock including END MATCHERS, LIGHTNING CUT-OFF SAWS, HEAVY SHAPERS, SELF FEED RIP SAWS, DIMENSION SAW TABLES (with or without boring and mortising attachments), HEAVY SINGLE SURFACERS, BAND SAWS, ETC., ETC. Write for full particulars.

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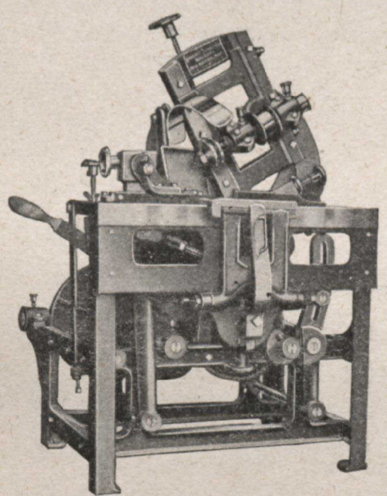
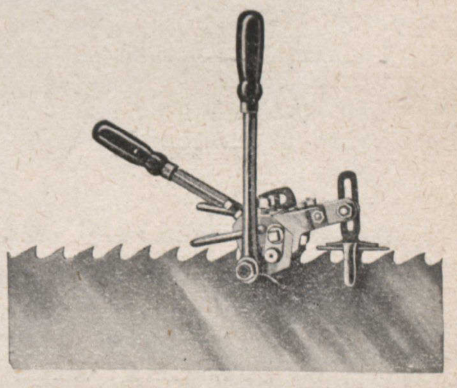
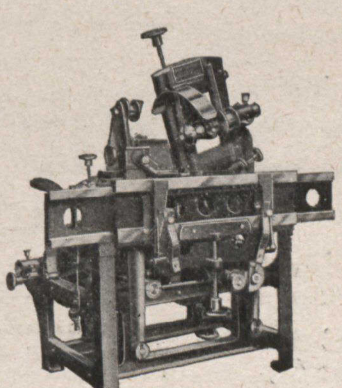


Hanchett Band Resaw Sharpener



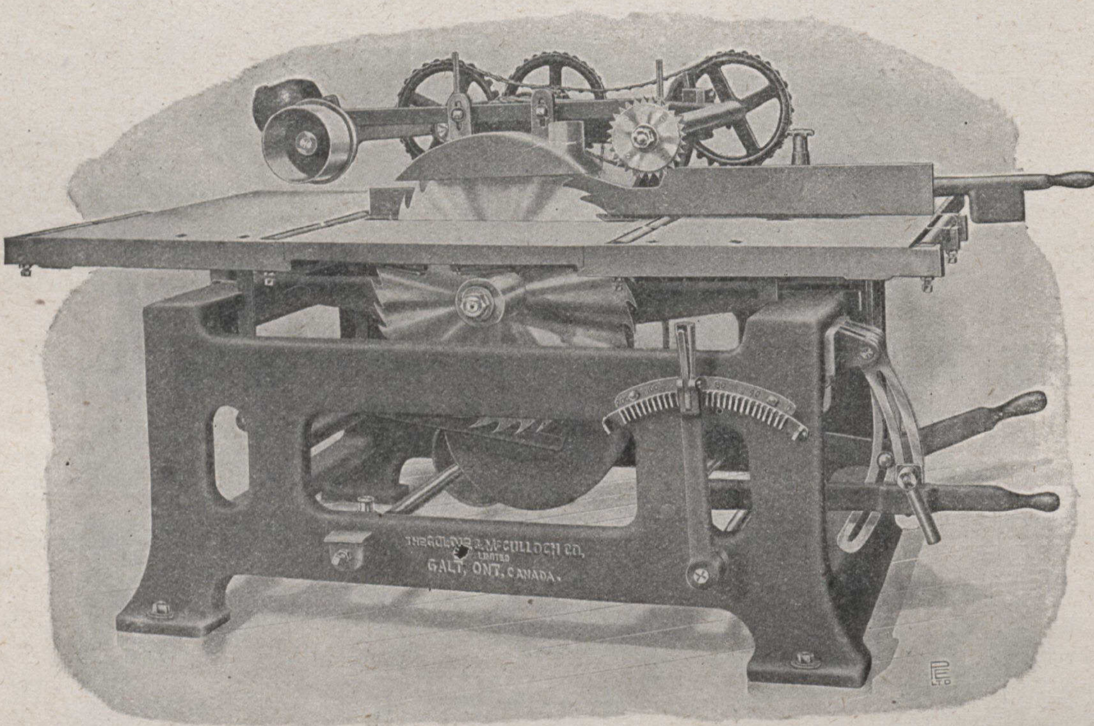
Hanchett Band Saw Swage

Hanchett Circular Saw Swage with Bench Attachment and Jointer



Hanchett Gang Saw Sharpener

OUR NEW No. 1
HEAVY SELF-FEEDING
RIP SAW



Frame is heavily designed and cast in One Piece, assuring constant and perfect alignment.

Table is strongly ribbed and is provided with adjustable roller running with the cut returning material to saw.

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Canadian Woodworker

A MONTHLY JOURNAL
FOR ALL CLASSES OF WOODWORKERS

Vol. 1 TORONTO, DECEMBER, 1908 No. 10

CANADIAN WOODWORKER

A Monthly Journal for all classes of Woodworkers.

Subscription: Canada, and Great Britain, $1.00 per year; United States and Foreign owing to postage $150, payable in advance. Advertising rates o napplication.
SAMPLE COPIES FREE ON REQUEST.

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

When changing their Post Office address subscribers will oblige by notifying the publishers.

THE LUMBER CUT.

An American contemporary, "Hardwood Record," draws a lesson for the benefit of American lumbermen from the action of their Canadian brethren during the past year of trade depression. As is known to our readers, there are large quantities of lumber held at the mills and warehouses throughout Canada still unsold, the shipments abroad during the year having been only a fraction of the average total, and the home demand having also been at a very low ebb during a large portion of the year. In view of this, Canadian lumbermen have come to the conclusion that it will not be good policy to cut as much lumber as usual during the coming winter, and it is estimated the cut will only be about 50 per cent. of that of last season. This refers to several of the large companies, while many of the small ones will practically not cut at all. Our contemporary, commenting on this, says: "Owing to the price of stumpage, Canadian operators realize that they cannot cut prices any further and make money. Therefore, they prefer to reduce their cut so that demand will be equal to supply, and thus maintain their values. The attitude of Canadian operators should be a lesson to American lumbermen, some of whom do not realize the importance of restricting output to correspond with demand. The present actual value of stumpage of all varieties precludes the possibility of lowering lumber prices to any appreciable extent and making a profit. There is a 'right smart' difference between doing business and making money in lumber operations. The wiseacres of the trade are cognizant of this fact and are holding down their output, while others seem to be careless of results, and are still making more lumber than they should. With a reasonable curtailment of log and lumber output during the next six months, a great deal more money may be made by manufacturers than by keeping their mills running on full time at present."

MANUFACTURE OF EXCELSIOR.

An increasing interest is being taken in the making use of by-products and side lines produced in the manufacture of wood, and in Canada, with its enormous supplies of forest materials, the outlook for a profitable utilization of the same should be peculiarly favorable. One of these minor products is excelsior, which, as most of our readers are doubtless aware, consists of curled shreds of wood, which may be used both for packing purposes and for stuffing mattresses, upholstered furniture, etc. In this material there is already considerable interest in Canada, judging from enquiries we have received about it. There is already a fair demand for it in this country, and as the requirements for packing tend constantly to become more stringent, this demand is likely to increase. Nor should it be difficult to work up a demand for excelsior in Great Britain and foreign countries. Some of the Canadian trade agents have more than once, if we remember rightly, called attention to the opening which exists in several centres of Great Britain for this line. At present, most of the excelsior which goes into the United Kingdom is imported from Norway and Sweden; but this is probably only because this is the only known or chief source of supply. Canadian manufacturers of excelsior, advantageously situate with regard to shipping facilities, should, we think, be able to compete on fair terms.

Meantime, as mentioned above, there should be a good opening for excelsior in the domestic market for some time to come. The customs duty on the product coming into Canada is 25 per cent., with one-third off this amount under the preferential duty affecting Great Britain, but the former figure would represent the only possible importations, for instance from the United States, with which we in this country would probably have to reckon.

—While there is lots of cheap furniture made, and probably too much furniture that is poorly manufactured, still the furniture manufacturers as a whole are a mighty high class of machine wood-workers, and they can generally give pointers to planing mill men on putting a fine finish to wood work.

Planing and Molding

GRINDING OF KNIVES.

In last issue we spoke of the temperature as affecting the grinding of knives, also the speed at which the wheel should be run. There are, of coure, other considerations. The beveling of a knife involves not only a consideration of how far back to grind, but also the matter of concave.

What might be termed the regulation formula for the grinding of veneer knives as to bevel, is to grind the bevel back three times the thickness of the knife. In other words, a knife 3/8-in. thick would have a bevel 1-⅛-in long, and a knife 1-2-in. thick would have a bevel 1 1-2-in. long. Sometimes this will vary, sometimes a knife ¾-in. thick is ground to 2-¼-in. This is different from grinding planer knives, which are usually ground to a bevel twice the thickness. That is a 3/8-in. knife would be ground to a ¾-in. bevel. This bevel is measured from the heel to the point on the face of the bevel, and not by the exact distance the bevel reaches back on the knife.

In regard to the concave, some prefer only a slight concave to facilitate whetting, while others seem inclined to like a pretty deep concave. This is governed some by the length of the bevel. To concave, in fact, as far as the point of the knife is concerned, is to extend the bevel, and those who use the longer bevels probably do less concaving, while those using comparatively short bevels concave more deeply, so in the end the effect is practically the same. In cutting some timber, say timber with a hard grain that is inclined to jerk a little in passing over the knife, it is probably necessary to have the knife a little short on its bevel so that there will be a little more body to support the edge, whereas in timber that is soft, smoothly grained and free from knots, the knife may be ground very keen; in other words, the bevel may be extended further. This makes the cutting easier and probably produces smoother veneers. If carried too far, however, it may result at times in breaking gaps in the knife, and this is expensive and calls for delays. When cutting quite a lot of rough stuff in a variety of timber, it is better to stay on the safe side and not grind the bevel back more than three times the thickness of the knife, and even with that not do too much concaving—just enough to facilitate whetting. Generally, however, every man, after he has had a few years' experience, develops some method of beveling or grinding his knives to suit the work in hand, so the suggestions given here are more general than specific. The specific points must be learned from practice.

It may look like a simple proposition, this other point about the grinding of veneer knives so that they will be straight from end to end. To the casual observer it looks like all a man needs to do is to clamp it on firmly and it doesn't matter whether the knife rest travels back and forward in a straight line, the knife edge will be true. When you get down to the work, however, and especially when you tackle a 100-in. knife and undertake to grind it absolutely true on the edge from end to end, it is not nearly so easy as it looks. If there are any lumps on the knife-holder from some foreign substance, or on the knife, it may cause trouble and interfere with the work. It looks like an easy matter to have the knife-holder perfectly clean and to clean off the knife and bolt it firmly. Yet try it a few times, try bolting your knife on the knife-holder of the grinder, grinding it off and then changing and bolting it to the knife carriage of the machine, and see how you come out. You will soon realize that it is a pretty difficult undertaking and calls for fine manipulation to grind a long veneer knife so that it will be perfectly straight and true from end to end on the edge. Also, you will eventually find that there are other things, other factors, that enter and influence the work aside from that of securing the knife firmly to the holder and having it free from lumps. One of these other things is the heat that may generate in the course of grinding, and the effect it may have on the knife.

When heat generates in knife-grinding the result, if this grinding is kept up steadily, is generally to grind the knife concave—that is, concave from end to end in relation to a straight line. This is not an entirely new idea, but it is one that probably some have overlooked. It is based on the fact that heat generated on the face where the grinding is done, causes expansion of the metal so that the bevel edge of the knife becomes longer than the back edge, and as a result it bows up while grinding, so that more is ground off in the centre than should be, and when it has cooled off and settles into its natural position, the edge, instead of being straight, is bowed or concave in relation to a straight line. Quite frequently you may find, on bolting a knife to your grinder and starting to work on it, that the wheel will cut at the ends and not touch the centre. Pretty soon, however, as the knife warms up from the effect of grinding, it begins to take hold of the centre and then it grinds more heavily in the centre than at the ends. Then if the grinding is kept up steadily, unless the knife is being ground very lightly and plenty of water is kept flowing to keep down the temperature of the knife, a hollow edge may result.

This point is especially recommended for study by those who persist in grinding knives dry. It is one of the strongest arguments in favor of wet grinding and the use of plenty of water. Also, it is an argument in favor of grinding slowly, because even if plenty of water is used, grinding too fast supplies sufficient warmth to cause expansion while grinding that may result in the edge of the knife not being straight after it is taken off the machine and cools down. Even when there is water running on the knife there is some danger of this fault developing, because the water cools the back of the knife as well as the edge, and because of the grinding, especially if it is pushed, there is likely to be some expansion of the edge, and some bowing up because of it. So be very careful and grind slowly. It not only helps to make the knives straight, but it is better for their temper.

After the knife is placed on the machine and the grinding process begins, the knife makes very few passages backward and forward until the edge becomes heated (though ever so little) while the rest of the knife is cool. This heating of the edge expands that part of the knife, and the result is the knife becomes convex on the edge. Anyone who has handled a grinding machine must have observed that on commencing to grind a knife, the ends only will touch the stone, also that while the stone does not touch the centre of the knife it will begin to cut that part of the knife very quickly. This is due to the heating of the knife at either end, which causes it to expand and gradually ring the centre out until the stone cuts that part of the knife. After the knife has reached its maximum temperature through the action of the stone, and will expand no further, the grinding is kept up until the knife is ground straight or until the stone touches it equally the entire length. The knife is then taken off and laid aside. When it begins to cool and the heat has become equally distributed over the entire knife and it is of an even temperature throughout, it will be found concaved on the edge.

IMPROVEMENTS IN THE DRESSING OF LUMBER.

Harder knives, better grinding and more accurate setting have all had a share in improving the product of the planer and increasing the output. But their effect is slight compared with that of truing the knives while in motion so that each does its full share of the work. Carefully conducted experiments have proved that no matter how accurately the edges may be jointed while at rest the different knives will always show unequal work when run up to speed. Undoubtedly this is due to distortion under the influence of centrifugal force, and to some extent to the lack of even structure of the material. It can only be overcome by truing the knives while running so that allowance is made for distortion.

Experience shows that when the knives are trued in this way the rate of feed may be considerably increased, and that the finish is finer and more even. Logically, it makes possible the maintenance of the same or better grade of finish at from 50 to 100 per cent. higher feed.

THE SCRAMBLE FOR OAK.

The feature of the hardwood situation is the steadily growing scarcity of oak, plain and quartered, and in both red and white. Some grades are scarcer than others and in stronger demand in some sections, while a different alignment of demand is apparent in other quarters. But in all sections there is a scarcity of oak, with the certainty that the scarcity will be greater before it is less.

The building season for a large part of the country is nearing a close, but the bulk of oak lumber now produced does not go into building. It goes into the factory trade, and this trade is slowly but surely gaining volume and has been for several months. The improvement will continue and steadily accelerate.

The greater part of oak lumber is now cut in the South, where it is certain that for the next six months production of hardwood lumber will be light. To a greater extent than any other Southern hardwood oak is cut by mills located on the railroad. This is due to the fact that oak timber is more widely distributed than any other Southern wood and is not easily logged by water. Nearly all the big river mills cut other woods more than they cut oak, while the same in degree is true of the big plants at such points as Memphis and Nashville, though less so, no doubt, at Memphis than at Nashville.

It is these big city mills and the river mills that can be counted on for continuous operation throughout the winter and early spring months, whereas the small mills up at the head of the hollow cannot run during the "spells" of bad weather because they cannot get logs, and even the stock they can cut during the next six months will be got out to the railroads only under great difficulty and at high cost.

We haven't time to refer to the statistics of last year for accurate figures, and do not need them to hazard the opinion that fully seventy-five per cent. of the oak lumber produced in the South is cut by the small mills that during the winter months are up against all the difficulties of handling the heaviest wood known in the trade, with light equipment, over miserable roads, and operating with a class of labor singularly hard to keep at work in wet, cold weather, and which have to finally team their output to from four to sixteen miles to get it to a railroad.—Southern Lumberman.

ORIGIN OF THE VENEERED DOOR.

Can anyone tell us who invented the veneered door, and when? asks "Veneers". There is no question but the veneered door is to be the most prominent factor in the door business in the future, and some day the door-making fraternity will get historical in its mood and begin to wonder where, when and how it all started. In looking back for the history of the door itself we find that the batten door, a door made up of boards or planks cleated together, was a feature in the earliest architecture, and followed almost immediately after the use of furs, skins and blankets for covering the mouths of tents and the openings of caves. The early batten door was a flat type of door, and later, with the development of the artistic features of architecture, somebody originated the panel door, which for many years has been the dominant character.

Now we have, in addition to the panel door made of solid framing and paneled in with thinner stock, the veneered door, made in the same style and of both solid and veneer panels. Then we have as a growing factor the flat-surface veneered door, inlaid and decorated in various ways to get the artistic features without the paneling. Just how prominent this flat door will come to be in the future remains to be seen, but what we are after right now more particularly is to get a line on where and when veneering began to be a feature in door making.

Evidently its first use was simply in a decorative way on a door framed up in the regular manner, and probably it just made its appearance first here and there where certain coverings of wood were wanted. But some time, and not so long ago but that the present generation should be able to place the time and date, somebody started to make the built-up veneered door, out of which developed gradually a heavy volume of business and several special types.

GETTING THE MOST OUT OF WOODWORKING MACHINERY.

The relative output of various types of metal working machines is to-day being determined with great care in many shops; the relations of feed and cutting speed, of shape and material of cutting tools for maximum output are matters of record. In the power plant the performance of engines and boilers is known and the steam-making values of different coals are established in terms of their cost of a horse-power.

But what have we in the woodworking industry to compare with this detail knowledge? In how many mills is there any evidence in the case except the personal opinion of some individual? When we buy the best machine that can be bought, do we treat it with any more intelligence than its cheap and inefficient brother? In a word, do we give it a chance to do its best?

Such queries may well be pondered by the mill manager and superintendent, for in all truth a host of the highest grade machines are to-day operating below their maximum capacity in quantity and quality, simply because no one has realized how much more they can do, realizing this, has not had the mechanical knowledge or the personal interest to make them do it.

LATTICE AND DENTALS.

The following describes a good device for gaining block lattice and for making dentals. In Fig. 1 A is the gaining head, B B the saw table, D D the guide or fence, and C C a piece of maple, ash or other hardwood about 1-in. thicker than the guide D D and 2¼-in wide, with one corner rabbeted out 1-in. wide and as deep as the guide is high, as shown. F is a steel or iron pin, 3/16-in. square, 2½-in. long, put through the edge of C C, near the middle, and 3/16-in. from the lower side; it must be put in square with C C, so as to have a square side next the gain E, to make a good stop. A round pin can be used, but is not nearly as good as the square one; the square one presents the best surface for a stop.

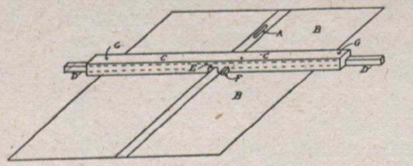


Fig. 1.

After setting gaining head, put device on the guide as shown, placing it as nearly as you can so the face of the pin is as far from the cutting line of gaining head as you want the gains apart, and clamp it to the guide, placing the clamps so they will grip the top of the device and the bottom of the guide, a clamp about at each G, and make the gain E through the device. Put the end of the piece to be gained against the pin and gain it. If the gain is not exactly as far from the end as you want the gains apart, move the device and cut the gain through it again. When the device is properly adjusted, place the gain already made in strip over the pin,and press the end of gain up against the pin carefully, thus using the last gain made against the pin, as a stop for the next gain, being sure to get the end of each gain against the pin, as it is necessary to have the gains all alike and exactly the same distance apart, to get block lattice together.

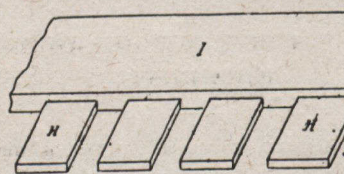


Fig 2

If you use boards in making block lattice, the fastest way is to rip the boards just wide enough to make what strips they will, thus gauging them, then gain boards and rip them and put strips through the molder on edge, dressing both edges, using the top and lower heads.

The best way to make dentals is to rip them out of stock thick enough to make a number of them, say 1¾-in. thick, gaining them to suit, using the device described above. If the gaining head has made the edge rough, run it over the jointer and take off a light cut, and then resaw and sand them. If the gains are not smooth enough, smooth them before resawing the dentals. If the gaining head is a good one and sharp, they will not need smoothing by hand.

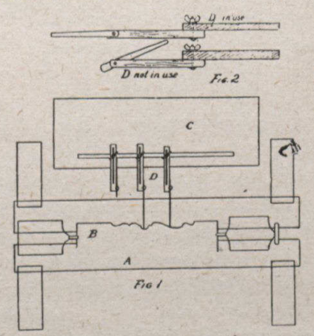
To make the dentals shown in Fig. 2, after the gains are made rabbet the gained part H on each side of the stock, resaw a dental strip off each other, and again rabbet and resaw, then run through the sander to smooth the part I. They will not always stand rabbeting after they are resawed, without breaking some of the dentals off, but a light cut can be taken on the joiner, to smooth the back.

A man sometimes spends half a day cutting blocks and spacing and nailing them on the transom bars for a store front, when an hour would have been more time than would have been necessary to have made the dentals like Fig. 2, and put them on; and the preference would have been for the gained dentals, as there would have been no joints at the top of the dentals.

AUTOMATIC CALIPERS FOR WOOD-TURNERS.

A correspondent of the "Woodworker" sends the following communication describing an automatic caliper for woodworkers:—

Place a board back of lathe bed with bottom edge on level with lathe centres. Slot the board about one inch from front edge, and in this slot fasten the calipers with thumbnuts (stove bolts may be used)). Calipers, may be made of wood about 10 x ¾ x ½-inch slotted for the bolt, and a piece of band saw blade about 8-inch long by ¾-inch wide. As



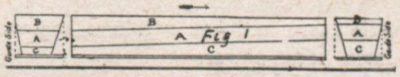
soon as the turning is round, let calipers rest upon it in all places that you wish to have exact size; when piece is cut to the right size, caliper will drop down; when piece is all turned, throw calipers back, as in Fig. 1. This may be done quicker by placing slack string for calipers to fall on; by a jerk of the string all can be thrown back at one time. I would not be without this simple device for many times its cost. I have 6-inch calipers, which cover all ordinary turnings. In sketch A is lathe, B the turning, C board supporting calipers, and D the calipers.

MAKING COLUMN STAVES.

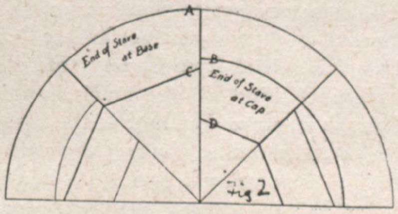
The following method for running staves through a moulder to make a built-up column not only bevels the edges and tapers them, but joints them to a perfect fit.

First we must assume that you have a heavy moulder of good make and in good condition (I prefer an outside machine); feed rolls properly adjusted, suitable pressure-bars, and side heads properly balanced and running right. Material must be dressed on two sides and sawed to the proper taper, as shown at sectional drawing, Fig. 2—A to C, base of stave; B to D, top of stave. Now turn to Fig. 1. Here at

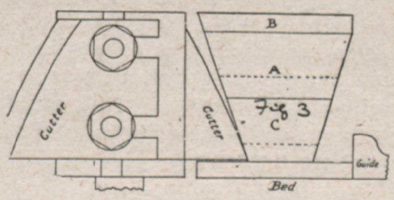
A we have a stave for a column 9 feet long, 12 inches diameter at base and 9 inches at cap, eight staves to the column. You will note that the stave is 3¾ inches at the cap, or small end, and 4⅞ inches at base, or large end, to finish 3½ and 4⅝, respectively.



Make two forms as in Fig. 1, B and C, correct taper to be found by referring to Fig. 2, A to B. To the lower form attach a piece of hardwood ⅜ inch thick in such manner that the inside edge, which should be perfectly straight, will project out as far as the top edge of stave. Lay stave between forms, wide form on top, wide end to feed in first, direction of feed as indicated by arrow. Stave should be secured to



forms by points in under side of form B and upper side of form C. When stave is in this position it will be seen that the stave and two forms are as one piece of parallel thickness, and can be fed between horizontal rolls. Now throw off your top and bottom head belts and set both heads with cutters ground to the required bevel and set as shown in Fig. 3.



Springs should be kept up tight. Three sets of forms should be used. By referring to Fig. 2 you will find a good method of getting the correct taper and bevel joints. This method does not refer in any way to the running of tongue and groove or lock-corner columns but a slip tongue may be used by simply grooving both edges of stave on jointer or rip saw.

USE AND ABUSE OF MACHINE KNIVES.

In a recent issue was published a paper by W. E. Bonesteel on "Knives—Their Use and Abuse." With reference to this paper a correspondent says:

This paper shows us very plainly that the writer knows what he is talking about.. I can voice my sentiments exactly with those written by that gentleman, and it brings to mind a little incident that happened a few months ago.

With nothing special to do for the day, I took a stroll through the city and chanced to pass a large manufacturing plant which had its own planing mill. Not seeing any No Admittance signs posted, I stepped inside the door and found myself to be in the room used for dressing and cutting out the stock to be used in another part of the plant. Almost the first thing I noticed was a man grinding a 30-in planer knife with an emery wheel.

Of all the botch jobs that ever could be done in that line, one was being done right then and there. He was using a dry emery-wheel—no water, understand—had blued his knife from one extreme end to the other, and still kept on pushing the knife against the face of the emery-wheel.

After I had come to my senses again—I must confess I was as near paralyzed as I ever care to be—I asked the man if he was not ruining his knife by drawing the temper. The look that he gave me for asking that question was enough to make we wish I had passed by and not taken notice of what he was doing. Finally he cooled down and concluded to answer. This is what he handed out to me: "No, I am not ruining the knife or drawing the temper out of it. Don't you know that when the temper is once put in a planer knife, you cannot draw it out again by grinding?"

What can a superintendent be thinking of to have such a feeble-minded idiot to do one of the most particular jobs in the mill, that of grinding the knives?

It certainly seems to me that if these owners of cabinet-making shops, planing mills, and all other works that use machine knives, only considered the care and study that the knife temperer has to exercise in order to produce knives that will stand up under all and every practical requirement it would teach the employment of that experience which fills the bill when it comes to the case of knife grinding. All the knives that are ruined and at once returned to the shop that put them out are branded as worthess, but let us stop right here a minute and see who gets all the blame for this.

The first and about the only one that hears of it is the temperer. He has an invitation sent in to him to come to the office. "Here is a set of knives which have been out and sent back again as no good. How about it? You must be getting careless."

Yes, any old thing will be put up against him except the real and only cause, which in ninety-nine cases out of every one hundred, is the abuse the knives have had in grinding after they left the shop. Any one can very plainly see that the whole matter is weighted down on the man who made the knife. He certainly must be an angel here on earth if he does not use some of those big words that do not look well in print.

With the exception of about 18 months, I have worked in a knife shop for 31 years and may have a pretty good idea as to the proper methods. Above all things I have learned this much: The man who does the tempering in any and every shop, not only shoulders his own troubles, but has to bear the faults of some others, namely those who ill-treat their machine knives by improper grinding.

The Falls Machine Company, Sheboygan Falls, Wis., call attention to the Falls No. 43 Undercut Face Planer for door stiles and other work. The way this machine cuts through a pile of rough lumber is remarkable. In fact it is reckoned that it does the work of four hand-planers—and does it well and easily.

—The Wm. Hamilton Mfg. Co. Ltd., Peterboro, has been reorganized under the name of William Hamilton Co., Ltd., and has already started operations, manufacturing all kinds of sawmill machinery. The President of the new company is Andrew McFarlane, who was superintendent of the old company. The company will also conduct a mill supply department.

Saw Mill Department

TENSIONING CIRCULAR LOG SAWS.

Some saws have too much tenison. Instead of 1-8-inch opening, as some have, you only want 1-25-inch. Get one of Starret's feelers," or thickness gauges, which run in thousands from 2 to 15, or any combination, and then you know just what you are doing. Put your straightedge across from eye to rim—the saws lying flat, supported on two edges—and then use enough of the blades of the "feeler" to make 40 thousandths. This should just slip under the straightedge in centre. Leave 8 inches of the rim flat. If you are just

beginning you will find it less work to level on an anvil with a leather pad. Use an 8-inch straightedge. Your saw should be like this:

There should be 4-100-inch under straightedge at A, Fig. 1. B is 8 inches, and should be flat. C is a 24-inch straightedge, and should show about 2-100 open across the eye. If the mandrel runs warm, a little less at C. If perfectly cool, a little more at C. All saw mandrels run more or less warm.. See that your carriage track has not too much lead.

BUYING AND PUTTING UP THE MILL.

By A. M. St. Cyr.

We are going to buy a sawmill, and as there is little between success and failure we must use caution. I shall not tell you of the sixteen mills I put up wrong but of the seventeenth that I happened to get right.

If we were a 50,000 per day outfit we would find it better to go to some of the many firms whose " ad " appears in the Canadian Woodworker and contract for the mill in place, but as we are only ten to twenty thousand a day we must put up our own mill and " buy on our judgment," of which we have none too much. We are going into the lumber manufacture to make money.

With a mill like ours success will come if at all by a succession and aggregation of little things. Little disappointments will take care of themselves, and now we will turn our attention to the little details that prevent aggravations and insure success. Our mail has been flooded with catalogues of all kinds of machinery that enter into the construction of a mill. Each and every one has the best and his mill will do what no other can do.

To the limit of business intergrity they have drawn the " long bow " in telling the performance of their mills and engines. Right here we remember that of all the mills we have visited none were working perfectly, there was always something to be avoided. In their zeal the boiler and engine builders have given the capacity of their machines under the most favorable conditions; conditions that we can never realize. A safe plan is to add their least and greatest capacity and divide by three. This sounds like a heavy discount but it is all we can surely depend on. A boiler with a capacity from 30 to 50 horse-power can, with the green slabs we will use for fuel, be relied on for 27 effective horse-power. The cost is but little more and you will find it good economy to have a few extra horse-power.

Strange as it may seem you can get 40 horse-power easier out of a 60 horse-power boiler than from a 40 horse-power one. As to the respective merits of fire box or furnace boiler, each has decided advantages according to conditions. If your mill is to be really portable and moved often a fire box boiler will be a necessity. It is more compact and easily moved and set up, but more particular in its demands for fuel. It is also much more expensive to repair and to keep clean.

My most satisfactory power plant was a cylindrical boiler in which I insisted on grates one foot longer than the regular size. I had less complaint from firemen, more regular steam and greater piece of mind. The stack is a matter of importance. Thirty times the diameter is the theoretical height but forty is better, and while you are buying extra pipe will not cost much. While you are fitting up it will pay to have a blower attached. I am aware that a device to blow up the fire is a lazy fireman's expedient and a busy man's convenience. You will find it a great help in case of the many short " shut downs " to rouse the fire in a hurry; but do not let your fireman rely on it to take the place of careful firing. Your engine for ten to twenty " M " per day should be forty actual horse-power, and your boiler of a capacity ten horse-power more than the engine. This will make it easier to " hold steam "; the engine will run steadily without pulsations shaking the boiler.

An essential point in selecing an engine is to see that all working parts are easy to get at and that you do not have to buy a special outfit of wrenches. Nuts are liable to work loose and they always do so at an inconvenient time; you do not want to lose time tightening.

Next to a perfect flying machine the world wants a perfect engine governor, sure and instantaneous in its actions. On fast feed there is nothing more trying on a saw than a governor that does not instantly give full power when the saw strikes the log.

In the sharp competition of these latter days the aim of mill makers to make cheap goods has led many to sacrifice strength for lightness. Husk frame, mandrel and carriage cannot well be too heavy and are nearly always too light. A mandrel that vibrates in the centre under the heaviest strain is too light and will be a constant annoyance from heating. The same with too light a carriage and feeble track. Under every heavy strain they will be found wanting and spoil boards that you cannot afford to lose.

A man who works to his full capacity soon wears out, and a machine is but the imitation of a man. It must have a reserve of strength to do its best work.

If the maker of the mill assures you that a ten-inch driving belt is sufficient to buy a twelve, and insist on an efficient idler; and one near enough the mandrel pulley to give a contact on two thirds of its circumference, and above all things have one that can be readily raised off the belt and keep it off when not running.

The pro and con of " dope to make belts stick " has been argued for ten years with both sides claiming a victory. I can side with neither. I have seen that where " dope " was depended on the tool room was full of half worn but use-less scraps of belt. It is my judgment that belts of proper strength and size for their duty will do as they should do without dope of any kind, yet what I believe with my whole heart may after all be wrong.

There is no neutral ground with a saw; it is either profit or loss, and while it is not in the cut doing full duty it is on the lose side of the balance sheet. And that brings up the question of variable feeds.

If the power behind the saw holds it to three-inch feed on a twelve-inch cut there is no reason why it should not stand five on a six-inch. I have used every kind of variable feed that has been invented; I have seen the good points and the bad ones. A variable feed is like the woman's description of the good traits in a man: "When you find two sure good points, let it go at that." The two essential points in changeable feed are: Certainty of action and durability. I found one feed with few wearing parts that could in an instant be changed to anything from one to six inch.

While you are buying remember that you will likely be where transportation on little repairs will cost in money more than the repairs themselves, and while you are buying the mill is the best time you will ever have to get duplicates of such parts as are cheap and liable to break. I once lost a week waiting for a feed pinion for the rack shaft. I could have had one thrown in when I bought the mill but I did not think of it. In mills of small capacity with cable feed the sheaves carrying the cable are usually too light. If they break it will occur in a busy time. Get duplicates while you can.

ACCURACY IN THE SAWMILL.

(By E. H. Newton.)

Accuracy and thoroughness, when combined with the other qualifications which are requisite to a first-class mechanic, are two points which should count much in his favor; indeed, they do count much, unless they are carried to that point of exactness where brains and good judgment are excluded. I have in mind a case where a new mill was to be belted up, and the architect and designer, like many others, believed that this was one of the places where accuracy must be practised to a niceity, and this practice could not be perfect without the use of steel tape. Indeed, such a stickler was he that before he would trust to his steel tape being accurate enough for his work, he borrowed another from one of the millwrights, with which to compare his. He had his shafting all in position, but had not yet received the pulleys, which were ordered from a distance; and as he was ordering his belting from outside, too, and having most of it made endless, he wished to get the order away, and so, after carefully comparing his steel tape with the one which he had borrowed for that purpose, he proceeded to take the exact centres of his shafting, that he might figure the lengths of his belts.

At this particular work he considered himself an expert. Indeed, so accurate did he think he was that with such a combination as his brains and the steel tape, error was impossible. The order went to the belt manufacturers, not giving the distance between centres of shafting and the size of pulleys to be used in each case, but simply ordering each belt to be made to an exact length, which length he gave. In due time the pulleys arrived and were placed in their respective positions upon the shafting, and when the belts arrived they proceeded to treat them likewise. But, lo and behold! Either the steel tape or the pencil had blundered, for it was found that the belts were from 2 to 4 feet too short, according to the size of the pulleys on which they were to run.

I do not offer this as an argument against the use of the steel tape, nor any other instrument of accuracy, because in this case it is quite plain to the practical mind that the tape did not make the blunder, as the belts ordered to run on the larger pulleys were shorter in proportion to the requirements than were those on the smaller pulleys, therefore the error was plainly in the figuring of the pulleys. The belts all had to be placed before they would go on. And so I say, brethren, it takes more than the steel tape to insure accuracy.

I have seen two high-priced mechanics spend a whole day in lining up a small tightener, running on a 9-inch belt. I recently knew two such men to spend three weeks lining up fifteen such tighteners and bolting them down; they had lines running in every conceivable direction, and still, when the machinery was set in motion it was found that there was not a single one of these tighteners that did not have to be shifted before it would run properly. It is painful to see time spent with fine lines and fine-pointed pencils, where all that is needed is the mechanical eye. I believe in working to the line, and I also believe in having a line to work by, when necessary, but when a man stops and sharpens his pencil so that it will draw a very fine line, then takes his square and draws a line carefully across a board which he is working, then picks up his saw and proceeds to cut this board off, leaving the line on one side of the saw at the beginning and on the other at the ending of the cut, then, I say, something is wrong, and it is not necessarily the line, either. There has been either too much or not enough energy displayed, for if there was nothing particular about following the line, then why should so much pains be taken to draw such a fine line?

I have seen the above-mentioned tighteners taken down after they had been run for a year or two, and had proven to be belt-destroyers, or by two men who, though they have due regard for the line in its place, did not use it for this work. They took those fifteen tighteners down and built them over and set them up in a different position. They did not spend half the time their predecessors had done, and when the mill started up only two of the fifteen required any adjustment. I believe in a man using just enough precision in whatever work he has in hand to suit that particular case, but when one man has to hang lines in several directions and perhaps work a whole day to accomplish less satisfactory results than another can accomplish in an hour, then I say, in the case of the first man, there is more energy being wasted than his own.

When a manager, superintendent, or foreman gets such an elevated opinion of himself that he cannot take a suggestion from any one working under him, he has certainly reached a very lofty position, and should take heed lest he fall. I remember having read something in The Wood-Worker some time ago along this line with which I quite agree. Suggestions, if properly given, and received with due appreciation, are valuable even though they are never acted upon, because they are evidences that he who offers them has been studying in some degree his employer's interests, else he would not have these suggestions to offer, nor would he offer them if he did have them unless he is in some degree interested. Some employers and their foremen seem to think that if an employe offers a suggestion he is meddling with what does not concern him, and I have actually known good men to be discharged for no other reason than that they knew more than the man they were working under, and when they offered him a suggestion, instead of considering it as any sensible man should, he took offense, and through a sense of jealousy, lest his men might know more than he did, he would discharge them for what he considered their temerity.

My idea of this matter is that he who cannot take a suggestion from one of his men, and use it if it is practicable and in the best interests of the business, and show the man that he fully appreciates his help, is not the right man for the position which he may hold. Of course,we know that there are some men who, if you were to pay attention to all their suggestions, would soon assume the roll of dictator, but this is not the class which we are considering, and the fewer of this class an employer has about him the better. The practical man who has used his brain in his employer's interest, and who offers a suggestion because he believes it might be used to further that interest, is of a different type, and the more such men a business can have, the better for it. I have known foremen who were actually so much puffed up with self-esteem that they would not recognize a suggestion made by a man working under them, even though it might, if made use of, put hundreds of dollars in his employer's pockets. I have seen these same men, after this man was gone, resurrect his suggestion, which they had so recently belittled and bring it out as something which had originated with themselves. This may be considered by some as being one of the tricks of the trade, but it is a narrow-minded one.

This is a time of year when a little extra attention might be devoted to house-cleaning in the mill or factory, or perhaps around the yard, with the most gratifying results.. I care not how well regulated the plant may be, I have yet to see the first one where there is not some room for improvement, and just at this time of year, when everything is dry, is a good time to clean up those odd corners—and possibly we may prevent a spark doing it.

A writer has told us that narrow belts stretch more than wide ones, and as he does not tell us why this is, I should like very much to be enlightened in the matter. I must admit that I cannot see why this should be so if the narrow belts are run under as favorable conditions as the wider ones, and are not expected to transmit any more power in proportion to their width and thickness. Of course, small belts are usually run on much smaller diameter pulleys than wide belts are, but give the small belt the same size pulley and the same amount of load to carry in proportion to its weight as you give the large belts, and why should it stretch any more?

Where do all the good men go? is a question which I often ask myself. I know that the minister told us yesterday they go to heaven, and I think that if there are any who deserve to go there it is the good men of our fraternity; but then there are many who have not gone there, and yet where are they? Good, practical men who can be thoroughly relied upon are being sought by an up-to-date employer, and they are very often hard to find. And why is it? It cannot be said that it is because there are not plenty of opportunites for men to educate themselves in almost any line, for employers are not all like those dealt with in the first part of this letter, and yet, while the common labor field is crowded, there is penty of room in some of the adjoining fields, and they could be reached by comparatively slight effort.

BALANCE IN CIRCULAR SAWS.

A correspondent of the "Woodworker" writes drawing attention to the importance of absolute balance in the cutterhead of a planer. The theory of balance in regard to cutterheads has been worked out to pretty fine points. It has been demonstrated so thoroughly that lack of balance is responsible for most of the planer troubles, that about the first thing a man looks after when he is called in to doctor up a machine, is this matter of balance.

Now how many of the boys have thought to apply this same idea to the circular saw? Factory saws are likely to get more or less out of balance through uneven filing and gumming. Take an old mill say that has been used quite a while, and even though all the teeth may look alike, if you strike a line at the throats, then measure from point to point, you will generally find quite a difference in the distribution of teeth; also, frequently there is a difference in the distribution of metal around the base of the tooth. The same thing holds true about rip saws and cross-cuts in the factory where they are filed by hand.

Some expert filers may keep the teeth evenly spaced, the throats all the same shape and depth, and the metal properly distributed at the base, all the time. Saws so fitted, however, are the exception rather than the rule, and if put to a careful balance test, the average factory saw, after it has been used and filed until it is worn down considerably, will likely show to be heavier in spots, because of lack of uniformity in the teeth. This lack of uniformity also produces lack of true balance, and it is probably this that is accountable for lots of the shaking and trembling of rip saw and cross-cut mandrels.

We don't hear much about it, but everybody recognizes in a general way the benefits of having all the teeth in a saw absolutely alike and the same distance apart, but it is doubtful if, even among good sawyers, enough importance is attached to the effect this may have on the running balance of the saw. If just a few ounces will make a big difference in a pulley or in the cutterhead of a planer running at high speed, it goes without saying that just a little bit of extra metal around some part of the rim of a saw will make it inclined to jump when running rapidly.

Some day we will probably give more attention to this fact and put more emphasis on the necessity of keeping all the saw teeth just alike. When that time comes we will find it is fully as important to have automatic sharpeners for the small factory saws as to have them for the mill saw. By using an automatic filer, properly adjusted, one can insure keeping the saw in balance so far as having the teeth uniform and evenly spaced is concerned. Then, if this is followed up by the careful hanging of saws on their mandrels, it should contribute materially to smoother running in the factory rip saw. In fact, attention to this matter will probably do more toward curing the shaking and chattering ills of factory rip saws than anything else.

Isn't it about time to give more attention to this, and also turn more to the use of automatic sharpeners for the small saws in the factory? It has been therefore considered by too many that anybody could file and keep such saws in order.

SHARPENING WITH THE AUTOMATIC.

I had a talk with a band saw filer not long ago who never touches the points of his saw teeth with the file. He claims he makes the automatic saw grinder do it all, while he sits by and watches it. Now, what I want to know is, will the automatic produce a keen-cutting tooth like one can make with the file? I say it will not.. I do not claim that one should not use the automatic; in fact, a filer should grind his saws lightly every time the saws are changed, but what I do claim is that the grinder will not produce a really sharp tooth like the file. I say the filer should put the finishing touch to the teeth with the file, after grinding, for the grinder removes the fine cutting edge and leaves the teeth a little bit dull.

Saw teeth must be sharp. If not, they will not do good work. It only takes a few minutes to point the teeth with the file, after grinding, and the saw will cut much better and easier; besides, it saves power. Trouble is often caused by dull saws, and by not having properly-formed teeth. A saw with poorly-formed teeth is more likely to do bad work than a dull saw with proper teeth. The points of the teeth are the only part of a saw that should come in contact with the timber, therefore it is necessary that they be swaged out sufficiently to prevent the log rubbing the blade.

One should not try to run a saw too long. When a saw is cutting steadily, three hours is long enough to run it. Of course, no matter how dull the saw it, it is obliged to go through the log, owing to the heavy power there is behind it, but it is liable to come off the wheels with several cracks in it.

CIRCULAR SAWING DEALS AND BOARDS.

In sawing deals or boards on a saw bench a circular saw of as small a diameter as possible should be used, as the teeth thus present the best cutting angle to the wood, and the power used is reduced in proportion. For high-speed sawing especial care should be taken in packing the blade. In addition to hemp packing at the back of the saw—which, in addition to guiding, creates warmth and even expansion of the blade—expert sawyers often arrange adjustable packing boxes fitted with leather-covered screws to act on the front of the saw near the roots of the teeth, with additional guide screws to steady the back of the blade. These fittings are found particularly serviceable in running thin gauge saws.

GRINDING OF BAND MILL WHEELS.

Different people want the face of band mill wheels ground differently. I found one set of wheels ground so I could not understand the object of the man that did the work. The bottom wheel was ground from centre back so that the saw did not touch the back part of the wheel. The top wheel was ground from centre forward, so much off that saw did not touch front edge of wheel. He made such a complete failure that he had to vamoose. I undertook to fix things, and did fairly well; had to work late for several nights (without pay, too), but finally got the wheels in such shape that we could cut a few straight lines. I ground and scraped and changed until I had very nearly a full bearing on the saws.

I found another mill with a double crown in each wheel about 2 in. from edges of wheels, and hollow in centre. They would not let me turn them flat or any other way, so I pulled out. A short time since I met an old filer who told me he had his wheels both turned larger diameter front than back, flat face. This, he said, to compensate for the wear of front edge. It seemed to me a very impractical idea. I don't know how he got along, but he is still at the old stand. I had the same men turn a wheel off for me, and they left the front larger than the back diameter, after I had told them to grind the same diameter all the way, and to leave face of wheel as flat as they could get it. They did neither, but left the centre hollow, and larger in front and a small ridge at back. Then my saws cracked worse than ever, so I scraped that front down some.

Some writers, referring to flat and crowded wheels, say to have them flat, but just enough crown to hold saw up to front edge of wheels when in the cut. They must mean a kind of combination wheel. But they do not tell us where to put the crown. I know where I would want it, but there may be some one that would like to try crown but don't know just where to put it.

One man I know said something about the crossline and tilt, that the crossline was only used in emergencies. Suppose he had a machine built to use the crossline altogether. That is the kind I have. Let me ask this question: How much twist will be in a six-inch resaw between the leaving and receiving point of wheels that are 50-in. diameter, 25-ft. saw? I judge the space about 6 feet.

I like the tilt, but when I have to get a ladder and climb up to top of mill, with wrenches, coldchisel and hammer, to use the tilt—not I; but I use the crossline—that is, my sawyer does. Keep the wheels and saw clean and free of dust and gum, are my orders, but they are not always carried out. Some wrote of saws heating, that they would always run back on the wheels. It depends altogether what part of saw gets hot. It has been my experience that a band saw will run to the warm or hot edge every time, if there is any way for it to get there.

For brazing, tempering brazes, etc. I use no acid at all for it eats up everything near, whether it is "cut" or not. All I use is borax water—boiling water poured onto a little borax. I keep the laps clean, lay them together, put solder between, pour on a little clear borax water, clamp the irons on, and have as good a braze as anybody, and my brazes don't pull open, either, neither are my brazing clamps and irons eaten up with rust. Cut out the acid; it has no welding properties in it and is only used by some to clean.

GAUGE FOR STOPPING WASTE.

M. F. writes as follows:—In our shop, where a large amount of lumber is cross-cut daily, I made up my mind that there was a good-sized leak in the cross-cutting of lumber, and I set about to stop it. I found that there was a patent gauge made which enables the sawyer to cut the different lengths accurately, and at the same time not to impair his speed in sawing.

This gauge consists of a graduate rod reaching along the table in place of the fence, and on it a number of adjustable stops, which can be set up to take care of the different lengths in the cutting bill. The stops do away with chalk marks, give accuracy to the work, and allows the sawyer more time to watch and grade his lumber, thus increasing his capacity.

I laid the matter before the sawyer, who was a bit unfriendly to the device at first, but when I told him of my conviction that somewhere between five and ten dollars was being thrown away every day by the old method, which loss, I thought, could be done away with by the use of this device, he consented to have one put on the table. The sawyer having entered into the spirit of the proposition, we kept rather close tab on it, and found that the saving effected was considerably more than $1,000 a year. I do not believe the sawyer could be persuaded to part with the device now; in fact, he has told me that if it was taken away from him, he would buy one with his own money.

This loss is occurring every day, and I am glad to be able to point out that there is a remedy which can turn this loss into profit.

AN UNEXPECTED DANGER POINT.

An unusual and unlooked-for danger point in the sawmill was revealed by an accident which took place at a coast mill whereby one of the men nearly lost his life. While endeavoring to quickly raise the band saw guide, the man in question gave the operating lever a rather violent jerk, causing the belt which operates this to slip off its pulley, and dropping over the end of the shaft, it fell across the man standing below. Being still around the driving pulley at the bottom of the machine, it quickly wound up around that pulley, and having caught around the man's head and neck while falling, he was hurled to the floor, falling across the countershaft, sustaining bruises on his arms and chest, narrowly escaping having his head crushed by the force of his fall. This is an accident of the most unusual sort, but still the danger exists. It can, however, be very easily guarded against by bolting a strip of wood to the framework at the top of the band mill in such a way as to prevent the belt which operates the guide from slipping off over the end of the short shaft on which its pulley runs.—Western Canada Lumberman.

RULES FOR SAW TEETH.

A considerable difference of opinion exists as to the best forms of teeth for different woods. Speaking generally, for ripping with a circular saw pine and soft woods, generally large, acute, and well-pitched and set teeth are necessary, whilst for hardwood more perpendicular teeth of less pitch and set are required. If a line be drawn through the points of the teeth the angle formed by the face of the tooth with this line should be, for cutting soft woods, about 65 to 70 degrees, and for cutting hard woods about 80 to 85 degrees. The angle formed by the face and top of the tooth should be about 45 to 50 degrees for soft wood and 65 to 70 degrees for hard. It will thus be seen that the angle of the tooth found best for cutting soft wood is much more acute than for hard. For soft wood the teeth should have large, well-rounded gullets to allow of the ready escape of the sawdust.

ROPE DRIVING.

Rope driving is not much in favor in saw mills. It possesses advantages and disadvantages which may be roughly stated as follows:—Advantages: The first cost is less than belts or gear wheels, power can be transmitted considerable distances, and the driving and driven shafts need not be absolutely parallel. Rope driving is also particularly useful in conveying power to various points from the same centre. The disadvantage of rope driving is that it is impossible to splice the ropes so as to give them all an equal working tension, some being strained whilst others are not sufficiently tight.

SLABS AND SHOOKS.

There is a theory clinging around the slab pile of the saw mill in connection with the making of box and crate shooks from the slabs which though tried at times in the past and found wanting, still persists in clinging and probably there will be more of it by and by. There are times when the mill man cutting pine takes the slabs and other waste and makes laths. Generally, however, when the demand and price of laths gets good it is soon overdone and the practice gets to be hardly worth while. On the other hand the price of box shooks runs more nearly uniform like the prices on lumber stock, and it is a more staple trade when it is once worked up, so the box shook idea naturally appeals and returns from time to time, even though it has not been turning out just right. Occasionally some mill man will turn aside and make special products like shooks for barb wire spools, cores for paper rolls and various other specialties, but notwithstanding all these, which help out considerably, there is still too much good stuff going to waste among the saw mills that could be made into box shooks.

Very nice progress is being made in the way of working slabs into short length stock and not only the box factories, but the furniture factories and various other users of lumber in smaller dimensions are making use of these shorter lengths now, in standard widths and thicknesses. What is needed to round out better this idea of utilizing the slabs from the saw mill and other waste stock is a market for narrow width and thin stock. It looks like, too, the market might be developed by persistent effort. Take box shook stock, for example, where short lengths are all time and most of the stock is resawed before it is used. What the box manufacturer wants more than anything else is 3/8-inch and 5/8-inch in thickness and it looks like a lot of this stuff might just as well be cut from the slabs direct as to cut it into regular inch stock and then resaw it. There is a horizontal resaw that has been designed expressly for this purpose in order to enable mill men to cut their thick slab ends into thin stock varying in thickness to suit the timber and requirements. In oak there is a chance for panel stock and in the softer woods there is always a chance for box shook and crate strip stock. The main worry seems to be the need for a market. There is such a large variety of material used in box making that it is difficult for the individual mill man to figure out just where to seek a market for stuff of this kind and he probably makes a tab at it now and then—is disappointed—and gives it up for a while The logical channel through which to utilize these things would seem to be the city box factories—that is for shipping to a general market. If there is some chance for home trade in crate strips, that should be developed first, and then efforts made to interest the city box manufacturers. If they can't be interested the next best man to cultivate is some produce commission man for crate strip stock, or if one has the time and patience, look up the various individual users among canning factories and other manufacturing enterprises requiring packages for their products. It is a matter that is bound to be looked into more in the future and there is not much question but what lots more of the slab waste at the mills could be utilized to advantage if the idea were just followed up with patient and persistent effort.

LOOK FOR HOT BOXES.

Look for hot boxes the last thing before shutting down at night, for probably nine-tenths of the many fires that occur in wood-working establishments come from hot boxes. There should be some person about every wood-working plant whose special business it is to look after the boxes, and he should be held as strictly responsible for this work as is the night watchman, who has the card punched for every time that he winds his clock. After going his rounds the caretaker should report to the proper person the condition of every box and bearing about the concern. The operator of every planing or moulding machine should know for certain the condition of every box and bearing about his machine before he leaves it.

Furniture and Cabinet Making

CORE WOOD.

With the furniture manufacturer the matter of core wood is different entirely from the subject of cores with the rotary veneer manufacturer. The rotary's core is the heart or center piece left in the lathe. The furniture manufacturer's core, door-maker's core, and various other cores used in veneering, is the body of wood on which face veneer is glued.

A writer in the Hardwood Record recently, describing the manufacture of hardwood doors, stated that the core of the door "is almost invariably made of pine, but sometimes other woods are used, chestnut being especially applicable because of its lightness and non-warping properties." This statement was probably made from a study of some one special door manufacturing enterprise. In different parts of the country people use different woods, being governed partly by the quality of the wood as a core material, but partly and quite extensively by the cheapness of some available wood in their locality. Up in certain sections of Pennsylvania, for example, chestnut is the core wood. It is also a favorite almost everywhere with coffin manufacturers. Some places they use poplar; in some places where cull oak is cheap, they use oak as a core body for oak furniture; some places they use cypress, and in other localities other woods—woods that are more plentiful in the locality and are found suitable for the purpose.

For the sake of consistency it might well be argued that if one can do so, it is a good idea to use for the core a lower grade, say cull stock, in the same wood used for the face. Say, for example, one is making oak furniture. There is a chance to use up a lot of rough oak lumber that can be had cheap as compared to the high-grade stock, in narrow strips of various lengths, and have core, body and the face of the same wood. If this idea could be developed a little more it would encourage a closer clean-up of oak stumpage by making a market for practically every length and width of oak that can be gotten out. Of course, when the oak costs more than some other wood which will answer just as well, it is in the interests of economy for the furniture manufacturer to just simply put oak facing strips around the core of his work and fill in with other wood, then face and back with oak veneer.

The matter of pine as a core wood opens an interesting and very wide field for experiment. The pine referred to specically was likely white or some pine containing no pitch. That class of pine is too valuable to use for core wood in the south country, and probably farther south in the Mississippi valley than a line drawn east and west through St. Louis. South of this—probably at some places north of it, too—it would be cheaper and more convenient to use the southern yellow pine, which has several varieties, and yet all contain more or less pitch.

This southern or yellow pine as a core wood has one distinct advantage in that it will work up with a smaller percentage of waste than almost any other wood, excepting, of course, other pines in the north. As compared to gum and cottonwood, it will work up with considerably less waste. Box manufacturers have demonstrated this fact, and it has encouraged them in the use of more pine than they would otherwise have used, because they do not like its color nor the pitch. Among veneer users some claim they cannot use yellow pine very well; others object to it as a core body because of the pitch in it interfering more or less with the glue. It probably depends some on the amount of pitch in the wood. Some of it is "fat" and some of it rather sappy. The sappy pine should not be difficult to make hold glue, and as it retains its shape pretty well after having been dried, and is comparatively easy to kiln-dry, it should make a good core wood for use in those localities where it can be purchased in competition with other woods. There is, in addition, also, to the typical southern yellow pine, in some of the mountains of Kentucky and Tennessee, a pine which looks like a cross between white and yellow pine, the best of which is sometimes sold as white pine, and the rough stock of this should be an excellent core wood. It has enough of the nature of white pine to take glue well, and not enough of the pitch of yellow pine to seriously interfere.

Another southern wood that is being used of late years as a core wood, is cypress, and it is contended that it should go along with poplar in points of desirability, being even better where durability is a question. In some sections it has an advantage in price on such grades as might be used as fillers.

Chestnut, of course, is an excellent wood for fillers, though some complain of it. People who are used to working close-grained woods are likely to have trouble unless they are careful, until they learn about its absorbing qualities. Those who are accustomed to using it are enthusiastic about it, and only grumble of its scarcity and its tendency to go up in price because of this.

Gum, of course, enters the field as a core wood, very prominently so, and there is quite generally an available supply of common and sappy gum that can be had for this purpose anywhere within what is termed shipping distance of the gum-producing section, at a relatively cheaper price than almost any other wood. One who understands working with it and will carefully dry it and handle it right, usually gets good results, too, but people who are used to pine, when they do take up with gum, take it up in rather an unfriendly manner, and simply buy it under stress of circumstances that make it cheaper.

The problem of core wood in the eastern half of the United States is brought about largely by the extensive use of the same wood for other purposes. Box and crate manufacturers, for example, use enormous quantities of low-grade pine, poplar, cottonwood, hemlock, and almost everything they can get hold of that will make either a nice box or a rough crate. The requirements in the box factories have grown so large that they, together with other factory needs in low-grade stock, clean up much of the woods that would otherwise be available for cores at only a nominal price.

At the same time that we are concerned for the future supply of this class of stock in the eastern half of the United States, over on the west side the mill people are more concerned about where and how they can find a decent market for low-grade lumber. There is probably enough low-grade lumber of one kind and another going to waste along the west coast region and what is termed the inland empire, to make all the cores needed in the eastern half of the country, if we could just get at it without paying a freightage that costs more than the lumber itself. There is probably not so much lumber going to waste as would represent the volume of core wood used, but by counting lumber and timber that would make this low grade lumber, there probably is. Any way, the problem of low-grade lumber on the west coast is, what to do with it and how to find a market for it, while the problem on this side is how to get enough of it to go around and which kind can best be used for a given purpose. Maybe time will bring some changes in these things, also in the problem of core woods for veneer users.—Veneers.

CROSSWISE DRAWER FRONTS.

There is considerable interest in the question of veneering drawer fronts with mahogany, Circassian walnut, oak, etc., having the veneer run crosswise instead of lengthwise of the front. Some think this is a mistake, others think it all right, both sides of the question being argued apparently from the standpoint of appearance only. At first it does look a little odd to see veneered wood running in an unnatural direction on a drawer front, but in the course of time you get used to it, and if it is matched up in crotch or other attractive figure, of course it makes it somewhat different than when the figure runs plain, without any special matching. The matter of appearance is probably one of getting accustomed to it more than anything else. Naturally, people accustomed to see wood run the natural way regard this new idea in drawer fronts as being rather freakish, while those who are familiar with them forget this freakish business and only see the beauty they display. They accept it as being veneered face anyway, and that this fact is well known, and that the main object of doing the veneering is to place the veneer in the position which will display it to the best advantage, and not necessarily in a position that will suggest the natural run of the wood and in a measure imitate solid work. Probably it is a good idea to get away from the notion of making veneered work so as to in some measure imitate solid work, because veneered work shouldn't be an imitation of anything; it should be what it is, veneering, well done and nicely finished.

There is one point that seems to have been overlooked, and that is that veneering crosswise offers mechanical advantages where one is veneering directly on a solid core without cross-banding underneath the veneer. Where the veneer is laid with its grain running the same direction as its core, it is more likely to be buckled or split in the swelling and shrinkage of the core than if laid crosswise. So in making these drawers and placing the veneer crosswise of the body, one also crosses the grain at the core, and thus get a more substantial veneer job from a mechanical standpoint Of course, where the very highest of grade work is being done, the core is cross-banded before the face veneer is put on, and then the veneer is just as well off from a mechanical standpoint running lengthwise as crosswise. Anyway, it is well to develop discussions of this kind, because they will in turn probably bring others, and among the others that might come in this connection are some of the French ideas of placing veneer at various angles and forming a wide variety of designs and figures. Probably from straight crosswise and straight lengthwise we may develop the idea of some other position of placing veneer that will give even a more artistic effect, especially with veneer of certain figure. So let the discussions go on, and let us hear the opinions of others, not only on this, but on other ideas connected with veneering drawer fronts.

PROPER DRYING ARRANGEMENTS.

An important feature in the furniture industry, and one which is frequently overlooked, is adequate drying capacity of the right sort. It would be safe to venture the assertion that half the furniture and other wood-working establishments in the country are short of drying capacity. In building, they usually put in the area of dry-kiln room they need at that time, and as business increases, find they are unable to dry stock fast enough to keep them running as full-handed as they might were they able to dry more lumber.

It would appear that the first necessity is to make sure of a market for the goods, and the next in importance is to be sure of sufficient well-dried stock, to enable the work to be put through to advantage. Lack of dry material is the cause of a great deal of loss to manufacturers, and is the cause of a great deal of stock being used that is not properly dried, which practice has caused no end of damage. The kiln is not quite equal to the strain put upon it, consequently the stock-cutter or the foreman says: "Oh, I guess that is dry enough; take it out." And out it comes, when it should have stayed a couple of days longer. A great deal, also, depends upon the handling of the kilns; the foreman should have foresight enough to keep the proper proportion of the different kinds of lumber in the kiln, so there won't be several trucks of one kind dry and ready for use when he is all out of some other that is needed to complete a lot of goods. It is an excellent plan to have a small note-book, and when a truck of stock is put into the kiln, simply write the name and kind of lumber, and date after it. Then when a truck is taken out, cross off the book that truck of six, eight or ten days back, as the case may be. This method will show at a glance just what lumber is in the kiln, and how long each truck has been in; also the position of each truck in the kiln.

RULES FOR USING GLUE.

Glue, being an animal substance, it must be kept sweet; to do this it is necessary to keep it cool after it is once dissolved and not in use. In all cases keep the glue kettle clean and sweet by cleaning it often.

Good glue requires more water than poor, consequently you cannot dissolve six pounds of good glue in the same quantity of water you can six pounds of poor. The best glue will require from one-half or more than double the water that is required with poor glue, the quality of which can be discovered by breaking a piece. If good, it will break hard and tough, and when broken will be irregular on the broken edge; if poor, it will break comparatively easy, leaving a smooth, straight edge.

In dissolving glue it is best to weigh the glue and weigh or measure the water. If not done, there is a liability of getting more glue than the water can properly dissolve. It is a good plan, once the quantity of water that any sample of glue will take up has been ascertained, to put the glue and water together at least six hours before heat is applied, and if it is not soft enough then, let it remain longer in soak, for there is no danger of good glue remaining in pure water, even for forty-eight hours.

The advantage of frozen glue is that it can be made up at once, on account of its being so porous. Frozen glue of same grade is as strong as if dried. If glue is of first-rate quality, it can be used on most kinds of woodwork very thin, and make the joint as strong as the original. White glue is only made white by bleaching.—Practical Carpenter.

Boxes and Cooperage

PROFITS IN THE BOX BUSINESS.

Profit in boxmaking is approached from various viewpoints by different manufacturers, hence we get competing prices that are difficult to understand, says J. M Leaver, writing in "Packages." Just what is a fair profit for manufacturing boxes has never been fully determined, even by those who associate together to swap information. Much has been talked and written on the subject, and a good deal of this has been to the effect that 10 per cent. should be the reward of the manufacturer for his risk and trouble.

As I am writing this for the eye of the beginner desiring that he should have what information appears to be general, and then do some thinking for himself, I would say that up to the present I have been unable to discover a great deal of unanimity in the matter of adding 10 per cent. for profit.

In published figures the 10 per cent. profit is added to the lumber cost and to the work bill, which latter includes labor and expense. This is a nice, clean proposition, simple to understand, and doubtless safe, and means that a box business of $300,000 yearly, i.e. f.o.b. cars at factory, for material, labor and expense, would yield a return of $30,000 on this output.

But we run up against the manufacturer who figures this 10 per cent. on the amount of his investment, and we find his investment being, say, $100,000 that $10,000 profit is his pinnacle of fame.

And we have the manufacturer who is satisfied with 10 per cent. on the value of the lumber used, which in this case is, say, 12,000,000 feet at $16, or $192,000, a profit of $19,200.

Then we have another operator who thinks 10 per cent. on value of net manufacture is just the thing; hence he gets, allowing 20 per cent. waste, 9,600,000 feet net, or $15,360. This party thinks it not right to charge the customer a profit on the waste.

The question of charging profit on payroll and expenses is still open for discussion. It's a good deal like that bone of contention, 2 per cent. for cash and the consignee pay the freight, deducting the discount from the net amount of invoice after freight has been subtracted, except that in the latter case the terms of sale having been specific and also supported by long standing custom are law, while as to the method of arriving at basis for charging 10 per cent. profit, it's a "go-as-you-please" affair.

To my mind a manufacturer is the sole judge of what his emoluments shall be and no hard-and-fast rule will work; however, we may talk things over and agree that profits should be so much per cent. Talking over matters is always beneficial, and where all interested cannot or will not come to the "pow-wows" then writing is next in order.

Asserting, therefore, the right of the manufacturer to his personal point of view as to the amount he shall earn from his business, it is no hardship to intimate that by considering the relation of other manufacturers to the business generally he might often benefit himself by asking a little more for his boxes, get a little more money for his work and help all around.

Say we take a manufacturer of lumber, who has considerable box material in lumber and by-product from which he thinks by building a box factory to get an extra dollar per 1,000 feet for. Naturally, this is his point of view, for he is accustomed to measure results by the 1,000 feet. Yet in putting this point of view into quotations he is demoralizing the plans and figures of many who cannot live on $1 per 1,000 profit, having no larger issue to look forward to for the main profit.

Of course, my figures are used merely for sake of argument. As a matter of fact, I doubt if 1908 business so far will show $1 per 1,000 feet profit, so far as the year has gone. The point is that this sawmill man or any man having a larger issue to depend on, and making a side issue out of the box business, is not always as solicitous about the other man's theory as he might be for his own and the other man's good.

As a matter of fact, profit in boxmaking depends more upon what prices can be obtained than on anything else, and all the nice percentage profit theories vanish into thin air the moment quotations are shaded to get business.

The beginner should, I think, regard his box investment something like this: Say he has invested in good securities, paying five per cent., $100,000, and that he sells these and puts the amount into a box plant and lumber and materials to run same.

Would the beginner undertake the responsibility of manufacturing a product of which he had to learn all the details and assume a fearful risk for $5,000 per year, or the premium his good securities paid him. Add to this lots of hard work and the daily grind and worry, and compare it with the ease of cutting off coupons. I think not. Nay, I am sure he would not. Then what would he regard as a fair profit for all this risk and toil?

That is a question for him to answer, though I will assume he would value the investment good for a yearly return of $10,000 or $15,000, and maybe look for a salary of $5,000 besides; if he did not get his ideas at least this high, he would leave his securities in the safety deposit vault and make periodical visits to same accompanied by a pair of scissors.

To realize a profit commensurate with the risk, labor and responsibility incurred in operating a box plant, the beginner must go to school, as it were, and learn all those details which belong to the manufacturing problems; also the purchasing and selling end of the business, for lumber well bought is half sold, and when is added to this boxes well sold, if the manufacturing is on a scientific plan, profit is certain just in proportion as these things are correctly handled.

Profit that is realized in part because of timber possession and owes a large percentage of its amount to that reason, is usually much better for the operator so favorably situated than for him who buys lumber from the party who owns the timber and the sawmill. It is right and proper that this should be so because the investment is necessarily so much heavier. The beginner is seldom in a position of this kind, and from lack of proper experience frequently makes mistakes in buying which seriously affect profit.

That profit which shows on paper in the estimate is, with the beginner, very elusive, from the simple fact that he has so much to learn before the paper theories can become actual facts, and when the results show a money loss instead of a profit, he must understand that his theories of operating are at fault, seek the causes and apply the remedies.

Very few new operations, handled by beginners, show any profit the first year. Frequently a serious loss has to be faced, and in some cases it takes several after years to recover from the mistakes of the starting year. This experience will be admitted by many who are now on easy street after a good, hard struggle to gain a profitable footing. If discouragement is allowed to take a hand, then there may be no recovering after years.

But discouragement is a court of last resort. Let the beginner ascertain frequently during the first year just how things are going. He must not wait for the usual inventory period. He cannot afford to do it, because a state of blissful ignorance is folly of the worst kind. I know of a factory which has been in operation for more than a quarter of a century, and which has grown from moderate beginnings into a very large establishment, is, in fact, several large plants at date of writing, which for the first three years lost money, and only got on a profitable footing by systematically inventorying every two weeks, or every pay-day. This means much clerical work, but the beginner had better hire an extra man in the office than go to bed nightly for a year in the belief that he is making money, only to wake up at the end and find himself insolvent or travelling fast toward a meeting of his creditors.

Too much cannot be said in favor of knowing frequently how profit account is working. It is when the business transactions are fresh in the mind that investigation applies the spur and surely wins the race, instead of being caught napping at the finish.

The usual experience for the beginner is, therefore, that there is little or no profit, but frequently a loss for the first year's operations. Paper estimates of profit somehow do not hold out, and thus is disclosed the difference between theory and practice. The daily operations, if viewed from the standpoint of facts, will show either an under-valuation of lumber, not enough being added for yard and delivery to factory cost, a higher waste percentage than figured on paper, a greater cost for labor than estimated, or a higher rate of expense per 1,000 feet than was calculated for; or it may be that the paper theory errs on more than one or even all of these items; hence the vanishing profit or the actual loss, as the figures may develop the situation.

Bad or over-expensive organization may be responsible for the high costs and excessive waste, though more frequently it is shown that the main trouble is with the prices quoted, which may be too low for profit results, yet, as the beginner presumably has figured for profit, it is evident that the fault lies in the handling of the operations in some cases, and in others it may be that the estimated cost and waste has been figured on a basis entirely too low for actual realization.

Profit, therefore, is realizable only when the figures for waste, labor and expense cover fully these items; and when this is the case, the difference between cost and selling price must be a profit, as surely as the difference in the other direction would represent a loss.

Whatever the initial mistakes of the beginner, he will, if not handicapped by large and long-time contracts, by close application and study of details, eventually master the points necessary to put his business on a profit-making basis, though if hampered by large and long-time deals he may be quite a while working out his salvation, if his money holds out as long as his determination.

Every day we have beginners who are stayers and beginners who are quitters. The former become useful members of a large and increasing business, which is gradually but surely being considered one of high standing in the lumber industry; the quitters get out of the business for the good of the trade, and of them perhaps it may be said that nothing they did in connection with it became them so well as in stepping down and out.

Many have failed because there was no way of knowing just how to break into the business except by taking a plunge. Knowledge could be acquired only by actual experience, and too often capital gave out before education was accomplished. It is possible nowadays for the beginner to know a good deal about the trade before plunging, and so some shipwrecks are avoided.

GUM FOR BARRELS.

Not long ago, a cooperage man who was making other lines of work but had a call for glucose packages and contemplated making them out of gum, was discussing with an older man in point of experience in this work various points connected with it. Incidentally he mentioned that he contemplated buying the staves ready jointed and piling them on the yard in quantity enough to do for a year or two by piling up ahead of time.

That is the way he does with his oak staves and he figured the same logic would hold good with gum cooperage. But the man with more experience in this work advised against it. He said that his experience with gum had demonstrated that the sooner it can be dried and put into barrels after manufacturing the better and that to pile it on the yard like oak saves and leave it throughout the year is to invite sap stain and mildew.

The general method of handling gum cooperage by this manufacturer of experience who is operating at both ends, making his own staves in the woods and making his own barrels by machinery at a central point, is to cut his gum staves on a cylinder saw, dry them for 30, 60 or 90 days, depending somewhat on the weather and the needs of the work, straight list them, ship them to his cooperage plant where they are kiln-dried and made into barrels.

If it were not for the weight and the additional cost of the freight, he would try taking the gum staves direct from the saw, kiln drying them and working them into barrels, though this might not be as successful as letting them air dry a little first before putting them through the kiln.

One point made about the use of gum in tight cooperage, not only made but given emphasis, was the necessity of having the staves thoroughly dry. It seems that gum, if put up before it is thoroughly dry, can cut more different pranks in the way of warping, twisting, shrinking and things of that kind than any other wood, and one green stave in a barrel is enough to spoil it, while the barrel made of staves that are not thoroughly dry is a waste of material. This suggests an idea that is resorted to now in connection with veneer work and it may be found available to put it into practice in working gum for tight cooperage and that is the plan of drying and afterwards redrying. This may look like a whole lot of sugar for a cent, but veneer manufacturers are finding that no matter how thoroughly dry stock is made, if not well seasoned it will come and go with the weather and that the only way to get this thorough seasoning and minimize this tendency is to dry the stock and let it season a while in the open air, and, just before using, put it through the drying process again. This idea applied to gum staves, while it may seem like piling up expense a little at first, may be found to work out better than it looks. The logical plan would be to have the dry kilns at the stave factory, thoroughly dry the stock and then let it temper in the air covering the period of shipping and piling on the yards waiting for use in the cooper shop until just before coopering, then let it be put through the dry kiln again. This, of course, involves double handling, so far as the dry kiln work is concerned, but it saves freight from the stave factory because thoroughly dry stock is materially reduced in weight below what it would be if not thoroughly dry. Another advantage is that it enables the stave man to ship his stock promptly, and this is quite an item sometimes. Up at the cooper shop, while it involves the same handling as if the stock had never been dried it wouldn't take as much kiln capacity, nor time, to redry the stock that it would to kiln dry the stock from the yard where it had simply stood in the open air for a couple of months, so that there would be a saving in steam for heating the kiln, saving of time and an assurance of thorough dryness, tempered by seasoning in the open air between times. This should reduce materially the tendency to swell, warp and shrink after being put up. This is a point that many cooperage men have been tempted to shy at for a while, but it looks from the results being obtained in this manner by veneer men that it is worth while and will have to be considered as a factor in connection with the successful working of gum into tight barrels.

Another point about gum for tight barrels that needs some discussion and possibly some general understanding is the question of bilge. There is to-day some difference in the way gum barrels are put up. The difference is in the size of the head for the same capacity barrel, some having higher bilges than others. It is found that gum doesn't work so well on a high bilge as oak, because there is a greater danger from breaking. It is not as elastic a wood as oak and the lower the bilge the better, so far as saving of breakage and ease of operation in the shop is concerned.

Of course, the barrel must have bilge enough to give it strength, but the making of what is termed a high bilge on a gum barrel seems to be a mistake, and, if the subject were discussed, it would probably be the sentiment of the trade informed on the subject, that a gum barrel should be made with a comparatively low bilge with the head larger than some use it so as to equalize its capacity.

In the matter of finish there seems to be some mistaken ideas and wrong impressions about gum barrels. It is not so long ago that there came a report from the old country that gum barrels were objected to because of their appearance. They didn't look well alongside an oak barrel. This impression was probably due to the fact that some gum barrels are what is termed rough finished, for it is well known that gum can be smoothed off in a lathe, polished up and given a finish like mahogany. It cannot be given the oak finish and grain, of course, but it can be given a finish and will take polish with almost any wood that can be found, and when made up of red gum staves, carefully polished and shellaced, makes an excellent package in appearance. Also, if they are made of sap wood and have nothing particularly attractive about them in color, they can be readily stained and finished, and made to pass well alongside anything that can be made.

In the making of gum barrels that involve the use of a bung hole it is an almost invariable practice to put in one stave of oak for holding the bung. The same practice obtains where barrels are made of poplar, or of cottonwood, which necessitates working in with the gum or poplar staves a certain percentage of either red or white oak, enough to have one good stave of average width for the bung stave. There are probably several reasons for this, among them being the greater strength of oak which is necessary when a stave is weakened by having a bung hole cut in it, so that if it were gum it would break now and then, making it advisable to use a stronger wood to avoid this fault. Possibly it could be safe-guarded by other means, by using heavier staves for the bung stave or one of greater width out of gum and maybe in time the oak bung stave will disappear from the gum barrel, but at the present time it seems to be an essential part thereof, and the manufacturer of gum barrels must see that he is provided with a sufficient number of oak staves to provide one oak stave for each gum or poplar barrel.

REQUIREMENTS TO MAKE THE BEST BARREL FOR THE PURPOSE DESIRED.

(By R. Mittelbuscher.)

This is a very elastic subject because there is such a great variety of slack barrels manufactured which admits of an unlimited amount of argument. I will, however, make my remarks brief and confine myself to the barrel which is the most important factor in the cooperage industry, viz. the flour barrel. If I have been rightly informed, the large majority of the small shops in the country have no dry kilns and make flour barrels from air-dried stock. In our section of the country, i. e., in Iowa, flour barrels have been manufactured from air-dried stock for a great many years.

During the past three or four years complaints have been multiplying on account of barrels, which the coopers furnished the mills, opening at the joint after the barrel had been exposed to the hot atmosphere in the mill or in the shop for any length of time. As a general thing the miller trims the barrel before he fills it, but in a great many instances, where the staves were not very dry, it is impossible to close up the joint tightly by driving and trimming the barrel. The local shop in our town made special efforts in the past to secure the best air-dried stock obtainable, but whenever a quantity of barrels were made and put in storage, they invariably opened at the joint when taken out of the warehouse. The millers finally gave the coopers the ultimatum that unless they would put in a dry kiln and kiln-dry their staves they would discontinue using barrels and put their flour into sacks.

The final outcome of the matter was that the coopers put in a dry kiln and there has been no complaint of any kind since barrels made from kiln-dried staves have been furnished. We made numerous kinds of tests before we installed the kiln and exposed barrels made from kiln-dried staves to the hot sun for an indefinite length of time and are pleased to state that they stood the test. It is my firm conviction that any shop which has a good flour barrel trade will find it a good investment to put in a kiln providing the business is of sufficient volume to warrant the expense.

There has been a gradual evolution in the kind of stock which is considered essential to the making of a good barrel. It is not so very many years ago when the Minneapolis millers were of the opinion that nothing but a red oak stave would make a satisfactory flour barrel. When oak began to get scarce, the stave manufacturers gradually began to introduce elm, which was not looked upon very favorably by the consumer, but we all know that the elm flour barrel is the best package for the purpose to-day. Now that elm is growing scarce, it is my firm belief that in the course of a very few years gum will be the predominant class of timber put into flour barrels. It is hardly six years ago when gum was considered absolutely unfit for any kind of a stave, but I am pleased to say that we are to-day shipping into the Minneapolis market a large quantity of gum flour barrel staves and am especially pleased to state that these gum staves are not mixed with any other kind of staves when put into the barrel.

Our local shop is also using a considerable quantity of this class of staves and they are giving excellent satisfaction. The great and only difficulty as I see it is in the joint, but as stave manufacturers grow more familiar with this class of timber, this difficulty will soon be overcome. An important question which to my mind might be considered with profit by this association is the per cent of mouldy staves permissible in No. 2 stock. We all know that gum moulds very extensively in the south, and a great many otherwise No. 1 staves have to be thrown out from the No. 1 grade on account of mould. It has been customary to pack these staves with the regular No. 2 stock.

We recently received a car of No. 2 staves in our warehouse in Davenport, which contained at least 33 1-3 per cent. of mouldy No. 1 staves. Some of these staves were actually as black as ink. The barrels made out of No. 2 stock in our section of the country are used almost exclusively for coffee, cracker and other food products and it can readily be seen that a very badly stained stave is unfit for a package of this kind. I am not familiar with the requirements of the trade in the east, as, for instance, the glass trade, etc., as to whether they object to a badly stained stave or not. This is a very serious matter and I would be glad to hear a discussion on this subject before this meeting.*

CHANGES IN HOOP MAKING.

A. B. Struthers, a well-known cooper of Romeo, Mich., tells the following interesting reminiscences of the hoop business of the past and present.

" I have read, with much interest, the reminiscences of cooperage men who have been in the business for 20 to 40 years, and have noted the many changes which have taken place in those long experiences. Our business as it stands today is an evolution of eight years, in which time the manufacture of coiled elm hoops has been revolutionized. Young in business experience, and a novice in the hoop business, we like many others, then, made money the first year in spite of crude methods, because the conditions were then most favorable.

"With a lot of junk for machinery, we belted these rattle-traps to a wabbling line shaft, which together with an antiquated saw-mill were attached to a squeaky, little old centre-crank engine, and with steam furnished by one 60-h.p. boiler, we turned the throttle and started the rumble-te-bumble-te-thump-thump-swish. We fed in the elm logs at $8 per 1,000 ft. at the mill, and turned out at the other end, strips which were called hoops in these days, because the coopers had to have them, and they did not dare to mention quality, because they couldn't get quality hoops.

"We received high prices and turned over our small capital quickly and often. Our men would do more work for $1 per day than they will do to-day for twice that amount. The expense of keeping up machinery, then, was very light, for if a machine would balk, some one would prod it with a cold-chisel and strike it a few vicious blows with a large monkey-wrench and yell ged-dap and sczw-z-z-z she would go and turn out more strips, which we put up in coils and loaded them into cars. 'Bless me, this was pleasant, making elm (w) hoops.'

"We were busy those days and had no time to spend our profits, and altogether we made money, because we couldn't help it. But as I said before, the hoop business has een revolutionized, and that what we are to-day is the result of an evolution, through a series of changes, and I want to assure you that we, like Uncle Remus' Bre'r Rabbit, have been compelled to run hard and fast to keep up with the times.

"Little by little it dawned upon us, that we must make hoops for the cooper and not merely coils to be counted in a car; that the hoop is the 'tie that binds' in barrel and keg making; that in making cooperage stock we must have 'the perfect package' in view as our model for the parts.

"We could not start in the hoop business to-day, as we did years ago, with no experience and such small capital. It requires experienced experts to make coiled elm hoops which are acceptable to the trade in these latter days. It requires ten times the investment to operate a mill; and conservative management, with strong organization of forces, are necessary to success in making hoops.

"Our raw material costs three times as much as it cost eight years ago. The total cost of producing hoops is $3.50 per thousand more than it was a few years back. With all this advance in cost of the product, the selling prices do not rise to the high marks which they used to reach, but they rather run down heavily into every depression. Of course 'there is a reason' for this. We believe that there will never again be a time when hoops of poor quality can be sold at a profit. The trade is rightly demanding good stock, and only that manufacturer who knows how to turn out acceptable cooperage will succeed.

"As in the market for brains, there is always room at the top, so in cooperage, especially elm hoops; there is never an over-supply of high grade stock, but the weight that besets us all in the market is the volume of poorly made stock.

COULDN'T UNDERSTAND IT.

A box consumer was trying to figure out the exact relation between the price of lumber and the price of boxes. He knew, or thought, at least, that the price of lumber had come down a little since last fall and he couldn't understand why the price of boxes hadn't come down in proportion, because it naturally seemed to him, if lumber was cheaper, boxes ought to be cheaper. It was explained to him that most of the lumber used in boxes now was brought before the panic struck last fall and whether it had been or not, the current prices on boxes gave a fair chance for profit on lumber prices at their present value, whereas a year ago lumber was rather stiff and the margin of profit was decidedly small, which is likely to be the case again this summer and fall. The box consumer meditated over this for a while and then said there was something strange about the box business all the way around, that he couldn't understand it. He said that 20 years ago he bought boxes from one of the local factories which cost him fifty cents each and the same boxes would cost him the same price to-day, while the price of lumber for making the boxes was probably twice as high as it was in the earlier days. If a man is making a profit on his boxes now, he must have made a big margin on it 20 years ago, when lumber was cheap and plentiful. Of course, this

*Read before the National Slack Cooperage Manufacturers Association at Memphis, Tenn.

was easy to explain to him, for 20 years ago the majority of boxes were nailed by hand and the machinery for cutting and shaping the lumber was of a simple type, and there was much more hand work done than now. Consequently, the labor cost of making the box was greater, whereas now improved machinery has reduced the labor cost, but at the same time the price of lumber has gone up until it equalizes again by the use of labor saving machinery where the quantity of lumber and work is involved. It would be quite interesting to figure out just how large a box, how many feet of lumber to the box and how much work to produce a package of equal value to-day and 20 years ago. Lumber has gone up and the cost of help has gone up, but improved machinery has reduced the labor cost somewhat, so that where sufficient lumber enters and not too much, the saving in labor cost just equalizes the additional cost of lumber as compared to 20 years ago. Who can tell us just what size box it would take to make these two items equalize themselves just now?—"Packages."

WORLD'S LUMBER IMPORTS.

The lumber importations of the various countries amount to $285,600,000. This is according to estimates for the whole world, compiled by Dr. Ernest Friedrich, of the German Commercial High School, at Leipzig.

Notwithstanding that it finds its own supply dwindling the United States furnishes about 20 per cent. of the lumber imported by other countries. Austria-Hungary furnishes 19 per cent.; Russia, 16 per cent.; Canada, 13 per cent.; Sweden, 18 per cent.; Finland, 10 per cent., and Norway and Roumania a small quantity.

"The countries importing wood are those on the highest economical plane, which were themselves in earlier times densely wooded, but whose forests have been denuded to a greater or less extent to make room for agriculture and other industries," says Vice-Consul James L. A. Burrell, of Magdeburg, in a report to this Government. Only 4 per cent. of the territory of Great Britain is covered with forests, and during the year 1906 that country imported lumber to the value of $135,561,750. Germany has still 26 per cent. of its territory covered by forests, but imported in 1906 lumber valued at $661,285,000. Belgium and the Netherlands, that have but 8 per cent. forest lands, Denmark, that has 7 per cent.; France and Switzerland, with a small percentage, are all compelled to import lumber.

Besides these countries, those lands lying on the dry Western side of the sub-tropical zone lacking forests are forced to import wood. Egypt imports wood and coal to the value of about $16,660,000 annually; Algeria, Tunis, Spain, Portugal (with only 3 per cent. forest land), Italy, Greece (with 9 per cent.. forest land), the eastern part of Asia, British South Africa, the western part of Chili and Peru, the Argentine Republic and Australia, all poor in wood, are dependent upon import.

The Sutherland, Innes Co., Limited, Chatham, Ont., state that they cut out at their Wallaceburg (Ont.) mill, in 9 hours and 42 minutes, 75,700 24-inch staves, standard stock. They think this is the world's record for the amount of staves cut on one knife. These staves were all piled by two regular pilers during the day. The staves were cut by Joe and Wm. Reaume, cutting one hour each, alternately. The day's cut is excellent in every respect, even in thickness, and the staves will nearly gross themselves when jointed. Can anybody better this?

CANADIAN LUMBER IN NEW ZEALAND.

The large importations into New Zealand of timber from British Columbia and the United States have, we are told by the Canadian Trade Agent, created concern amongst the sawmillers of that dominion, and they are petitioning the government for an increase of the tariff in order to prevent the competition, which, they claim, is ruinous to them. The cost of building materials is already very high in New Zealand, and rents of houses have gone up very much more rapdly than the increase of wages. These factors have a restraining influence upon excessive taxation upon timber. It has also been pointed out to the government that a large proportion of the imports is due to the universally low prices of Oregon in the United States, the result of the financial crisis of last year. As the effects of the panic pass away, the prices of lumber will likely go up and become more effective in reducing the imports into New Zealand than any legislation the government would venture to undertake.

TESTING WOOD WITH THE MICROSCOPE.

A new line of work consisting of a microscopic examination of wood after it breaks, in a testing apparatus, has recently been installed by the office of wood utilization in the forest service.

The structure of wood is complex and very singular. Every species has several different kinds of cells, each of which has its own size and form. There is a wide variance in the number and arrangement of cells in different species. These differences in structure have their bearing not only on the strength but on the density, time-resisting qualities and texture of the wood. As is well known, the forest service has been carrying on extensive tests for some time, utilizing various kinds of wood in order to determine strength, stiffness, elasticity and other physical properties, and thus learn the best possible utilization of the various kinds.

The Hardwood Record has contended for years that there were possibilities in the microscopic examination of wood to attain a specific knowledge of it, not equalled by any other line of similar investigation. The application of a microscope to the wood will demonstrate almost at a glance the value or non-value of certain kinds for specific purposes. Perhaps laymen will not understand the value of these microscopic examinations so quickly as architects, builders, carriage-makers and other wood users, who through the scarcity of the more valuable woods find the knowledge invaluable.

The forest service is to be congratulated upon taking up this important line of investigation, for it will surely demonstrate the high value of certain woods that to-day bear a poor reputation as to general utility, throughout the country.

BELTS RUNNING OFF PULLEYS.

The chief reasons for belts running off pulleys are: (1) the shafts not being parallel or the pulleys out of line; (2) from the belt being overloaded (3) from running at too short centres; (4) the belt being crooked or twisted; (5) an improperly jointed or laced belt; (6) badly turned pulleys; (7) a spongy, badly tanned belt.

—The duties on school furniture going into Newfoundland have been abolished and there is an increased demand for the same.

LEAKS IN STAVE MILL.

The leaks in operating a large number of stave mills are many and are, also, very difficult to overcome. A volume could, possibly, be written upon this subject. It occurs to us that the greatest leaks are in the failure to work timber closely and properly at the stump; the leaving of stave bolts in the woods after they are made, and the waste in jointing staves at the finishing plant.

With regard to the first it is not unusual to work over a tract of timber a second time, at an additional expense per cord, to get timber that was left at the first cutting.

In regard to the second, it seems almost impossible for your bolt-haulers or teamsters to gather up, cleanly, the merchantable bolts at the stump.

In regard to the waste of jointing, any stave man or cooperage concern, who uses jointers, will say that the waste at the wheels is enormous, at present prices of staves. From tests we have made, by measuring staves before they were jointed, we have found the loss to run as high as eight per cent. This is something we do not believe will be overcome until we have an automatic jointer.

There are leaks too numerous to mention, but, I believe, the ones I have enumerated are the most expensive.

The possible leaks in a business of any kind are many. For instance, a business may be losing through stealings, through wasteful use of material, through lack of care for machinery, through careless supervision of employes, through unskilful manipulation of finances, and through ignorance of the real cost of products. Any of these defects in the carrying on of a business is sufficient to make it unprofitable, especially when it comes to periods of stringency and close competition. It has been said, in reference to farming, that the master's foot is necessary to success, meaning that the master should be found everywhere, almost, at all times so as to be able to know how things are going, and not merely to surmise. Organizations, in a large business where it is plainly impossible for the manager to be in every department and at every corner every day and perhaps several times a day, has taken the place of the master's foot, and the more a man knows of his own business, even to its smallest details, the better the prospects for success.

Waste can only be prevented by the knowledge of just where the losses and leaks are occurring. This means that it is necessary for a box manufacturer to have absolute knowledge of every department of his business from day to day. He must know, first, what is being done with his men; whether they are being handled economically, laid off when not absolutely needed, and spurred on when laggard. He must know not only whether his business is profitable from week to week, and month to month, but must be able to tell in what department or specialties his business is losing or gaining. Waste of material is so obvious, when it takes place, that it ought to be easily corrected. None of these losses can be obviated without a proper system by which the master can tell when he is gaining and at what rate, but more important still, so that he can ascertain without a doubt just when and where he is losing. Without this knowledge, it is impossible for any one to manage business with the certainty that he can make a proper profit in good times, or that he can avoid disastrous failure in bad times. It all sums up, therefore, in the one rule, "Know what you are doing, and, if your business is not run on a system which furnishes you such information almost daily, adopt some system that will."

The first and greatest leakage in our business, says another stave mill man, is the inability to handle sawed material to the mill on account of poor car service, and inability of the railroads to handle material delivered to them. Terrible losses are incurred by bolts checking on the railroad when they are piled up waiting for cars, while the mill is generally shut down a great deal of this time, and fixed expenses are running on just the same as if it were running. A large amount of stock has to be carried at more different points, in order to be able to draw from many more points. Stocks on the yard run down light and a great deal of material is lost by the sap rotting or the bugs eating it up.

The little things in the manufacturing end of the business, that are money losers, are too numerous to mention, and the only way to remedy them is by every manufacturer closely patroling his out beat.

The greatest leaks in the selling end consist in giving stock away for less than it is worth. The stave makers are generally philanthropists in that line anyway. As to the buying, that is where friendship ceases, and all parties look about alike to the buyer. In buying, I don't think there is much over credit extended to the trade in general. We have never lost any money in this line. We have always tried to do business with people where they are considered safe, and whose integrity was beyond question. I think, when special concessions are made, it is generally because some other fellow is forcing it; that is, I mean, that we have something that we don't need and want to sell it, and the other fellow has found it out. A great many other people are in the same fix, and the buyer knows it, and will not buy except at a concession. I think this is about the way such concessions are generally made. Of course, if you have some party who is a special friend of the buyer and has been a regular customer for a long time; has helped you out of difficulties by taking material off your hands that he happened to have a good market for at a fair price, we think it is only right to reciprocate, and it is some times the means of building up a strong and healthy business.

THE FACTORY FLOOR.

Up-to-date factory people are now giving more or less recognition to the idea that it is as much a matter of economy to have the best practical factory floor as it is to have up-to-date machinery. There are some old-time rough floors to be found yet, but the tendency in equipment is to make the floor both smooth and substantial; and frequently an old factory can be materially improved by the addition of a new floor. The advantages of a good, smooth floor are all so readily apparent that they scarcely need setting forth here in all their details, and what those who are seeking to improve their floors desire more than argument on this point is information on the matter of material used and how to construct floors to get the best service.

Where it is a basement—that is, where the floor rests practically on the ground—the best plan is to fill in and make a concrete floor. Some people make a concrete floor and then put a wooden floor on top of it. Others use the concrete face as it is. Choice in this matter depends on requirements. In places that are not on the ground, where it is essential to cover with wood of some kind, a factory will naturally be influenced more or less by the availability of specific woods for flooring. In the Mississippi valley country, especially the upper half of it, maple is regarded as the best, but beech is coming in a pretty close second, and probably will constitute a fair share of the flooring. On the west coast they probably use fir more than anything else. In the south yellow pine is used extensively. It is largely a matter of location with reference to the different species of wood. There is some difference, of course, in the wearing qualities. Maple would wear longer and splinter less than pine, yet where there is considerable moisture pine is considered the most durable and less subject to decay. Where pine is used extensively it is generally advisable to use edge-grain, because this kind will not splinter so much as the plain-sawed or flat-grain pine.

One point to keep in mind, no matter what kind of wood, is to use narrow stock so as to avoid prominent cracks from shrinkage. Maple and beech generally come in narrow widths, but pine is made in widths up to 6-in. stock. This 6-in. stock is not the best for flooring, however, by any means. Even 2 1-2-in. or 3-in is better than the 4-in. The narrower the stock the less shrinkage there is in each board in case it is not thoroughly dry when laid, consequently the smaller cracks. The ideal wooden floor is a floor laid of narrow stock, then finished off with a scraper, or gone over with a plane or something to smooth down any unevenness, after which it may well be given a coat of oil or paint, or something to help preserve the wood. It will be found, too, that the little extra attention in finishing will be well worth while for a good floor.—J. C., in Woodworker.

USE OF THE WRENCH.

The use of a wrench to turn the cylinders of a moulder or other machine work comes in for much criticism on the ground of injury to the slots, but sometimes a defence can be put up for the practice.

One writer takes the case of one machine under his care, a 10-inch four-sided molder, which has run steadily on special work for about seven years, making from ten to twenty changes every day, and on which a wrench has been used to turn the heads. The head is of soft steel and shows plainly the compression due to the wrench in the slots, but a careful examination and calculation indicate that even with this excessive use of the wrench, the head would last thirty years before the wear and compression would make the slots unfit for use. After the corners are first rounded somewhat, the wear is very slow. When the head is nearly full of knives and the machine is all belted up, it is a mean thing to grasp with the naked hands and exert all of one's strength upon, and if one of the other spindles or heads sticks fast, it is impossible to slide the pulley under a 6-inch belt tight enough for heavy work. One might have suggested the use of a flat stick of oak or hickory for a lever, which would turn the head as well as the wrench; but it would not pay to do even this, as I will show.

It will be a very conservative estimate to say that the use of the wrench as a lever will save half a minute on an average at every set-up. Taking the low estimate of ten changes a day, we lose five minutes; this will make half an hour every week, and about twenty-five hours a year. Figuring molder work at seventy-five cents per hour, we have lost $18 per year, and, cutting this estimate of damage in the middle, during fifteen years of service the loss would be the considerable sum of $270.

—The Royal City Mills planing mill at Vancouver was burned. Loss $100,000. The sawmill and dry kilns were saved.

—The passenger car shop of Rhodes, Curry and Co., Amherst, N. S., with a large stock of raw materials, was burned down on 24th November, with a loss of nearly $100,000, mostly covered by insurance.

STAINING ON FIGURED WOOD.

The woods which receive the greatest degree and variety of stains are frequently woods which have a natural figure and color that has a value itself, while the plainer woods which would seem to need heroic treatment with stains, at times, are practically neglected? One of the exceptions is bird's-eye maple. This wood is seldom stained; it is sometimes, but as a rule it is used in practically its natural color whether used as a solid wood or in veneer. On the other hand there are some woods that are plain as to figure which are at times heavily stained. Poplar furnishes an example of this. Poplar is sometimes stained as black walnut, really being made blacker than the average walnut, and though it shows but little of the walnut figure, it is sometimes sold in furniture as walnut. This probably applies more to the solid wood than to veneer, for when people turn to veneering the cost of the work is such that they generally put the real walnut veneer on if it is walnut that is desired.

It goes without saying that to get great varieties in stained both as to degree and to color that there is considerable abuse of nicely-figured wood. On the other hand there is no doubt but what the best of wood in oak, mahogany, or walnut can at times be improved by the use of a stained filler to deepen the tone and darken the shade. It is seldom that you hear of an effort to lighten the shade of a wood, for in all staining and coloring the stain is of a darker hue than the natural color of the wood. Why not, for the sake of furnishing some outlet for the desire to use stains extensively, take up more with the idea of staining woods that are not very pleasing in the natural color instead of expending so much of this staining energy on woods that are not so seriously in need of staining and that sometimes are not improved by the stains used on them?

There are native woods without very attractive coloring, which might, by treating with stains, be made to give excellent results. What is known as black gum is one of these. The name is something of a misnomer, as the wood is really a yellowish white, and frequently has an interlocking grain running in streaks and waves which would enable it to present a fairly good mahogany appearance if properly stained. This wood, it seems, might receive more attention at the hands of the stainers than it is getting.

—Business of almost every class is improving, but it is not yet what it was a year or so ago. For this reason it is a good time for woodworkers to look closely at their plants, to locate leaks of time and material and money-making, to put in little improvements which mean better quality or greater economy. Soon, in the hurry of a rush business, there will not be time for these little odd jobs; and so profits will be lost which might be made NOW.

—The cotton-workers' strike in Lancashire seriously affected Pembroke and other Ottawa Valley lumber towns. The strike tied up the cotton mills and the class of pine lumber known as "squares" or "rollers" used in the process of manufacturing cotton was not needed. All this lumber was supplied from Ontario, and many firms with offices in Ottawa were thus injured by the labor trouble in an entirely different field.

Machinery and Mill Equipment

LINE SHAFTING.

By H. E. Welch.

One of the most important points about a woodworking plant, and one that is too often neglected, is the proper installation and care of the shafting. This is more often the case in plants that have grown to considerable magnitude from a small beginning. The shafting that was ample to transmit all the power required in the earlier days, being extended by additions to its length, or having additional machines installed to be driven by the original length, until the result is a greatly overloaded line that is the cause of constant trouble.

In novelty plants, where there are long lines of light shafting driving numerous small machines, the buildings are frequently of cheap construction, with insufficient foundations, so that in course of time, through unequal settling, the bearings of the shafting become out of line to such an extent that the friction of the shafting alone consumes a very large percentage of the power. In one instance that came under the writer's observation the engine failed to give the necessary power to drive the plant at the desired speed, although at the time the plant was first built it had been quite ample for the purpose, and no machinery had been added to the original installation. Upon applying an indicator it was found that the engine was developing 165 horse-power with all the machines on and at work, while to drive the shafting alone with the machines idle required 57 horse-power. The shafting system was thoroughly overhauled and put in alignment and the bearings rebabbited, after which the indicator showed the friction load to be only 21 horse-power and the engine amply able to drive the plant up to its full capacity. This was an extreme case, and probably few instances could be found where the friction of the shafting consumed so large a proportion of the available power, but it shows the importance of keeping a plant in proper condition.

Where the bearings are insufficient in number and spaced too far apart the springing of the shaft under the strain of a tightly-drawn belt will cause an increase of friction that would surprise one who had not given the subject close attention. The best authorities agree that the deflection of shafting should not exceed 1-64-inch to each foot from bearings, which would give 1-16-inch as the maximum for a shaft with eight feet between bearings, a deflection that is exceeded in many plants which to the casual observer appears to be well planned. It may be stated as a safe rule that, where shafting is properly proportioned as to size for the work it is designed to perform, that the bearings should not be spaced more than eight feet apart between centres, and that in no case should there be over ten feet between centres. A wider spacing increases the deflection, which is the prime cause of the crystalization that is observed in nearly all broken shafting, and which is generally attributed to a poor grade of metal having been used by the manufacturer. With the smaller sizes of shafting the bearings should be located closer than the distance above mentioned.

It may be added that shafting that is used as a head shaft, or prime mover, should not be required to transmit more than two-thirds the power that a shaft of the same diameter running as a secondary will be ample for, while for simple transmission double the power will be well within its capacity; in other words, for a main shaft, three inches in diameter, running 200 revolutions per minute, 40 horse-power is a fair load, while the same shaft driven is ample for 60 horse-power, while if used for transmission only, and not subjected to the transverse pull of belting, 80 horse-power is well within its capacity.

There are several formulae for determining the proper size of shafting to transmit a given horse-power, some of them very complex. There are also tables in many of the mechanical handbooks giving sizes and speeds for different requirements. The following is as good a set of simple rules as have come under the writer's observation, and the results attained by their use as reliable as those obtained by the more complicated methods:—

To find the power of a shaft when its speed and diameter are given:—Rule: Multiply the cube of the diameter of the shaft by 600, and this product by the number of revolutions per minute. Divide this sum by 33,000 and the quotient will be the horse-power that the shaft will safely transmit.

To find the speed at which a shaft should run when its diameter and the horse-power to be transmitted are given:—

Rule: Multiply the given power by 33,000, divide the product by 600, and this quotient by the cube of the diameter of the shaft, which will give the speed required.

To find the requisite diameter of a shaft, the horse-power to be transmitted, and the revolutions of the shaft per minute being given:—

Rule: Multiply the given horse-power by 33,000, divide the product by the number of revolutions and this quotient by 600. The cube root of the last quotient will be the diameter of the shaft in inches. These rules are to be used to find the desired factor for transmission only. For prime movers and secondary shafting allowance must be made as explained earlier in this article.

THE NUMBER TEN OBER LATHE.

The accompanying illustration represents the improved Ober Automatic Lathe for turning Fork, Hoe, Rake, Mop, Broom and Ice Hook Handles, Pike Poles, Trolley Poles, Tent Poles, Curtain Poles, Dowels, Rods and other work of this class. The lathe is entirely automatic, the operator having only to pile the squares between the guides in front of the lathe and the machine feeds itself.

The front feed rolls open and close automatically, so that when one stick leaves the roll the next stick drops into place and is fed through the machine. The first knife simply rounds the work to the size of the die, and the finishing knife, being automatically moved towards or from the centre of the die by the cam pattern, makes the shape of the handle.

The work done by the finishing knife can be made larger or smaller by turning the screw on the arm which is raised and lowered by the cam pattern. The cam pattern is made from wood, and any pattern can be made and put on to the lathe in a very short time, and at a trifling expense.

The taper or knob on any article can be made longer or shorter without changing the cam pattern.

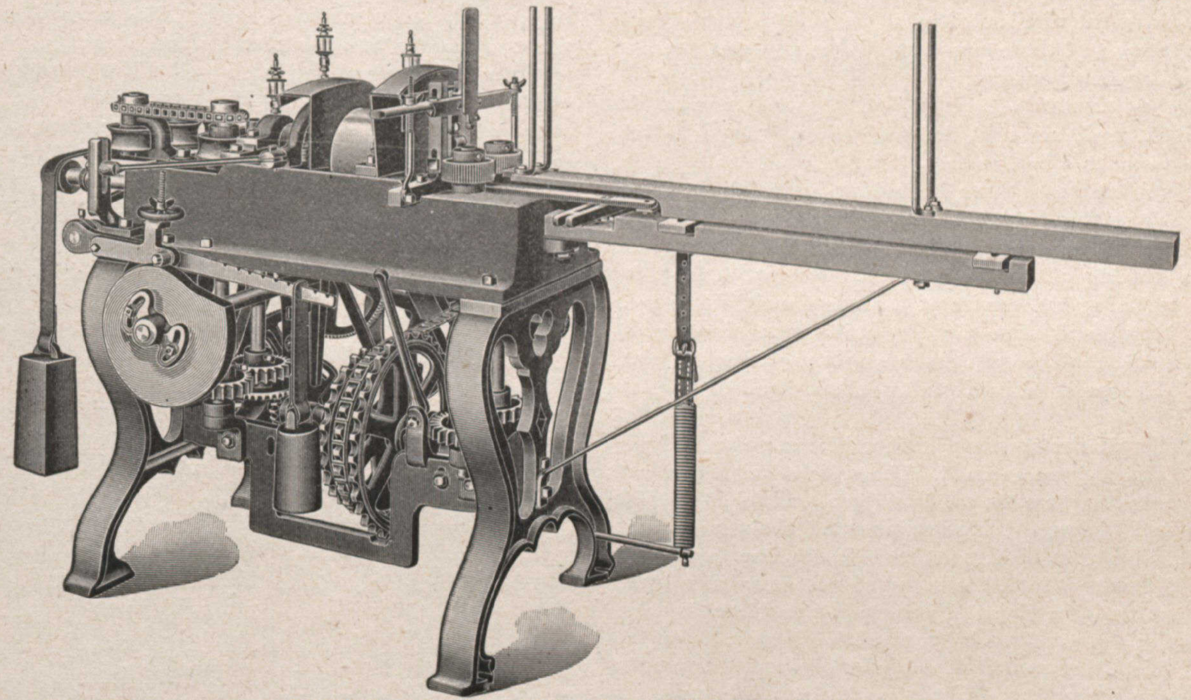
The lathe is provided with a lever and clutch for starting or stopping the feed.

It will turn from five to seven hundred broom handles per hour, and other work accordingly. The regular sized lathe will turn up to 1 11-16 in. diameter, and is furnished with four dies, any sizes desired, and with gearing to turn from 2 to 18 feet long.

Extra dies of any size up to 1 11-16 in., and extra gearing for turning longer work can be furnished at an additional cost.

Special lathes are made to turn 2 in., 2¼ and 2⅜ in. in diameter.

The lathe is very simple, strong and durable, and easily changed from one kind of work to another. It weighs about 1,000 pounds and requires about three horse-power. A countershaft is furnished with each. The tight and loose pulleys on the countershaft are 10 inches in diameter for 5 inch belt and should turn 1,050 revolutions per minute.



No 10 Ober Lathe for Handles, Poles, Dowels, Rods, Etc.

POINTS ABOUT BELTS.

The putting on of an endless leather belt looks these days like a simple operation, for the matter of how to put on belts has been the subject of some pretty warm discussion between mechanical men in times past, and even to-day, with apparently every idea connected with them well threshed out, one occasionally sees something done wrong, and now and then ends up with some one who is seeking information on the subject.

One of the points that the technical correspondents used to debate quite a lot on is, which side of a leather belt to run out next to the pulleys. Some contended that the belting on the pulleys should be run in its natural position, with the same side out that was out when it was a hide on the animal; but notwithstanding the consistency of this position and all the arguments brought forward, it seems to finally have been the general verdict, that the proper way to run a single leather belt is to put the hairy side or natural outside of the leather in next to the pulley. In the making of double belts, of course, the question of which side is pretty well taken care of, because both outsides are generally made the same.

There is not so much of the double and three-ply belting run now in the average factory as there was a few years ago, for when the factory became larger, electric transmission came to help split up the power unit. There are still, of course, lots of heavy belts used, but in many factories of considerable magnitude there are very few belts over eight inches, and a great majority of them are four and six-inch single belts. This is especially true where electric transmission breaks up the power unit. There are some institutions still carrying the heavy belts and heavy lines of shafting, and here, of course, the question of belt handling is a little bigger problem than in those factories where the belts are light.

But to get back to the belts and to the matter of which side to turn in and which side out, this has been pretty well settled so far as a single-ply belt is concerned, but another point which was discussed considerably at the same time was, which way to run the lap of a single leather belt; that is, which way to put the belt on for the lap to be inclined the proper direction. This, too, is a fruitful source of argument, because, while the driving pulley and the driven pulley both run the same direction, the pull or strain of the driving pulley and driven pulley are in opposite directions by virtue of the fact that one is driving the other. But there was another side which seemed to bring the deciding influence, and that was the effect of the air in opening up the joints of the belt while in motion. It was found that where the lap ran with its point against the wind on the outside, it was likely to curl up and turn back quicker than if it ran so that the tendency of the wind was to smooth the outside point down.

In the early days, when the endless belts were the exception instead of the rule, there used to be a wonderful lot of argument about lacing. It even went so far that some prominent belting concerns in the early days had contests among engineers and millwrights and people from all over the country to send pieces of belting laced with their favorite method of lacing, and then they were put to various tests—tests for strength and for wearing qualities, and everything else—and prizes awarded to those styles of lacing which were generally regarded as holding the best. In these tests, and the discussions brought out by them, various technical features of lacing were aired, among other things being that of strength of the lacing, as a whole, depending largely on the belt being so laced, that the lacing would slip through the holes enough to adjust the strain, otherwise a little unevenness in the lacing was likely to cause excessive strain on one or two strands, and either break the lacing there or pull out the holes, and because of this fact some of the favorite methods of lacing have proven to be rather weak. All the fancy lock stitches and things of that kind, while given credit for having qualities that would hold a belt together, will often have a strand of lacing worn through here and there, that unless very carefully drawn in were weak, in that the strain was not evenly distributed across the belt, and consequently the holes might pull out one at a time. Following these arguments, in later years came studs, hooks, and a great number of other fastening devices, and close on the heels of those also came the more general practice of making belts endless.

There is no question but what the endless belt is a better running belt, and, since it doesn't take a great deal of equipment to make a belt endless, it is preferable to do this, except on such belts as have to be cut frequently for one purpose and another, or belts which have light duties to perform, in which any ordinary lacing will hold quite a long time. The making of endless belts was thought, at first, to be a task requiring the service of a professional belt-maker, but it has been found since that any ordinary mechanic with a little time and patience can make a pretty good glue joint in a belt. The most difficult thing about it all is to trim the lap.

To trim a decent lap on a leather belt one should have good tools and a place to work. The tools required are not complicated by any means. I have seen millwrights make a pretty good lap with a block plane and a sharp pocket knife, and have seen others take a jack plane, and still others with something on the order of a shoemaker's knife whittle a pretty decent lap and belt without a plane or other special device. A good work bench and a place to keep the tools and things convenient is one of the greatest things to encourage the proper care of belts, and it is worth while for practically every institution to have some place of this kind. A good bench, with a few good tools, is all that is necessary so that a belt can be repaired in a workmanlike manner. If a man has to get down on the floor or on his knees and tack a belt down until he chamfers the ends to a lap, he can't be blamed much for showing favor to cutting a square cut and lacing his belt. One could fasten a belt to a piece of board so that the end of the belt comes about even with one end of the board and work off a chamfer very nicely, just as if he was chamfering a piece of cabinet wood or something. Some nail the belt to a board.

—The tempering of knives and cutters is both an interesting and important subject for machine wood-workers, but the proper grinding of knives is frequently more to the point; for, while we can look to the knifemakers to do most of the tempering, we can't expect them to do the grinding, too. After the knives are once in the hands of the machine wood-workers, it is up to them to know or learn the ways and means by which the best results can be obtained.

—A rough-and-ready test for ascertaining the soundness of timber is given by a correspondent of "Building World," who says: "The soundness of timber may be tested by placing the ear close to one end of the log while another person delivers a succession of smart blows with a hammer on the opposite end, when a continuance of the vibrations will indicate to an experienced ear the degree of soundness. If only a dull thud meets the ear the listener may be certain that unsoundness exists."

TESTS OF A BALL-BEARING EXHAUST FAN.

The general subject of moving air by fans is receiving an increasing amount of attention, both in its application to mechanical draft, to heating and ventilation, and to the conveying of light material from place to place. The efficiency of the fan as a centrifugal air pump is consequently becoming a matter of greater importance, and whatever means is used for decreasing the power lost in the fan must be of general interest. Perhaps one of the most obvious ways of reducing the losses is to lessen the friction of the bearings.

To determine how much may be expected under ordinary conditions along this line, Prof. C. H. Chase, of Tufts College, conducted some tests during the past college year in the engineering laboratory at Tufts College.

The ball-bearing fan used was taken from the regular stock of the Massachusetts Fan Company. It was provided with an interchangeable set of babbitted bearings. Each set of bearings had its individual shaft on which the wheel could be keyed.

On several occasions, before the tests with ball-bearings were made, there was a considerable amount of dust in the air from a paving-brick testing machine located nearby, and

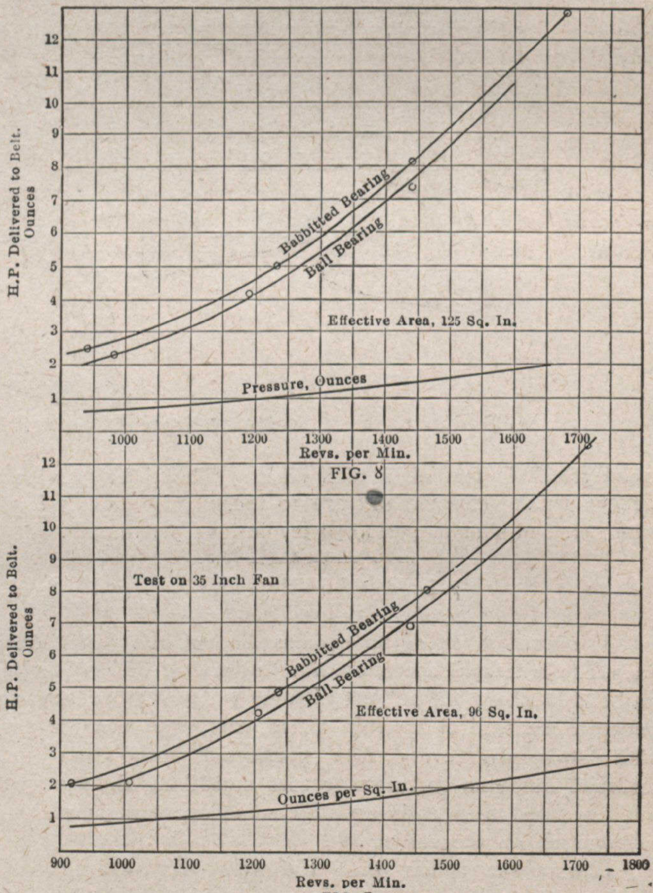


FIG. 7

the fan stood uncovered most of the time. Apparently, little dust entered the bearings. The plain babbitted bearings were cleaned, smoothed with a scraper, and kept well supplied with lubricating oil during the tests. The ball-bearings were run just as they came from the makers, packed in vaseline.

Under these conditions, which are noted in order to show that they were not especially favorable to the ball-bearings, the results of the tests gave an average saving in the power required to do equal amounts of work of 8.3 per cent. in favor of the fan with ball-bearings.

The fan is listed in the maker's catalogue as "Size 35." The diameter of the wheel from tip to tip of the fan blades is 24 inches and the width of blade at its tip is 8 inches. The inlet diameter in the casing is 14 inches and the outlet is 12½ x 13½ inches. The accompanying drawings will give additional information with reference to the manner of applying the ball-bearings, also with regard to the fan casing and the fan blades.

Power was furnished by a 10 horse-power shunt-wound motor, with several sizes of pulleys to give the required range in speed. The revolutions per minute were taken at the motor by a magneto and a voltmeter and checked by a speed counter, and at the fan by a speed counter after the adjustment for the reading was made, using a hand tachometer. The same electrical instruments were used in all the tests and the readings were corrected for instrument error. The power delivered to the belt was found by subtracting the motor losses from the input to the motor. Separate determinations of the losses corresponding to the conditions were made at the time of the tests. Temperatures were taken with wet and dry-bulb thermometers to determine the humidity of the air, and the barometer readings were noted. To determine the volume of air discharged, several conical galvanized iron nozzles were made having an angle of convergence of 6 degrees, for which 0.92 is taken as the coefficient of discharge. The dimensions were based on the "capacity area" of the fan, which for this type is equal to "outside diameter of blades in inches × width of blade tip in inches ÷ 3″, or $\frac{DW}{3}$.

The curves drawn in Figs. 7 and 8 are from reduced data, and show the difference in power taken at the different speeds with the two sets of bearings. To show the performance of the fan at effective areas other than at its "capacity

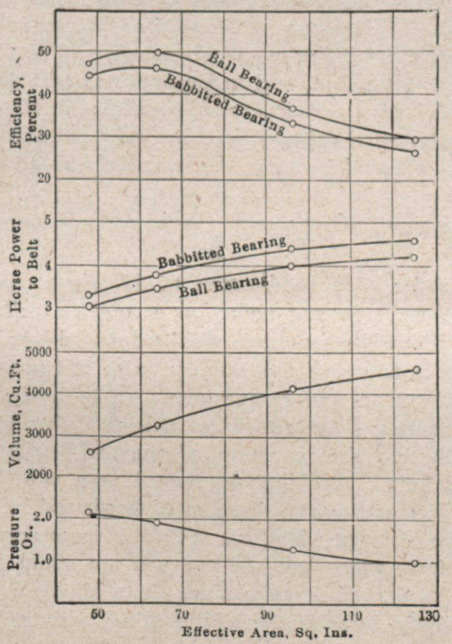


FIG. 13

area," Fig. 13 is given, which is derived from data at 1,200 revolutions per minute. Calculation for efficiency at 1,500 revolutions per minute shows a slight increase over that shown at 1,200 revolutions on Fig. 13.

The saving in power by the use of the ball-bearings may be stated as a percentage, and found thus: At 1,355 revolutions per minute, at which the pressure due to velocity head is 2.45 ounces per square inch, 5 horse-power is required by the fan using ball-bearings, and 5.35 horse-power with the babbitted bearings, or an increase over the power taken by the fan with ball-bearings of 0.35 ÷ 0.07, or 7 per cent. In this way the saving was calculated for each discharge area through a range from 3 to 9 horse-power, giving for the areas 48, 64, 96 and 125 square inches, an average saving of 7.2, 8.4, 8.6, and 8.8 per cent., respectively. For each nozzle the amount of gain by use of the ball-bearings varies from about 11 per cent. at 3 horse-power to 5.5 or 6 per cent. at 9 horse-power. The accuracy of these figures depends upon the closeness with which the curves represent the data, but the mean value of 8.3 per cent. saving probably represents fairly the existing conditions.

HARDWOOD INTERIOR DECORATIONS.

Interior decorations from the hardwood man's viewpoint is an exceedingly large subject, and can scarcely be more than outlined in the course of a short article. Wherever the white man has penetrated his methods of building homes have been exemplified, and though he has built for himself the cabin and the shack, he has also built the house with its three-part construction—sheathing, framework and lining, and with its rooms separated by walls. And the interior walls of his dwellings are always to some extent of wood. Wood has been used in the making up of dwellings from the earliest times; primitive man probably did not always live in caves, and he had before him the example of the birds to teach him how to construct a home of twigs. The tent, also one of the most primitive forms of dwellings, was upheld by branches of wood, and the mud hut, as we can see to-day in the pueblos of the Mojave desert, was strengthened by reeds and branches.

Wood construction developed where wood was plentiful; stone construction in places such as those of Egypt, where building timber was scarce and where the mountains of the interior contained suberb building stone, as we see in the baffling pyramids; brick construction originated in plains like those of Nineveh and Babylon, where clay was abundant, and the tent was the only practical dwelling in vast, sandy deserts where there were neither trees nor stones, but where the skin of the wild beast could be utilized in making satisfactory shelter.

For centuries the interior finishing of the white man's home has been an art. The Romans, as excellent evidence proves, neglected the exteriors of their palaces entirely and lavished all their attention upon the interiors. Painted plaster was the chief medium of expression, but marble veneer was common in the palaces and wood was somewhat used. The use of plaster, it may be remarked, dates back to prehistoric Egypt.

Among the white races, the European and his North American descendants, are the chief users of wood as an interior finishing material. The great forests of ancient times were in the northern part of Europe, and it was there that the baronial hall, which had much to do with modern ideas of wood utilization in interior construction, had its origin and development. Naturally oak was the wood used for this purpose; it got its tint from Nature alone, and the modern finishes, variously known as weathered oak, fumed oak, "baronial" oak, etc., are but attempts by modern artisans to reproduce that rich, sombre tone seen in the oak posts and girders of old English castles, glorious in their antiquity.

In the past few years the use of wood as a material for the interior decoration of homes has received a great impetus says Hardwood Record. There are a number of reasons for this. One is the renaissance of the Colonial style of home building, under the influence of William Morris and his followers. Another is the increasing objection to wall paper on sanitary grounds. A third is the unquestioned superiority of wood over painted and papered walls in point of durability. And then, of course, there is the aristocratic character of wood interiors, and finally the desire of change which nowadays is all-potent.

The woods employed for this purpose in the United States are many, and the soft and hard varieties both have their innings. Among the softwoods precedence must be given, of course, to pine, while oak has from time immemorial enjoyed a like distinction among the hardwoods. Poplar is very common, also red cedar, basswood, magnolia, spruce, Washington fir, redwood, cypress, and butternut.

The most commonly used hardwoods are birch, mahogany, cherry, maple, ash, black walnut, rosewood, chestnut, holly, and American sycamore. Cherry is a beautiful wood for interior decoration, but it has long been reckoned among the scarce varieties. "Baywood" is sometimes mentioned by lumbermen as a wood for interior finish, but this is generally what should be designated as Honduras mahogany.

After the wood comes the finish, and the candid observer must admit that stupendous things have been done in the past few years by the makers of stains and varnishes. A piece of pine can be made to take on a degree of beauty that is astonishing to the man who is accustomed to see it only in hardwoods. The writer saw in a Chicago factory a piece of Georgia curly pine cut into small sections, upon which stains and varnishes were so applied that not only were a large number of color affects produced, but the peculiar beauty of the curl was preserved intact and even heightened. Mahogany, cherry, maple, oak in all its forms, etc., were superbly limited. Oak is likewise stained in the various effects now in vogue and is even stained for mahogany occasionally, though this is more or less of an oddity as oak is in all its forms a beautiful timber and does not need to be disguised in order to produce an impression of beauty. The wood usually employed nowadays when an imitation of mahogany is wanted is birch, as every lumberman knows, and it far surpasses every other known timber for this purpose.

As to the choice of colors in stains and varnishes, the favorite shades remain, as always, the brown, with mahogany and cherry a strong second. The demand for browns has been more insistent this season than ever before. Brown is a color that in interior work not only has tradition behind it but is restful to the eye and is in line with the growing predilection of the Americans, English and Germans for the Mission, "baronial" and related finishes. The "copper" effect is much sought after, and in the production of this finish much skill is shown by varnish makers. In oak finishes it is notable that the old-time "golden" oak is losing caste in popular taste, and the weathered, fumed, Flemish, cathedral and similar varieties are gaining proportionately. The prevailing partiality for restful tones in interior decoration is seen also in the vogue of the new gray finish for birdseye maple, which brings out the characteristics of this wood superbly.

Many of the "colonial" houses now going up all over the country contain one or more rooms in mahogany and white enamel. This produces a charming contrast. The timber upon which the enamel is laid is generally poplar. Too white enamel is glaring and, what is worse, has a tendency to take on a bluish tint, so that a creamy tint is more desirable.

Also in line with the general tendency in American interiors is the growing preference shown for the dead, dull satin, or "art" finish in all woods. Mahogany does not take it as well as oak or walnut, yet we see much mahogany in the dull finish. A room paneled in dull finish Circassian walnut, on the other hand, is worth going miles to see it, for such rooms are rare, although Marshall Field's new grill room and a reception room of the Illinois Athletic Club at Chicago are fine examples.

As to the question of flooring. The old-time carpet on a cheap wooden floor has been replaced by the hardwood floor with rugs.

For this there are a number of reasons. Cleaning the old carpet was a labor of Hercules, and the woven, dust-and germ-gathering fabric bred disease. A rug, on the other hand, can be lifted up with ease and taken out to be shaken. Again, the hardwood floor is beautiful in itself. Maple is one of the best woods for flooring, because its grain is very close and of uniform hardness, does not absorb moisture, wears evenly and without discoloration if properly cared for, and will take a handsome finish. Above all, its cost is moderate. Oak flooring is extremely hard and handsome, and wears finely. Cherry and birch are two other hardwoods that are utilized more or less. If properly seasoned, they make a serviceable floor and both take a beautiful finish. There is some use of ash, black walnut and even mahogany, the two last named being employed chiefly in parquetry flooring, which is said to be growing in popular favor. The finest woods are employed in its manufacture. Parquetry flooring is made in two thicknesses. If it is to be used simply as the border of a rug, it is generally five-sixteenths of an inch thick, while if the entire floor is of parquetry the thickness is usually seven-eights of an inch.

It is erroneous to suppose that hardwood floors art of recent origin, for it is safe to place their manufacture at a very remote period; they are doubtless as old as the use of sawed boards in the building of homes, and this means prehistoric times. Hardwood floors were de rigeur in the times of our Colonial ancestors. From time immemorial, varnish makers say, the finish almost universally applied to hardwood flooring has been wax, and in Europe it is still the rule. In America, however, certain special varnishes have been in use for a quarter of a century, and are now more popular than wax. It is claimed by some that waxed floors are insanitary.

UNITED STATES LUMBER DUTIES.

The white pine lumbermen of Michigan are about to reopen the fight for the reduction of the $2 tariff on rough lumber. The white pine men will be opposed by all the other lumbering interests of the country, with the possible exception of Wisconsin and Minnesota. In both the south and among Americans interested in British Columbia and the Western States, the reduction of the tariff will be fought tooth and nail. Michigan hardwood men will also oppose the reduction as there are oceans of hardwood left in Michigan. The Michigan hemlock men also have enough to last them for forty years, and the two will not stand for opening the gates to Canadian white pine. The Michigan white pine men, however, have practically nothing with which to run their mills except Canadian pine, and over one hundred million feet of this is shipped into Bay City every year, while smaller quantities go to Saginaw, Grand Rapids and interior towns. With the tariff removed it is believed this amount would be tripled or quadrupled, and the hemlock men particularly are afraid of it. Southern pine will be the bitterest opponent, as every foot brought from Canada supplants southern pine shipped to Northern States. The white pine men, however, believe the amount shipped from Canada while vastly benefiting Michigan, would do no harm outside the city.

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.

A. D. Burrows has put up a planing mill at Eden Mills, Ont.

* * * *

J. W. Milligan is starting an apple barrel plant at Orillia, Ont.

* * * *

Thomas Darling & Son's sawmill at Callendar, Ont., has been injured by fire.

* * * *

W. E. Walsh has erected a sash and door factory at New Westminster, B.C.

* * * *

Wm. Rudd's carriage factory at Dresden, Ont., has been partially destroyed by fire.

* * * *

The Rowden Manufacturing Company will build a furniture factory in Guelph, Ont.

* * * *

Tolmie & Graham, Cleveland, O., propose to install a basket factory at Dresden, Ont.

* * * *

Brayden & Johnston are starting work erecting a sawmill at Canoe Creek Siding, B.C.

* * * *

The Kennedy & Davis Milling Company, Lindsay, Ont., will make all kinds of woodenware.

* * * *

The Cooke Lumber Company, Nelson, B.C., is preparing plans for the erection of a sawmill.

* * * *

G. Gorvette's saw and planing mill at Arthur, Ont., has been burned. Loss $6,000; partly insured.

* * * *

F. A. McCalum's sawmill at Rodney, Ont., has been destroyed by fire. Loss, $5,000, insured for $2,500.

* * * *

The Empire Lumber Company's planing mill at Latchford, Ont., has been burned with a loss of $30,000.

* * * *

Mitchell Bros'. sawmill at Berkeley, Ont., has been burned with a loss of $8,000 and with only small insurance.

* * * *

The Ross-Taylor Company has added to its planing mill at Exeter, Ont., a branch for the manufacture of boxes.

* * * *

The Jenkins Lumber and Shingle Mill at Blaine, B.C., was destroyed by fire at a loss of nearly $500,000; partly insured.

* * * *

It is understood that the old Milneford planing mill at Don, near Toronto, is to be taken over and converted into a planing mill.

* * * *

Stracey & Garland's sawmill and woodworking business at Vancouver has been taken over by the Nimpkish Lake Logging Company, Ltd.

* * * *

The McLaughlin Carriage Company, Oshawa, have secured a site in Toronto and will build a large four-storey factory and warehouse.

The Canadian Fairbanks Company, Ltd., Montreal, manufacturers of woodworking machinery of all kinds, have started a large branch in Sherbrooke, Que.

* * * *

H. G. Bykhouse, Grand Rapids, Mich., has taken over the Humber River Pulp and Lumber Company's timber limits and sawmills at Deer Lake, Newfoundland.

* * * *

A petition has been filed for the winding up of the Borland Carriage Company, Stratford. Its authorized capital was $225,000, of which about $18,500 was paid up.

* * * *

John McLean has become sole owner of the extensive lumber business carried on for the past thirty years in Merritton, Ont., under the name of McCleary and McLean.

* * * *

The assets of the Crown Furniture Company, Preston, Ont., have been disposed of by the assignee to Austin Moss, who will form a local company to operate the factory.

* * * *

The Baie St. Paul Lumber Company's limits and mills near Beaupre, P.Q., have been sold to an American syndicate composed of F. A. Kernan, J. B. Couglin, and others of Utica, N.Y.

* * * *

William Hazelton, formerly of Belleville, writes from Oneonta, N.Y., offering to establish an automobile factory in the former place if a stock company can be organized with a capital of $50,000.

* * * *

The Stevens-Hepner Company, Port Elgin, Ont., have made a deal for the purchase of the plant and patents of the Dominion Brush and Mirror Company, Toronto. The entire plant would be removed to Port Elgin.

* * * *

H. E. Ratz has just installed in his saw and planing mill at St. Clements, Ont., machinery for manufacturing hoops and staves. He has also purchased the Millbank heading mill and will install their sawmill machinery.

* * * *

Graves, Bigwood & Co., Buffalo, N.Y., have just increased their equipment at Byng Inlet, Ont., by the addition of a Woods heavy double surfacer, fitted with truing devices. With this machine they will dress lumber at 100 feet per minute.

* * * *

The Leamington Basket Company, Leamington, Ont., after several years' successful operation, is branching out into another line, that of the manufacture of handles for spades, hoes, forks and similar tools. Part of the machinery has already been installed.

* * * *

The rumor is revived that the Gibson Railway and Manufacturing Company's lumber business in New Brunswick, whose head office is Fredericton, is to be taken over by a United States syndicate. Messrs. Baxter & Davis, of Boston, Mass., are mentioned in connection with the negotiations.

J. W. Lowe & Son's wood working factory, sawmill and adjoining buildings at Aylesford, N.S., have been totally destroyed by fire. Loss $25,000.

* * * *

Oliver G. Anderson, formerly of Newcastle, N.B., proposes to start a chair factory in Halifax, N.S. He plans to erect a $100,000 plant and asks the city to guarantee bonds of the company which he would organize, to the extent of $40,000. The city would be given a first mortgage on this for security.

* * * *

Cook & O'Brien, who formerly had control of the Rainy Lake Railroad, now controlled by the Canadian Northern, are said to be joining forces with Hines and Weyerhauser in a large lumber project. Between them, these men are said to possess two billion feet of pine. Part of the plan is to erect a large mill at Fort Frances.

* * * *

A new company is being formed to rebuild the Morris Piano factory in Listowel, Ont., which was burned down recently. One of the conditions is that the town shall loan to the company $25,000 for twenty years at 4 1-2 per cent. interest, and shall grant exemption from taxation (except for school and local improvement purposes) for ten years. A by-law is to be voted on on the 30th inst. The promoters propose to put $100,000 into the building and plant, besides the amount of the loan.

NEWLY INCORPORATED COMPANIES.

Cariboo Lake Lumber Company, Ltd., Vancouver, capital, $250,000. To manufacture lumber, pulp, sashes, doors, etc.

Adams-Powell Timber Company, Ltd., Vancouver, capital $100,000. To take over the timber limits and sawmill of Roland D. Craig.

Tidewater Timber Company, Ltd., Vancouver, capital $100,000. To carry on sawmills, planing mills and make woodenware of all kinds.

Heaps Timber Company, Ltd., to take over the business of the Heaps Timber Company in Vancouver and build sawmills, etc., capital $1,000,000.

Acme Stamping and Tool Works, Hamilton, Ont., capital $40,000. To manufacture and deal in metals, screens, tools, and machines. E. P. Bowman, Hamilton.

Gardner-Browne Company, Ltd., capital $25,000. To take over the business carried on in Vancouver by A. F. Gardner, under the name of the B.C. Furniture Company.

Vermilion Tie and Timber Company, Vancouver, capital $50,000. To manufacture lumber, shingles and by-products of wood. J. A. Knox, Vancouver, and George Lux, of Beaton, B.C.

Richmond Furniture Company, Ltd., Richmond, Que., capital $75,000. To operate saw and planing mills, furniture factories, etc. A. J. Hudon, Richmond, Que., W. A. Catton, Montreal.

Pioneer Lumber Company, Ltd., Lethbridge, Alta., capital $100,000. To do a lumber manufacturing and construction business. C. R. Carlson, Lethbridge, Alta., and F. H. Stoltze, St. Paul, Minn.

William McVicar & Sons, Ltd., Port Elgin, Ont., capital $200,000. To take over the businesses of the Port Elgin Lumber Company, Ltd., and William McVicar & Sons, and operate sawmills, etc.

Algonquin Lumber Company, Ltd., Klock, Ont., capital $48,000. To acquire timber limits, operate sawmills, etc. J. H. Maybee, of Edwards, N.Y., and F. D. Sullivan, of Watertown N.Y.

THE WOODEN SPLIT PULLEY.

William Hebron, of West Hebron, N.Y., who claims to have been the original inventor of the split pulley writes of it as follows:—The idea occurred to me that if the sapling products of our forests could be utilized in the manufacture of small casks or kegs by a machine that would cut into the end of a block six or eight inches long, and produce wooden cylinders ⅛-inch thick, without any seam, that these cylinders would make cheap casks, as different sizes could be cut from the same block, and staves dispensed with. After some exasperating failures, I succeeded with a steel cylinder, armed with peculiarly-shaped teeth. This did the work, rapidly and beautifully.

But here I was confronted with the problem of how to hold the block. The shells of cylinders of wood were too thin to permit of dogging them at the ends, and if held in a vise the downward pressure would force the wood the jaws came in contact with, down on the cutting teeth of the cylinder and make it balk. After much thought it occurred to me if the blocks were turned on a lathe to uniform size, and placed in a clamp, where the pressure on the outside of the block would be perfectly equal and the pressure from every point of the circumference in the direction of the centre of the block, the frictional resistance being equalized, it might perhaps hold the cylinder from turning round.

I had a clamp made to test this principle. The lower half of it was rigidly fastened to a carriage, while the upper half hinged to the lower on one side. The upper half was held down by any simple device from which could be derived a small pressure. When all was completed, I raised the upper half of the clamp and dropped in the block and fastened it down. I started the carriage, expecting to see the block revolving in harmony with the cylinder, but it never budged, and in a moment the cutting end of the cylinder was through the block.

The intelligent reader will see at once that a cylinder saw five inches in diameter would be removing as much sawdust as an ordinary saw would in cutting a board fifteen inches wide. When I released the pressure of the clamp and lifted out a beautiful wooden cylinder only ⅛-inch in thickness, I knew the problem was solved.

This was the first application of this mechanical principle I have ever heard of or known, and is indispensable in the use of the split pulley. The frictional resistance of a perfectly-fitting cylinder to a round shaft, where the pressure is equal on every point of the surface and in the exact direction to the centre of the shaft, must be enormous, to resist the leverage exerted by a belt on a large pulley.

A planer knife must project beyond the head, but to do nice work the edge should keep as close company as possible to the point of its seat.

COLLAPSIBLE BOXES.

Gentleman who has invented a highly useful form of collapsible box, but who is not in position to place same on market, would be glad to be placed in communication with anyone interested. Address "Canadian Woodworker," Toronto.

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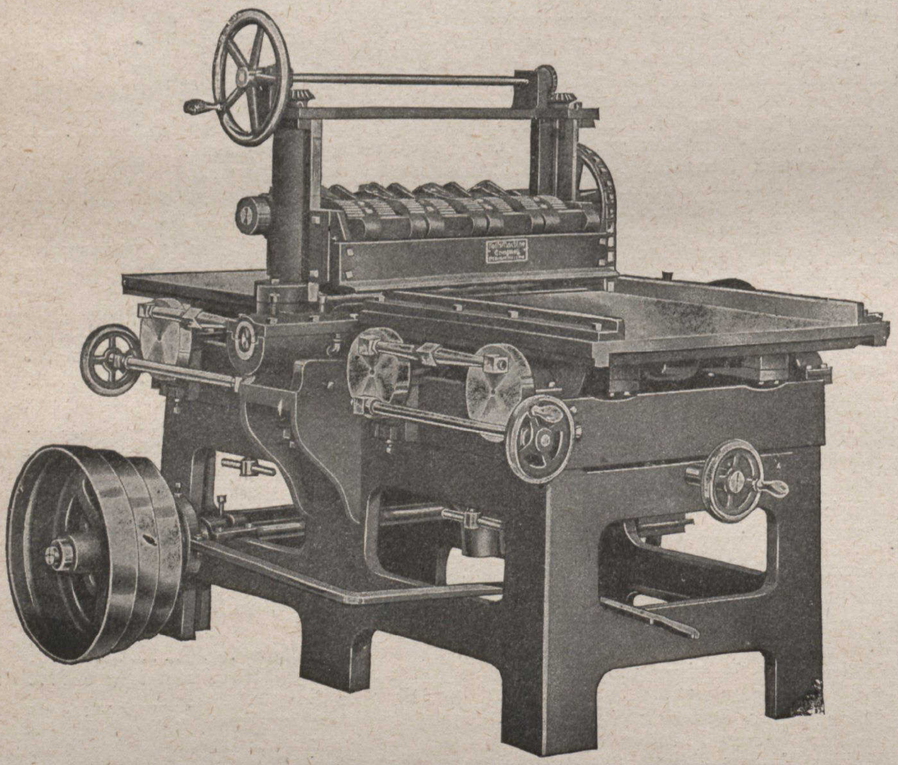
TRANSMITTING POWER BY A BELT.

The science of transmitting power from a steam engine by means of a belt is embodied in the following: In the first place, an engine which is in good proportion to its load will develop and transmit a certain power, independently of the manner in which it is connected to its load. The manner of connection determines, mainly, how much power shall be used in friction of engine and belt, and how much net power shall go to the machinery to be driven.

The diameter of a belt pulley upon the engine shaft is independent of every and all considerations, except obtaining a high belt speed, and all conditions of transmission can be so reduced that the belt speed and balance wheel requirements coincide. If the engine is of insufficient power, or its balance wheel is not heavy enough, or its rate of revolution is too slow, or the regulating apparatus is incompetent, the delivery of energy through the belt will be unsteady, no matter how the connection is made. The whole compass of the object in view is to get the most power, in proportion to the engine, in the steadiest manner, just where it is wanted, and the method which is the most direct under the conditions conforms most closely with science and wisdom. The idea of "leverage" is, no doubt, the prominent one with those who advocate the large balance wheel and small pulley plan.

Falls No. 43 Undercut Face Planer



does the same work that an ordinary planer can do but will CUT THE COST 75%.

It will turn out from 15 to 45 feet per minute, and the capacity on 4" stock at the end of a ten hours run would be 108,000 feet.

Can you beat that record, or come anywhere near it on the hand planer?

Write for our Circular.

Falls Machine Co.

Sheboygan Falls, Wis.

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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."

The Talge Mahogany Co.

Tabasco Mahogany

Indianapolis, Indiana, U.S.A.

For Sale—Lumber and Veneers

225,000	ft.	Bird's Eye Veneers.
430,000	ft,	Mahogany Veneers.
73,000	ft.	Mahogany Crotch Veneers.
24,000	ft.	Cedar Crotch Veneers
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93,000	ft.	Circassian Walnut Veneers.
138,000	ft.	Cuban Mahogany 1 in. to 4 in.
286,000	ft.	Afr. & Mex. Mahog. 1 in. to 4 in.
23,000	ft.	Circassian Walnut 1 in. to 3 in.

RICE VENEER & LUMBER CO.
Grand Rapids, Mich.

J. A. DeCEW

Chemical Engineer

Wood Distillation. Utilization of
Chemical Pulp. Waste Woods.

EXAMINATIONS,--REPORTS

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One all round, machine and bench hand for planing mill. Apply
GEO. S. EDDY & CO.,
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Wanted

One first class filer on gang saws apply
THE SNOWBALL LUMBER CO.,
Chatham, N.B.

Wanted

By end of August one band sawyer and one band saw filer, stating experience and wages expected. Apply
The DALHOUSIE LUMBER CO., Ltd.,
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Position Wanted

A First-Class Spindle Carver wants position at once. Has had six years experience and is capable of doing any kind of work on the spindle Machine.
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Box 5, Bridgeport, Ont.

Position Wanted

First class mill foreman wants position. Competent in all classes of work in the woodworking line. First class on new work and detail work, and thoroughly understands the handling of help. Box 252 Canadian Woodworker, Toronto.

Position Wanted

By first-class rotary sawyer, steam or friction feed, or as filer or general mill foreman; sober and steady; references furnished.
Address Box 6,
Canadian Woodworker,
Toronto.

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Carriage Woodworkers wanted. The Baynes Carriage Co., Ltd., Hamilton, Ont.

Wanted

Position to take charge of modern mill. British Columbia preferred. Can run rotary or band saw, any kind of feed. Good references. Appiy Box 20, "Canadian Woodworker,"
Toronto.

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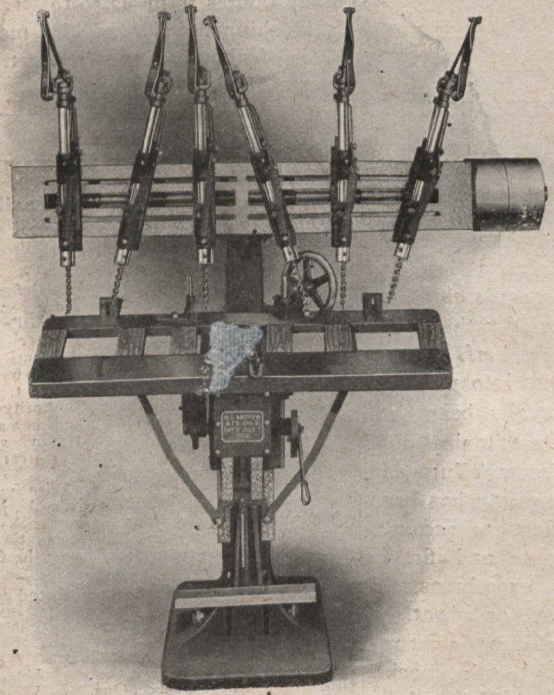

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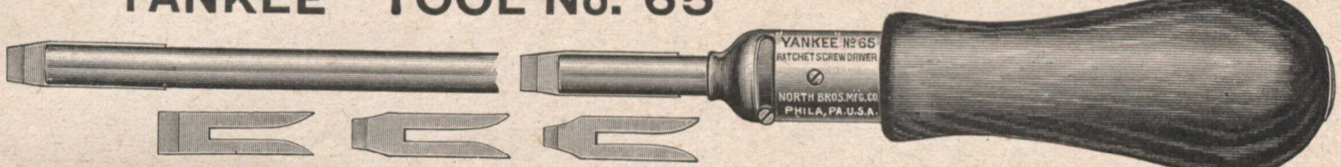

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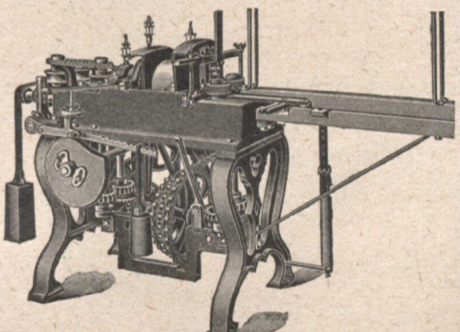

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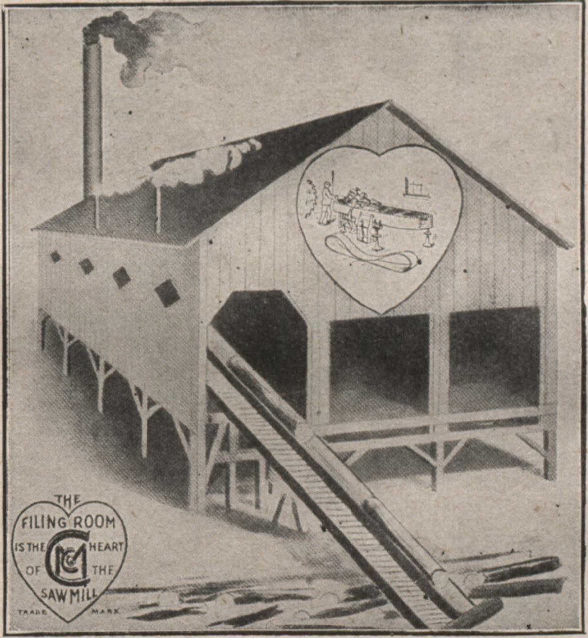

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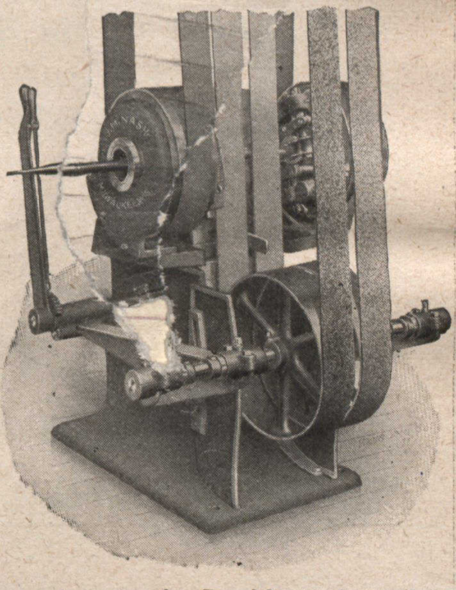

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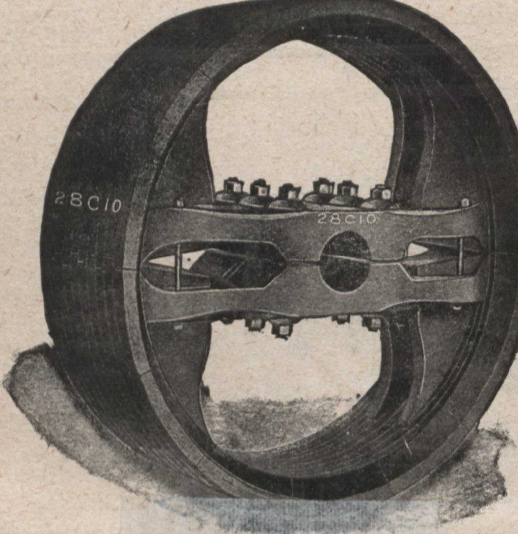

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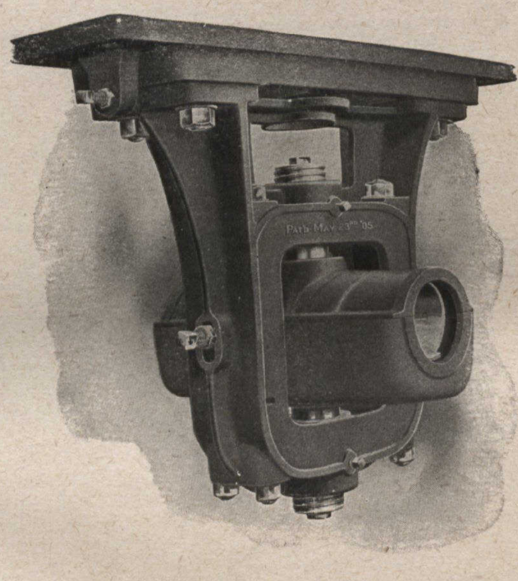

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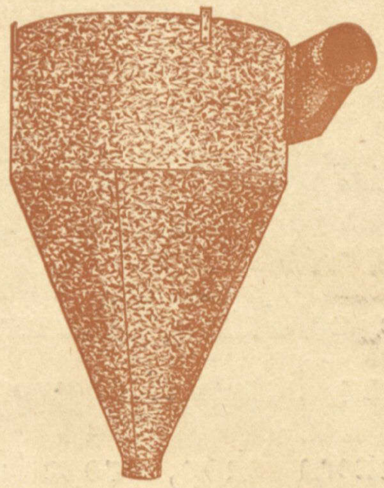

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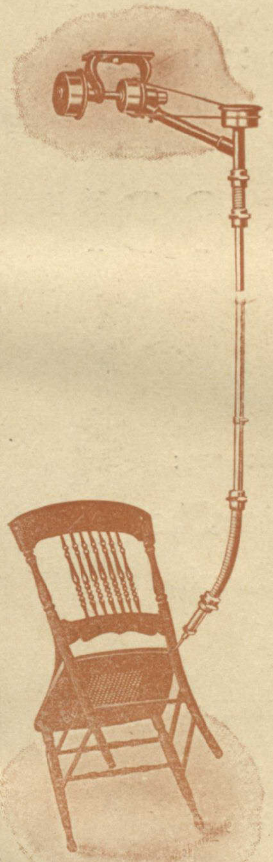

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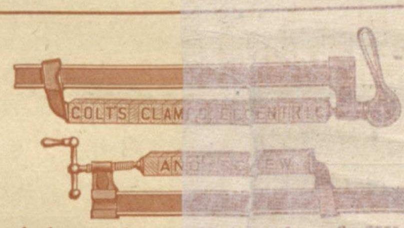

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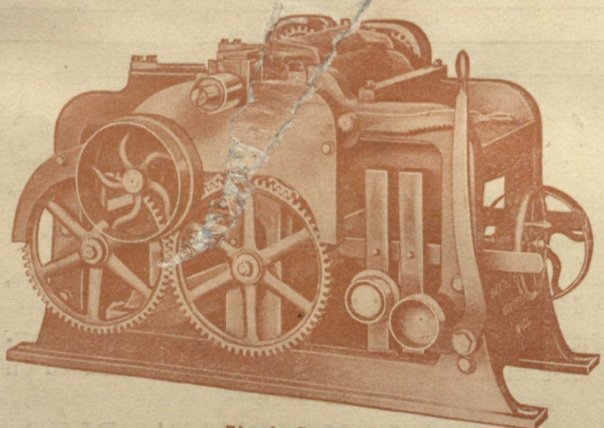

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