CANADIAN WOODWORKER

Vol. I.] JULY 1908 [No. 5

PRINCIPAL CONTENTS

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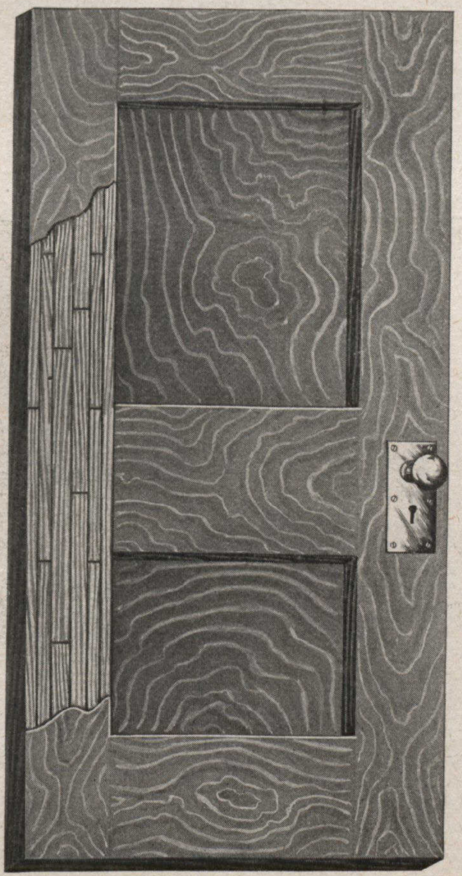

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Canadian Woodworker

A MONTHLY JOURNAL
FOR ALL CLASSES OF WOODWORKERS

Vol. 1 TORONTO, JULY, 1908 No. 5

CANADIAN WOODWORKER

A Monthly Journal for all classes of Woodworkers.

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

BIGGAR-WILSON, Ltd., Publishers

Offices: 73-80 Confederation Life Building, Toronto, Ont.
Telephone, Main 6377.

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

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

FUTURE GROWTH OF WOODWORKING INDUSTRY.

One strong prop of the woodworking industry at present and an augury for its constantly increasing importance for the future lies in the fact that so much of the carpenter work on residences and other structures which formerly was done by hand right on the premises is now done by machinery in the planing mill. In large buildings, where there is a great quantity of such work to be done, woodworking machines are now sometimes installed on the spot so as to do it with greater quickness and efficiency. The whole sash and door and other carpentry work for a whole row of houses is now not infrequently ordered complete from one mill, the only thing remaining to be done in its permanent location being its setting up.

Joists and studding are not only cut to exact lengths, but rafters are cut and the gains in studs are cut in the mill. On every side we find work being done at the mill which formerly was considered impractical. One thing that has helped in this more than anything else, probably, is the more general use of blue-prints and detailed plans and specifications in house-building. In the early days only mansions and buildings of like kind were carefully planned by architects, whereas to-day many of the simplest cottages, and the majority of the better class of dwellings, are all carefully planned and specified by an architect, so that these plans and specifications can be taken to the planing mill and practically every piece of lumber entering into the work be cut to the exact size and shape desired. Some planing mills have added special machines for work of this kind, and make quite a feature of it. If the practice continues to grow, as is sure to be the case, it certainly behooves every planing mill man to make a stud of it and prepare to keep up with the procession.

Canada presents such strong advantages for the carrying on of all branches of woodworking that the above feature in construction work is bound to become a great factor in its advancement as a manufacturing nation. Not only have our woodworkers the opportunity to meet the demands from a rapidly increasing population, but owing to its possession of great stores of wood becoming constantly more valuable as those of other countries dwindle, it will have a chance to make up many articles of wood for export to less favored nations. There are a multitude of opportunities presented in the woodworking industry which at present are but dimly realized by us in Canada, who are more than usually blessed by nature with the wherewithal to make use of them.

THE MACHINE AS AN AID TO ART.

A machine of any sort, but especially in the furniture or other woodworking line, is often regarded as an enemy to art, besides being a kind of "bad spirit," taking work out of the hands of men and putting it into the clutches of unfeeling iron and steel. Prof. Herkomer, the well-known artist, lecturing at the London Institution recently, took issue with these opinions. He took the ground that a good and expensive design should be reproduced by machinery rather than that people should be content with cheap and inferior work done by hand. Machinery, by the reduplication of what was best in statuary and carving, could bring the highest art closer to the masses of the people, and make it not only a means of pleasure, but an elevating and ennobling force.

Another of the allegations brought against the machine was that limitless repetition of any one article must take from its value. Such repetition was supposed to be contrary to art; but in order to grant that, they must assume that rarity was an art quality; and that Prof. Herkomer does not believe. Rarity played a great part in the commercial value of an article, but it was a source of the greatest danger to the proper valuation of art as art. The beauty of an article lay not in its rarity, but in the design, the workmanship, and in the material used.

At present the cheap article supplied to the masses fails mostly in design. The possibilities of the machine for producing artistic things have hardly been touched. We want the best for the masses, and the word "art" may not be misapplied to the wonderful productions of machinery.

Planing and Molding

TEMPERING KNIVES.

The tempering of knives is the subject of more thought, experiment, and careful attention than any other step in the process of manufacture from the crude ore to the finished product, and even then it retains the greatest degree of uncertainty of any. In the making of steel itself scientific research and a long line of experiments have reduced the work to a satisfactory degree of positiveness. There are flaws, of course, now and then, but, generally speaking, we are in position to-day to know pretty well just what we are getting in our steel, what chemical properties, and what kind of structure, and the process of manufacture has been perfected enough that the product runs so nearly uniform as not to give serious trouble. The same thing is true in all the mechanical work of making knives, and, while it requires care and skilful manipulation all the time to turn out the best product, still, that is comparatively easily obtained, but when we come to tempering we strike the most difficult and uncertain step in all the work.

This comes partly from the fact that two pieces of metal exactly alike in chemical parts and physical structure may be given what appears to be the same treatment, and yet produce varying results in tempering. This is only a part of the uncertainty, however, and another part—a very prominent part, too—comes from the different uses to which knives are put and the difference in temper required under these various conditions. The problem of tempering would, of course, be materially simplified if the knife-maker could know in each instance the exact service required of the knife. That is, if it were a planer knife, if he knew just the kind of wood it was intended to be used on, speed at which it would be run, and average depth of cut, and whether for doing finishing work or roughing off. Without this exact knowledge, however, the knife man must work with the idea of getting a cosmopolitan temper, so to speak, so as to give good service under quite a wide range of conditions. Some special knives are made to specific order with a reasonably clear understanding of the work they are to perform, and then the work is simplified somewhat, though naturally made more expensive, and usually the knife under these special conditions has to do the most trying work, so it puts the knife man on his metal anyway.

The majority of knives, however, are made like what we might call hand-me-down clothes, being given a certain range of tempers just as the manufacturer of ready-made clothes makes certain sizes calculated to fit with a reasonable degree of satisfaction a large class of people, and by being able to make up large quantities in these sizes can materially reduce the cost to the purchaser, as compared to the cost of making individual suits by tailors. This may sound like an odd kind of comparison, but it will maybe serve to give you an idea of what I mean. We make a certain range of standard tempers on stock knives, not only because of certain standard conditions that are always met with, but because there is quite a difference in the opinions of users, just as there is a difference in the taste of wearers of clothes. Some want the knives hard, and do practically all the sharpening on the grinder, while others want them soft so that they can dress them up with a file frequently without taking the knives off the machine; and so it goes, some with one kind of an idea and some with another, until the knife man is kept guessing all the time on the subject of temper."

It is worthy of remark in this connection, however, that users of knives are coming to realize the general importance of this subject of tempering, and to have more respect for the temper that has been put in their knives. In times gone by, and among some careless workmen even to-day, there has been many a carefully-tempered knife practically spoiled by careless grinding.

SYSTEM OF ACCOUNTS FOR VARIED PLANING MILL WORK.

The extent to which the superintendent goes into the making of detailed cutting bills generally depends upon the amount of work which falls to his lot, and sometimes upon the amount of time at the command of the general foreman of the mill or heads of departments. For instance, the superintendent may make piece bills for all the frames, interior trim, stair work, cupboards, porches and the like, but bill the doors, windows, screens and so forth to the heads of their respective departments, who will make the piece bills and see that they are cut out and machined. In many of the smaller mills the superintendent will do all the billing when he has time, but so instructs his sash and door man that he will be able to attend to this important duty whenever necessary. Nearly every concern of any size employs a stair-builder, and in such a case he will bill out all his own work, including piece bills for his newels, hall seats, panel work, pilasters, columns, beams, etc.

But no matter in what form the bills leave the superintendent, they must cover all the work turned in for the mill to make, and each sheet must carry the number of the order, the name or mark of the customer and the date of billing. All of the bills made by the superintendent or his assistants should be made in duplicate—that is, with a carbon copy—and in case of sending out work k. d. the bills should be made in triplicate, so that a copy may accompany the goods for the carpenters to work by.

The original ticket and duplicate are both turned into the mill, and the foreman or heads of departments will file the original and give out the carbons for the men to work from. When the work is completed, both tickets are checked with the date, and the original sent along with the completed goods to the shipping clerk or warehouse, as the case may be, while the carbon copy is filed in the mill for future reference.

The making of duplicates takes very little longer than to make the bills singly, and many times more than pays for the trouble. They make it absolutely possible to fix the responsibility for errors, and this alone is worth the while; they make it possible to ascertain if delays in shipping are caused by the neglect of the shipping clerk or slow work in the mill, and they always show on the face how long a time has transpired between the billing and the completion of the job. However, it sometimes occurs that the superintendent will work a long way ahead of the mill, as in the case of billing the trim on a job at the same time as the frames, but not turning the trim bills in to the mill for a month afterward. In such a case the superintendent should leave the bills undated until ready to put them through, and then date them level with their entry into the mill.

There are two types of billing for cutting, and superintendents and foremen are divided in their favor, some preferring one because of its completeness and the ease with which the work is followed, and some favoring the other because of its compactness and the facility with which it may be cut and checked.

The first system makes a complete piece bill for every size of article, such as window frames, so that a frame the same length as others, but two inches wider, would call for another list of the same number of items which would be the same for all the vertical pieces, but two inches longer for the horizontal members. This method calls for a heading or title for each page, describing the article to be made out of the pieces enumerated. Sometimes there may be a dozen or a hundred of the same kind, and in this case it is no more trouble to make a bill for one than for all. Where the stuff is sent out in the knock-down, this system is a good one, as the material is accompanied by the triplicate bills, and the carpenters may sort out the different lengths by the bills and may be as familiar with the work as the man at the mill.

One of the serious objections to this plan is that in case of a large and varied order, the work will cover all the way from ten to thirty or forty pages, and the yardman, sawyer, cutter, jointer and some others must look all these tickets over in order to cut and work the material, each one checking as he goes with a check of his own. While this takes time, it has the valuable feature of proving the work all the way through, and if any of the material gets lost on the way the check marks will show who had it last.

This system works very nicely when just enough of the other method is applied to take the burden of searching the tickets from so many of the different employees. This can be done by the assistant superintendent or the mill foreman bunching all the similar pieces from the various tickets into one item and giving out this list for the men to work from, and requiring only the stock man to check from the whole lot of piece bills. In case the work is made up in the mill, the carpenters will use the regular bills to work by, and the bunch bill need not go farther than the machine men.

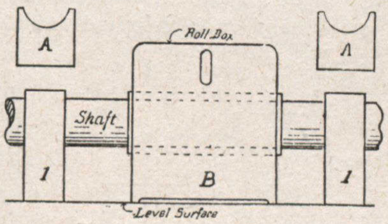
As has already been hinted, the second system of billing will be composed of a list of the different pieces required on the whole job, grouped in such a manner that all the pieces of a size are in one item, and all the items of a kind follow each other in the order of their length, the longest coming first.

Like the other system, this requires a heading, but in this case all the units—that is, frames, sides of trim or whatever the class of work may call for—must head the piece bill. This often requires a different sized sheet from the ordinary, if it is to carry all the items on the job, but it is a long and varied bill of frames that may not be billed on a sheet 8 x 20 inches. By putting down a few notations it will be possible for the bench men to work from this bill nearly as intelligently as from the other and more elaborate billing. In any case, the bills should be made out in a regular and fixed order, so that the various workmen will always know where to look for any particular item.

—A drop or two of oil once a day is better than a quart once a year.

BABBITTING PLANER ROLLS.

To rebabbitt the roll boxes on a planer, matcher or moulder is generally a tedious operation. As a rule, the boxes are solid, and in babbitting, the shaft having become somewhat the worse for wear, the babbitt will grip the shaft so tightly it is nearly impossible to get the box separated from the shaft.



I have adopted a system of babbitting rolls which have removable and adjustable boxes, which is simple enough after one gets the lines fully figured out. The method consists of two blocks of hardwood like A A, this being the end view. These blocks are exact duplicates, and are for the purpose of resting the babbitting arbor in the notches on a level bench, thus holding it at the required height, supporting the shaft, or really the babbitting arbor, an equal distance from the box, thus making each box exactly the same. By having the box out of the machine one can get at it, and it is much easier than to do the job in the machine. B shows the box in position for babbitting, the two blocks of wood (1 1) at each end, with the babbitting arbor through the box.

In babbitting solid bearings, in order to make a complete and smooth job, the shaft or arbor should be wrapped with paper, after being heated just so hot that it is impossible to hold it in the hands. This heating is to thoroughly expand the shaft, so that when the metal contracts it will not grip the shaft. Heat the box equally hot, and you will be surprised to see how much tighter the metal will be in the box when it cools off. When metal is poured into cold castings it chills, and as it cools, contracts, and the result is the metal is loose in the box. The box and metal thus contract together, consequently the metal remains tight.

It is a good plan, when trying to get a shaft out of the bearing, to heat the frame as well as the shaft.—A. B. C.

JOINTING SEGMENTS FOR PATTERN-MAKING.

Of all the artisans working in wood to-day, the pattern-maker probably is most dependable upon the tools of his hand and upon his skill in directing them in the myriad requirements of the mechanical draftsman and designer. Long ago cabinetmaking became more or less set in form through the agency of the mill. The carpenter of the present does little more than tack together the products of the saw, plane and milling machines of a dozen varieties. The pattern-maker, however, must take the soft pine materials in the bulk, lump his materials in sufficient bulk to contain the design, and then saw and cut and plane and gouge through his blocked and glued mass until the draftsman's blue print lines have materialized to a hair-breadth.

In is in this infinite variety of pattern intricacies that the pattern-maker has the element of novelty in his work, while from the point of view of working with the simple tools of the craftsman he may put more of himself into his work than does almost any other of the skilled workmen of the time.

In engines, steam pump, air compressor, and, in fact, almost every kind of manufacture, the pattern-maker is often called upon to make patterns and core-boxes which require a great number of segments. For instance, he is given a blue print of a globe condenser from which must be made the pattern and core-boxes. The construction is almost entirely of segments, and is made as follows:—

First, with a shrink rule, lay out on a board a cross section (Fig. 1) to the parting line, to determine the size of the segments, inside diameter, outside diameter and length. A templet is then made for the different courses, 1, 2, 3, etc., from refuse stock and the required number of each sawed out.

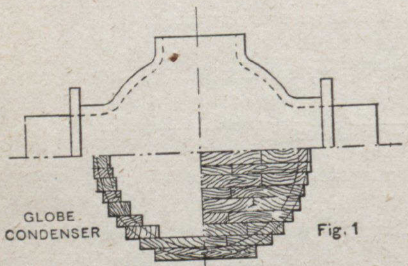


Fig. 1


Fig. 2

Fig. 2 illustrates the method of sawing several segments of the same dimensions in one operation, the number being determined by the thickness of the stock, the limit of the saw and the patternmaker's judgment. They are now ready to be jointed and this is the point I wish to emphasize in this article.

In many shops much time and labor is lost in this operation, saying nothing about the ugly joints which meet our eyes. This can be overcome with profit to your employer and less labor for yourself by adopting the device shown in Fig. 3. Fig. 3 represents a jig adjusted to the saw table in place of the squaring head and is for six segment work (60 degrees). Others can be made for any number of segments,

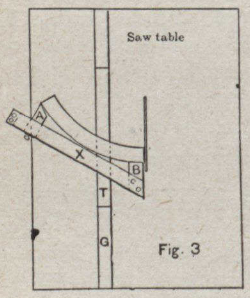


Fig. 3

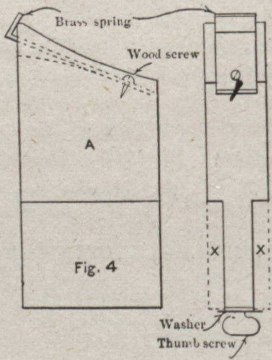


Fig. 4

care being taken that the angle is right for the required number to the circle, viz., 90 degrees for four and 45 degrees for eight, etc.

The jig will be easily understood by a careful study of the drawings and needs but little explanation. The tongue t is fitted to the groove in the saw table g and the arm x fastened to it at an angle of 60 degrees with the saw. The blocks a and b are clearly shown in Fig. 5, b being fastened to the arm x, while a slides in the groove so that it may be adjusted to any length of segment within its compass.

A spring is placed at the end of block a (enlarged in Fig. 4) and serves as a stop when making the second cut, the first being made with the spring pressed back and out of the way. In Fig. 5 the segment is in place ready for the first cut and the dotted lines represent it after turning end for end and the second cut is made. Nothing but a sharp cross-cut saw should be used. Care must be taken that the points O O, Fig. 5, are 60 degrees with the saw, otherwise they will not come out exactly six to the circle.

This device can also be attached to the trimmer and will give a much better joint for glueing than a circular saw can do. This arrangement is shown in Fig. 6. It is some-

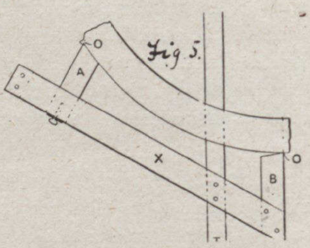


Fig. 5.

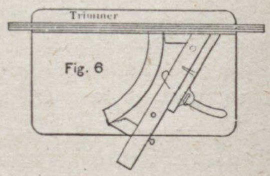


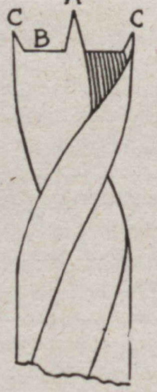
Fig. 6

times fastened by two wood-screws from the back of the gauge, which is set at an angle of 60 degrees, and by others is attached to the table by two iron dowel pins, but the safest way is to use the two dowels in the table and one screw through the back of the gauge.

OPERATING A BORING MACHINE.

The spindle which carries the bit should be just loose enough to turn freely, but not have side play, for if there is lost motion in the boxes the bit will not run true, and when the point of the bit strikes on the side of a hard place, such as the hard grain in oak, it will jump to one side and bore the hole off centre. This is a serious matter when boring for close dowel work, as it will go together hard or not at all.

The next thing is the bit. This should be kept sharp,



but simply making sharp edges and a sharp point is not sharpening a bit, unless this is done in the proper way. The sketch herewith gives the different cutting parts each a name: A is the centre point, B the flat cutters, and C the side cutters. The centre point is longer than any of the other cutting points. This is very essential, as the centre point holds the bit steady and keeps it in the centre. If anyone doubts this, let him try to bore a hole with a bit which has the centre point broken off and see how it will jump around on the piece he is trying to bore before it starts to cut. The centre point should be filed either three sides or four sides, not overly heavy at the base, but heavy enough to stand the strain without breaking—say, 1-16-inch at base for bits up to ½-inch, heavier in proportion for larger bits, then tapering down to a sharp point; this gives the point a reamer-like shape, which enters the wood very easily. The centre point should not be filed first, as it grows up out of the body of the bit when filing the flat cutters B. By referring to the sketch it is easily understood what is meant by saying the point grows up out of the body of the bit, for the more the flat cutters B are filed down the longer the centre point and side cutters will become. The point and side cutters should not be allowed to get too long, however. If the point of one of the side cutters gets broken off, all that is necessary is to file the flat cutters B down until the centre point and side cutters are the required length.

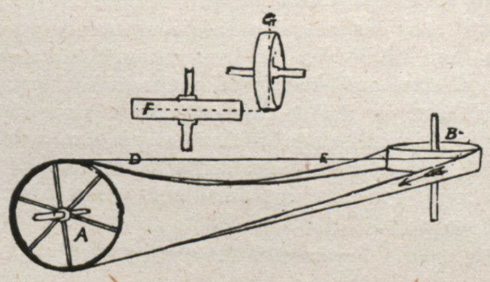
Always file the flat cutters first, taking care to not file either the point or cutters off. When filing the flat cutters the file handle should be held considerably lower than the other end of the file, to give the cutter a bevel on the back for clearance. (See bevel in sketch, shown by shading.) I might add that care should be taken to not file the sides of the point much when filing the flat cutters, as there is danger of getting it out of the centre of the bit.

Do not use a three-cornered file on a boring bit; you will ruin your bit if you do. Use a small flat file, and if the bit is too small to use the file flatwise, use it on edge to file the flat cutters; after filing them, hold the bit with point up, about 12 or 14 inches from and level with the eyes, and see if both the flat cutters are the same height, because if one is higher than the other the high one will have to do most or all the work; make them the same height by filing the high one down to the low one.

Now file the side cutters C, giving all the bevel from the inside, as shown in the sketch. Never file a bit on the outside, as this will change the size, causing it not only to bore the hole too small, but also to bind or get tight as it sinks into the wood. The spiral groove around the bit is, of course, for the purpose of extracting the shavings, and when boring holes deeper than the length of spiral groove the bit will completely fill the hole and prevent the shavings coming out. The operator should then let the bit back until the shavings can escape.

RUNNING A QUARTER-TWIST BELT.

A problem that bothers a great many is the adjusting of pulleys for a quarter-twist belt. This illustration should make the problem plain and simple. First, observe how the driving pulley runs. A is the driving pulley, B the driven



pulley. The arrow shows which way the belt runs. The rule is, centre the face of the driving pulley from the driving side to the centre of the face of the driven pulley, as the straight line D E is shown. The belts can be run at an angle of 90 degrees, as shown by illustration F G.—H. B.

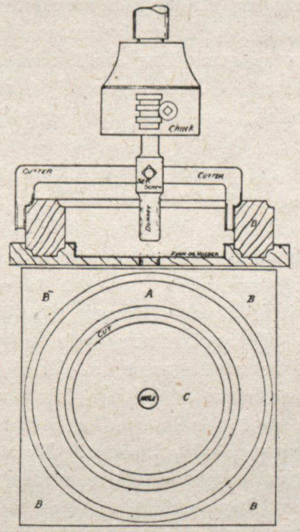
CONSTRUCTION OF MACHINES.

A correspondent states that if machine manufacturers only knew it, there are often little features about the machines that manufacturers make that they really think are good, but in reality prove to be bad. This was brought quite forcibly to notice in one of our planers the other day. The machine was running, when all at once there was a crash. I saw the dust fly from two or three places on the ceiling, and at the same time the man who was feeding the machine flinched, caught his right hand, and I knew he had been hit by something from the wreck.

Needless to say, the planer stopped of its own accord, and very suddenly. Examination showed the pressurebar broken in four pieces, one of the knives broken in two and minus two bolts, and the other knife badly bent and a couple of chunks broken out of the edge of it. All this was owing to the method of attaching the hood, which was hung on a couple of pins or studs, these being put through the hood into the frame of the machine and fastened with a very small stud bolt. This stud bolt had failed to hold the stud, and as it only went into the frame a short distance, it soon worked out and dropped into the knives, and as it was 3 inches long and ⅞-inch diameter, it was rather heavier feed than the planer was used to. It went down through between the knives and the pressurebar, and naturally something had to bend a trifle. Then it came out between the feed rolls, striking the man a glancing blow on the hand as it went by, and made a good-sized dent in the iron frame of another machine when it struck. The bolt heads from the cylinder went out through the shavings hood and hit the ceiling, but the knives struck what was left of the pressurebar and stopped the cylinder before it did further damage.

TURNING WITH A BORING MACHINE.

The accompanying sketch shows better than words how an ordinary upright boring machine can be made to turn circular work. A shows a circle cut into the block; B, a section through the completed circle, with cutters, etc., in working position. These circular pieces were used as balus-



Turning with Boring Machine.

ter work on a residence, and were 1⅝-inches thick and 7 inches diameter, outside, and made of soft wood.

The first operation is to get out the square blocks the right thickness, then bore the centre hole the size of the dummy shown so as to keep the tools working exactly from the centre. This dummy is also made with a slot and set-screw to hold the cutters so they can be shifted as desired, and can be held in any ordinary chuck. The stock should be kiln-dried, if possible.

After having the cutters sharpened and set securely in position, they are ready for use. The first cut is made only about half way through—see A B C. For the second cut it is necessary to have some kind of a holder to hold all parts in place and in line while the cutters cut through. If this were not done, the separate parts would be thrown into confusion and probably break or bend the cutters the moment they become separated, and possibly do other damage. During the making of the blocks above referred to, a metal holder was used, and being made at the mill, it was of course out of the question to use iron. Babbitt metal was used, and in this manner a first cut was made in the wood.

This block was then plugged, babbitt metal poured into it, and a small frame made of strips nailed around the block. Of course, an exact pattern was thus made, which exactly fitted all blocks. When making the second cut, the cutters should cut from the sides, as shown, as well as from the bottom end; in this way a very desirable piece of work can be obtained.

CORE STOCK.

Core stock for doors and other built-up work that is to be faced with veneer, is steadily growing into a more important item in almost every planing mill, and at times no doubt everyone gives more or less speculative thought as to how and from what sources this core stock can be made to the best advantage, all things considered. We all know that the usual plan is to rip the lumber into strips, using scraps as far as they will go, then matching and gluing these strips together for the core body of whatever dimensions are desired. Sometimes, but not always by any means, the standard thickness of lumber will furnish the thickness desired for the core stock, and when this is the case the work of making the cores is comparatively simple; it is just a matter of ripping the strips to whatever width is desired. At other times though—and such times are quite frequent, too—the thickness wanted for the finished core doesn't conform to the standard thickness in lumber, or at least will not fit the class of stock on hand of which one has the most scraps.

This fact has led some people into making cores for door frames out of strips just as wide as the thickness of standard one-inch lumber. Making them in this way enables one to rip the strips to whatever width is desired in the core. By following this plan one can take one-inch stock and readily work it into cores of any thickness desired. Of course, the width of the built-up core may not come out exactly even, but the waste need not be heavy on the edge of the core, because when made up this way the strips are decidedly narrow, and the loss of a strip or half a strip doesn't mean a great deal of waste. Moreover, it is both possible and practical to put up these strips in cores of what might be termed multiple widths, then rip them to any dimensions desired, just as one would rip a wide board. In fact, there are so many points in favor of this method that unless some contra argument can be offered, it looks like there might be a more general turning towards it, the trade benefiting considerably thereby.

SPEED FOR PONY PLANER.

If machine has good, large cylinder and shaft is good size, say, 2-inch or 2¼-inch, it should do good work at 4,600 r.p.m., and perhaps best work at 4,500 r.p.m. If cylinder is small and shaft not over 1¾-inch., 4,000 r.p.m. is about right. The reason a planer cylinder changes ends when in operation is, the belts oscillate enough on the pulleys to give the cylinder an oscillating motion.

THE BELTING OF PLANERS.

I have heard some people claim that, as the pull of the knives is downward, and more than that of the belt, it does not matter which way the head is belted. This argument recalls the case of a planer with which I was once acquainted, which was belted down, and which did good work till it was found that it was planing thin on one edge—the edge toward the belt side. Examination showed that the box on that side was considerably worn and that the shaft had not touched the cap for some time.

Now, if that planer had been belted up, while the pull of the knives was mainly down, bad work would have been done the moment the box began to wear. Of course, it may be quite justly argued that the box should have been attended to and the wear taken up; but a man can't stand over a box with a wrench all the time, and I still hold that belting downward conduces to steady running. As to the strain on the cap and bolts, they ought to be strong enough to hold either way; but there are often cases when the knives are dull, or when they strike some obstruction, where having the pull of the belt downward might save the machine, and mayhap the operator.—O. L.

STEEL-FACED OR ALL-STEEL CUTTERS.

A correspondent of the London (England) "Timber News" says: "I have used both, and in my opinion the steel-faced cutter is the best and safest. In the first place, I contend that a bent cutter is better than a broken one. When cutters break on a top head, as a rule they fly in a line with the machine unless they meet with some obstruction in their flight, but when a cutter breaks on a side head or a circular moulding machine its flight is exceedingly dangerous to anyone who may be about. A machinist can tell in a minute when anything is wrong. He can detect the sound of a bent-cutter or any change in the cutting sound, and stop his machine before a foot or two of the stuff has been spoiled by the bent cutter." With regard to grinding all-steel and steel-faced cutters, he claims all-steel to be the best, as the steel-faced cutters glaze the emery wheel. "Steel-faced cutters ground to suit the work in hand for moulding, square turning, scribing, etc., and given the required bevel, will give satisfaction to the most critical of experts," he says.

CURE FOR CHIP MARKS.

I had a lot of trouble with chip marks on finished stock at one time, tried about every remedy I could think of, and at last discovered that it was because the exhauster didn't take up quite all the shavings, some of them catching on the edge of the knives and denting the board just before the knife cut. Or, if shavings are left on the board where the knife strikes, they are sure to leave dents in the finished surface. It makes no difference what bevel the knives have, nor how far the knives project beyond the cylinder, the result will be the same. I suggest more suction; or, if there is already enough of that, perhaps there isn't enough opening in the hood over the planer. Make a hole with slide in front side of hood; if that doesn't work, place a slide in hood. More suction cured my case.—J. A. G.

THEY DIDN'T ADVERTISE.

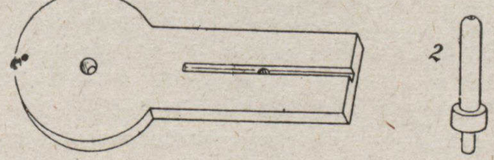
A new concern in a Southern town, whose specialty is the manufacture of wooden columns, has built a high tight board fence, topped with barbed wire, around its factory, hoping to prevent outsiders finding out anything about the machinery inside. There are two principal machines, one for boring, the other for turning columns. One of the proprietors said they were four months finding where the machines were built, and after they did find them everybody wanted to know where they got them. "Several people came here from distant places, and one man wrote to one of our merchants, asking him to obtain the builder's name," said he, "and we have made up our minds that those who wish to purchase machines and become our competitiors will not find out anything about them through us." Evidently the machine builder is also afraid the public will find out where he is and what he has to sell.—Exchange.

REMOVING RUSTED-ON PULLEYS.

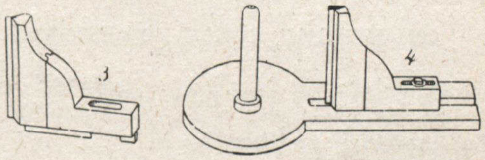
In regard to the best method of removing pulleys that have become rusted on their shafts, various opinions are expressed. One says: "I would suggest heating the hubs and melting beeswax into the joints. Then drive the pulley with a heavy sledge, while hot. In this way I have been able to loosen pulleys and gears which could not be loosened in any other way." Another says: "I would suggest that the hubs be wet with kerosene oil, and then fired. The quick heat will cause the hubs to expand sufficiently to loosen the rust and permit the pulleys to be driven off with a sledge. I have followed this method with success." A third says: "Heat the shaft and hub of pulley to a temperature, say, that will turn the shaft blue, then place beeswax around the joint and let it run well. The pulley will loosen 'as slick as grease.' Beeswax congeals at a comparatively high heat, but when melted it is very thin and will run into any place that oil can reach, and is a better lubricant for a condition like this."

SETTING TENON KNIVES.

Heretofore I have been setting my tenon knives by placing a smooth board beween the heads and setting the knives to that; but have now found a better way. First, I got a heavy piece of birch and jointed one side, then ran it through the planer to about 1⅛-inch thick, then sawed it like 1,



having it narrow on one side so it can be easily placed in a vise. Putting a plow in the centre to hold the gauge straight, and boring a hole for a bolt to tighten it down, I then bored a straight ¾-inch hole in the centre of the round end, to fasten the spindle in. The turner then turned me a spindle like 2, the bottom part fitting the hole in the board, and the top the hole in the head, and a collar for the head to rest and revolve on. Then comes the gauge, like 3, which is made in two pieces so there will be no cross-grain,



bettering it some by placing a steel point on the end, made of an old file. The steel point is best, for if the knives are not a true circle, one can turn the heads backwards so their farthest points will strike and wear off, moving the knives over gradually until their whole length just clears the point, then grind to an edge and set to gauge. This steel point mentioned is ground off square. When gauge is finished, like 4, it will be a time-saver after that, and all knives will cut. If the tenon is not straight when set up by this method, it is because the boxes are worn or the heads sag.

—Some think that a heavy machine will inevitably jam small mouldings or small work on a planer, while a small machine will not. The pressure required to drive a small piece of moulding through a small machine is just as much as though a large one and no more. If the work jams, lighten up the rolls till it does not jam, and put it through a small or large machine. One of our twenty-ton steam hammers will strike a blow just hard enough to drive a ten-penny nail, or a blow of many tons. The force of the blow depends on the man running the hammer. So the jamming is regulated by the operator.

—The beveled or flat side of a knife to the head is a theorem that most operators do not care to tackle. Others look favorably upon it, and if opportunity offers are willing to give it a fair trial. In the first place it will take more power. This is conceded. So does a stunt-ground knife, ground first just so the heel of the knife clears the board. It must be kept sharp, as must the stunt-ground knife, but one-fourth the filing will do it, and keep it in just as good order. And it is a chipbreaker itself, so there is no possible danger of getting tough, stringy stuff under the knife. These are some of the arguments in favor of using the bevel next to the head, when there is a lot of tough, knurly and cross-grained stock to run.

—The Woodstock Wagon and Manufacturing Company, Limited, Woodstock Ont., are introducing to the trade the "Buster Brown" children's express wagons, which are substantially made miniature wagons, and not mere toys to be thrown aside in a few days. They are claimed to be the finest and strongest express wagons on the market, being made of identically the same classes of materials as enter into the construction of their widely known make of farm and freight wagons, where strength and endurance are the prime factors. This is a safe guarantee that any dealer who undertakes to handle their express wagons as a regular line will not make any mistake. Dealers will do well to write for a catalogue and discount sheets, as the sales of this line will be heavy during the summer months.

Saw Mill Department

GUIDES AND ROLLS FOR RESAWS.

The guides are not intended, as supposed by some, to support the saw blade, nor make it accomplish something great and overcome any deficiency in fitting the blade. They are not placed on the mill for that purpose. Theoretically, the saw should run independent of the guides. While the guides serve their purpose, operations as a rule depend too much on them to support the saw. On the other hand, the filer should fit his saws so nicely, in levelling, tensioning, swaging and sharpening, that they will run practically without guides; otherwise, broken saws will surely be the result. Many saws are cracked and broken from coming in contact with, or vibrating in and striking violently against, the guide, and the trouble is attributed to other sources.

The upper guide column should be in perfect alignment with the saw when the saw is strained ready to run. If not, the saw will come in contact with the guide when sawing different widths of stock. To illustrate, suppose you set the guides perfectly for 6-inch stock and the guide column is 1-16-inch out of line. Now raise your guide to saw 20-inch stock and see how hard the guide presses the saw out of line. You will then realize why some saws crack and run so badly, and at the same time see the importance of keeping them in line. As stated above, the guides serve their purpose. In the first place, they overcome the "flutter" in the blade, which at times is more noticeable than at others. Apparently there is no reason for this fluttering of the blade while at work, but there are reasons for it just the same, else it would not occur. Among those which may be mentioned are, irregularities in fitting the blade, and the speed of mill. In most cases the resaw mill is driven by the same engine that furnishes the power for all the machines in the mill, and properly so, where there is plenty of power; but often the conditions are reversed and there is a lack of power, which means trouble with the resaw other than fluttering in the guide. The idea is to have the mill run steadily and as nearly perfectly uniform at all times as possible. Especially does this apply to the saw when in the cut. Then the guide will have a tendency to reduce the flutter to a minimum keeping the saw in line and insuring nicely-sawed stock.

When setting the guides the saw should be strained ready to run. Then take a sheet of very thin paper, place it against the saw blade and bring the guide on that side up to it, being careful not to deflect the blade out of line when so doing. Now adjust the other side the same way, both bottom and top, after which the guides are set and are ready for the run. Of course, one with a fine eye and sufficient experience can set the guides without the use of paper, by bringing them up to the saw blade, just close enough to see daylight between them and the blade. The raising and lowering lever to the upper guide should be conveniently arranged so that the operator can handle it from where he feeds the machine. It should work quickly and easily and be under the control of the operator at all times, so that stock of different widths may be handled as though it were one width.

The method employed by some in handling the upper guide is very poor and handicaps the operator to a great extent when resawing different widths of stock. The guide-blocks should be made out of some suitable hardwood, preferably maple, which seems to give better satisfaction than any other hardwood. The surface which comes next to the saw blade should fit the blade its entire width and be kept true at all times; this will have to be looked after frequently, as the guides wear away very rapidly, especially at the toothed edge, where the teeth come in contact with them. A small block-plane, such as carpenters use for fitting end wood, is the best tool for keeping the guide-blocks true. If they are looked after often and are not too badly off, one or two shavings taken off with the plane at the right spot will put them right again. The end wood, of course, is always used next to the saw blade, which gives it a better wearing surface than if the reverse, or flat-grained surface were used next the blade. Do not use any kind of metal guide for resaw work, as it will surely case-harden the saw blade and cracks will follow. There are some hard woods which are equally as bad, if not worse than metal; for instance, lignumvitae or Chilian oak. After using them for some little time they become glazed, when they will run the saw hot, cracks will follow, and you will wonder how it happened. In my experience, maple has given better satisfaction than anything I have tried.

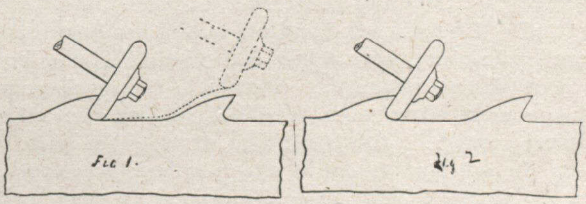
For good results, one of the most essential features in first-class band resawing, is to have the feed rolls properly lined with the saw blade. Unless this is done the stock will pass through the machine badly and often refuse to feed through at all, causing the saw to cut out of line, and miscuts will result. The trouble—through ignorance on the part of the operator—is sometimes laid to the saw, but on close investigation and inspection of the feed rolls they are found to be at fault. It is well to look after them often, so as to keep them lined up at all times. To line up the rolls with the saw it is only necessary to have a straightedge a little longer than the distance between the rolls, to do the job. The straightedge should be perfectly straight and parallel for a distance sufficient to take in both sets of rolls. To line them, begin with the inside rolls—i.e., the rolls nearest the column that supports the top wheel—at the bottom (having the saw strained up, ready to run), by placing the straightedge against the saw blade, and bring the rolls up until they touch the straightedge also. The straightedge will now touch the saw blade its entire width and the two rolls at their outer diameter. This is the proper way to line them. It will not do to have the straightedge touch some part of the blade, as, for example, the toothed edge, and not the back. It must touch the entire width. Now raise the straightedge to the top of rolls, and if the same conditions exist, the rolls are properly lined; if not, change them so as to get them as they are at the bottom, working from bottom to top until they are in perfect alignment with the saw blade from bottom to top.

After the inside rolls are properly lined, run the outside rolls up to the straightedge. The same pressure should apply at both bottom and top, the straightedge touching the inside rolls and the saw blade. Now make all the rolls fast, as far as the adjustments are concerned, and they are ready for the run.

GRINDING OF BAND SAW.

The processes of tension, swaging and shaping the swage are often gone over pretty thoroughly, but the matter of grinding not so often. In this article we will go over some of the kinks I have practised, which no doubt are a sort of second nature to many of the older readers, but new to those of little experience.

The wheel of proper grade, running at the proper speed, is the most important consideration in the matter of grinding.



The wheel that any of the leading manufacturers might recommend will do good work, providing you give it the proper speed and not be afraid to change the speed of your machine because "that's the way it has always run." Because the machine is speeded right for a "60 L." carborundum wheel is no sign you can put another make of corundum wheel on the same arbor and make it do all it is capable of doing. It is proper rim speed you want, not too much nor too little, for if you have either you will be blaming the abrasive wheel manufacturer for what he is not to blame for; but give either wheel the proper speed, and no reasonable man will find much fault with it.

The machine should be adjusted so, when it is started, the wheel will not quite touch the teeth—will drop into the throat and follow along over the top of the next one. Then, after the machine has run over a few teeth and everything is safe, I draw the wheel back carefully into the front of the teeth, like Fig. 1, and run around the saw two or three times that way, for it requires more grinding on the front of the tooth than on the back or in the throat. Do not burn or make blue any part of the saw tooth. If you burn the point, you spoil the cutting edge, and if you burn the throat, you case-harden the steel, and it is only a matter of time when a crack will appear. Then, after the fronts of the teeth are nearly finished, adjust the wheel so it will follow along the throat and over the back of the next tooth—Fig. 2—and allow the grinder to run until the teeth are all finished to a nice cutting point, for six or eight badly finished teeth may spoil all the good work done on the saw.

There is a great difference in opinions in regard to using a file. I am convinced that the final touches should be given with an 8-inch mill file, for the reason that if you use a wheel fine enough to finish up the points nicely, it is a slow, tedious job to grind a saw down without burning or case-hardening, and if you use a wheel of the right grade to cut rapidly, it is hard to give the points of the teeth as nice finish as you can with a file. So the filer can save time by using a coarse stone on even resaws, and finish with a file providing he is competent with the file to finish all teeth perfectly square, but a very slight variation will make the saw run wrong.

FITTING CYLINDER SAWS.

First, see that the teeth are of even length, which can be accomplished by holding side or wornout emery wheel against saw while saw is in motion, after which file the teeth which are struck by wheel, then swage out full. Do not use spring set. There are two or more eccentric swages made especially for use on cylinder saws, either of which will give good results if properly used, but do not get discouraged if at first the swage does not give good results, because a little practice will be necessary to get good results with this little machine. After the saw is swaged, use a swage-shaper, as no side file will work on this type of saw. In connection with this will say that I know of only one shaper that will work on cylinder saws, though there may be others.

In order that your swage may work well you must have a high back to teeth, but this is no disadvantage, because it leaves you a stronger tooth. Next, gum your saw so that you have the pitch and depth of tooth to suit the size and kind of timber to be sawed. It is best to have plenty of room for dust; by using swage instead of spring set you can get deep gullets and still not run any risk of breaking teeth, as the swaged tooth has little tendency to bend. This is a decided advantage in knotty timber. The filing may be done by pulling the file from within outward, or in the usual way; but in case your saw does not hold to the timber as it should, you will likely get the best results by pulling the file. Give a little lead to your carriage by measuring from saw to inside rail of track while saw is in motion; 1-32-inch will likely be enough. Use a tightener on belt and see that the speed is not under 1,700 revolutions per minute—1,800 would be about right. Your saw will give much better results if you have sufficient power to hold speed up while in cut.

A little experience may not be out of place here. The filer at a stave plant near here was using a spring set and having so many broken teeth that he was forced to break off what remained and retooth nearly every week. One day he asked me if I had such trouble, and when being told that I had not, he wanted to know how he could prevent it. I gave him my method as above, and after fitting his saws in that way he had no more broken teeth.—E. L.

THE BAND SAW.

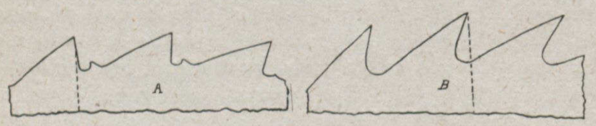
In looking over the band saw of the present day and noting the vast number now in use, I can but wonder that it came into general use so slowly, but at the present day it has not attained anywhere near the limit of its usefulness. The great drawback is in operators not knowing how to care for the saws and the poor quality of saws on the market. There are also many machines put on the market and sold for a small price, but dear at any price.

To arrange for the best results the machine should be very rigid, so as to prevent any vibration of the wheels. Every part should be susceptible of adjustment, and all running parts perfectly balanced and so constructed that they can be well and easily lubricated and adjusted. There is probably no machine that contributes more to the rapid production of a wood-working factory that the band saw. In the manufacture of lumber it is fast superseding the old circular and gang saws, as it is able to produce nearly enough more lumber from the log to pay the cost of manufacture; and I am of the opinion that it has not as yet attained anywhere near the highest point of its usefulness in that respect.

Many manufacturers are of the opinion that anyone can operate the band saw and keep the saws in order, but from my experience there is no machine in a wood-working factory that should require more attention than this one. The writer has taken a band resaw that was condemned as worthless, put the saw in condition and done first-class work with it, both in quantity and quality. I also think some manufacturers of the machine should come in for censure. They are trying to produce a machine at too small a price. The users are very short-sighted. I consider a poor machine dear at any price, while a good machine will pay for itself in a short time. The successful manufacturer is generally looking for the best machine, not for the one that can be bought for the least price.

TEETH OF CIRCULAR SAWS.

The two illustrations show how some operators of circular saws allow the teeth to become dilapidated. A represents one saw before treating, and b after treating. To make a bad matter worse, it had little or no set. It was hard to conceive how they could possibly run a saw in such a dilapidated condition. If the operators had been in such rundown condition as the saw, they would have been taken to a hospital long before the saw was taken to the mill for repairs. Because of the power it took to run the saw, the belt slipped. They put on belt dressing, then tightened the belt until the boxes were smoking hot. Yet this did not overcome the difficulty. They would saw, then wait; then saw



again, and so on, for a time. Finally the fever became so high it was of no use to try to run the saw longer, hence they brought it to the factory. B shows the condition of the teeth when it was sent home. Note the difference.

In a the dotted line represents the direction to the centre of the saw, showing the teeth filed so far back on the point that they did not have any hook at all; even filed back of the hook line. No wonder they had hot boxes, tight belts and had to use belt dressing. The line in b represents the direction to centre of saw, showing enough hook to insure fast and easy cutting, with even set or spread to the teeth equal to five gauges. These teeth will cut without having the belting so tightly strained as to cause excessive heating. I have often thought that if the men who push lumber against saws would take time to study the numerous catalogues showing the general shape of saw teeth, they would try to keep the teeth as nearly as possible like those shown.

CUTTING HEAVY STOCK ON ROTARY SAW.

There seems to be among some veneer-cutters a dislike to cutting heavy stock. Many an operator who is first-class on 1-16 or thinner, seems to be up against it when it comes to cutting ¼ or ⅜ stock on a rotary machine.

Of course, it depends a good deal on the size and style of the machine and the kind of timber to be cut. It would be foolish to try to cut ⅜-inch stock on an 8-foot machine and expect to do first-class work. The same may be said of trying to do good work on a shorter machine with too small spindles, or a machine that is loose in its bearings, or to cut such stock out of logs with soft centres while using small chucks; but with the right kind of machine and logs, there should be no trouble in cutting heavy stock, and cutting it well.

In the first place, a great many make the mistake of grinding the knives with too long a bevel. You ask ten veneer-cutters what the proper bevel for a knife should be, and nine out of the ten will say, "Three times its thickness." While this is true of a knife used for cutting thin stock, it will be altogether too thin for heavy stock. In fact, I prefer a knife ground with a shorter bevel for any kind of stock. My rule is two and one-fourth times the thickness for heavy stock, and a little thinner for thin stock.

Again, the knife should be set at the proper angle to the block; not to be set too far back, as this will cause the machine to run hard and split the block, thus spoiling much valuable timber; neither should it be pitched too far forward, as this will cause it to lean into the log, making the veneer run thick and thin. It should be set so that the block turns freely against the knife and cuts the veneer instead of tearing it off. The pressure-bar should then be adjusted so that it exerts the same pressure the entire length of the log.

A common mistake that is made is too much pressure. Many veneer-cutters seem to think if they can only get pressure enough on the block the veneer is bound to be all right. In cutting ⅜-inch stock, 1-32-inch of pressure is plenty. In fact, I do not commonly use as much as that; more than that makes the machine pull hard, thus spoiling more blocks and making quite a difference in the fuel bill in the course of a year. The operator should see that his bearings, especially the spindle bearings, are all tight, also that the knife carriage is not loose in the ways.

The blocks should then be fitted right; they should be boiled, but not too long; too much boiling makes them soft and woolly. In cutting hard maple, seven hours' boiling, with steam at 80 to 90 pounds pressure, should put them in first-class condition. They should be cut while hot; by no means should they be allowed to lie in the skids and get cold.

A cutter should study his timber. Some needs boiling longer than others. Take poplar, for instance. If it should be boiled as long as one would boil maple, it would not be worth much for veneer. To cut veneer, whether thick or thin, one must study the different kinds of timber. He must know his machine, its weak as well as its good points; in fact, he must be a mechanic, and not only understand his machine, but keep on his tiptoes every minute. He cannot chuck his block, start his machine and expect it to do the rest. It must be watched all the while, else one is bound to get some poor veneer.

CRACKS IN RESAWS.

There are filers and sawyers who claim that cracks are the result of bad saw-fitting and that there is no excuse for having them. Now, all this kind of talk is largely "hot air." There may be filers who are lucky enough not to be bothered with cracks, and sawyers who have never run a cracked saw, but it may not be because they are more expert than others. Perhaps they have not yet run up against it good and hard, or perhaps they are taking cautious measures to avoid trouble. There are lots of filers who do have cracks to contend with, but they don't let anybody know it, if they can help it.

What a lot of dodging, slyness, trickery, etc., there is among the craft! If silence is golden, then some of the brothers ought to be "real yellow" by this time. I worked with a filer, as assistant, and a very close-mouthed man he was. He would sidetrack me at every opportunity, even to sending me on some fool errand when he was about to place solder and borax in the braze, so I could not see how it was done. Now what do you think of that? There is lots of jealousy and rivalry among band saw filers, and in some cases a bitter hatred. One filer asked me what caused a crack. I said, a saw tensioned to the extreme cutting edge and having too full a back, will cause some cracks. A bad blow from a cross-face hammer may cause a crack. A sawyer may run a saw too long, and by forcing it, when dull, cause a crack. Loose spruce knots have been known to tear out teeth and cause a crack. Gum, slivers, spikes, etc., will cause cracks, under certain conditions.

There is a shop where the 6-inch resaws are tensioned from edge to edge and then crowded for all they can stand. They saw pine, spruce, hemlock, fir, etc., and admit that their saws are short-lived. Have they cracks? Well, occasionally. Can't very well help having them. Some time ago I went into a place where they run a 6-inch band saw and do some custom sawing as well as the usual routine work. I learned that, on an average, they run the resaw from two to three hours a day, but employ no regular sawyer. Going into the filing room, I found saws in all stages of "consumption." One lay on the bench, and if there was one crack there were fifty, anywhere from ¼ to 1¼-inch long, and from an inch to several feet apart, all on the tooth edge. Another lay on the floor, in several pieces, ready to be brazed. Another had just been sheared and brazed; and there were lots of pieces in the corner, showing that they did "a little" brazing now and then. There were plenty of hammer marks on the saws, showing that they were troubled with twists, or used the tensioning hammer more or less. I remarked that I was not bothered with cracks, and the foreman said he wished I could tell him how to avoid them. Wanted to know if I was looking for a job, and, on learning I was an amateur, offered to show me anything I did not know, besides paying me $18 for eight hours' work per day. Seems that he was not very well up on filing, or he might have avoided so many jobs of brazing and had better looking saws.

However, whether the filer, sawyer or saws are at fault, it is true that once in a while a saw will begin to crack, and keep cracking in spite of all one can do. Seems to be brittle and sensitive to little strain. Such is the case, at present, where I am employed. One saw developed nine cracks, while the rest give no trouble at all. Does it pay to shear a saw having two cracks 1¼-inch long, while the rest are ½-inch and less? I think it would be better to cut and braze at the two cracks, for then one still has a 6-inch saw. I generally leave ⅜-inch on the tooth edge and about ¼-inch on the back, when I tension. I don't believe in edge-to-edge tension. I always go over my saws every time they come off the wheels, as one can keep them in better shape and do it easier. Never allow two or more to get ahead of me.

Speaking of brazing, I have three ways of doing it, according to size of the job. For saws ⅛ to ½-inch, I use the blowpipe kit, and for saws ½ to 1½-inch, use the tongs and thumb-screw clamp. For all wider than 1½-inch, I use the regular 6-inch clamps and irons. When I braze a ⅜-inch saw, I put solder between the laps and on top, then heat to almost a white heat, and squeeze tightly several times. This method suits me, and rarely fails. Referring to cracks, I don't believe there is a filer living who has not had a crack to contend with some time during his saw-filing career. And, again, I say that a crack does not always indicate bad fitting.—J. H.

FILING AND TENSIONING OF BAND SAWS.

A nicely-finished tension is the first thing for a filer's consideration. It must be put in evenly from the gullets of the teeth to the back edge. Filers disagree to some extent as to the amount of tension that should be used. I have used tension levels ground to a 32, 34, 36 and 38-ft. segment, and proved a 36 to show the right tension for 19 and 20-gauge re-saws, from 4-inch to 6-inch wide, where the lumber to be re-sawed is a mixture of spruce, hemlock, fir, basswood and occasionally some hardwoods, such as many box manufacturers are using now.

Before commencing on the tension I always go over the back of the saw with the back gauge, and if the back does not conform to gauge, I roll along the back edge where it shows a hollow under the back gauge, like Fig. 1, and along the front, like Fig. 2, where it shows high for the back gauge, or is too convex along the back.

In making tests with the back gauge one should move the gauge along only half the length of the gauge at each test; for by looking at Fig. 3 you can easily see how you might be led into the error of rolling **a** and **a'** and putting a long swell in the back of the saw, that would require a lot of skill, patience and hard work to do anything like a nice job in getting back straight again; while, by placing the middle of the gauge on the high point **b**, as you would do if you placed the gauge forward half the length, and found where the saw was actually out of place, and rolled along the lines **c**, you would have fixed it right in much less time than you would spend in making **a** and **a'** conform to the back gauge, which, of course, would be entirely wrong.

Many filers use a crowned back and are very successful,

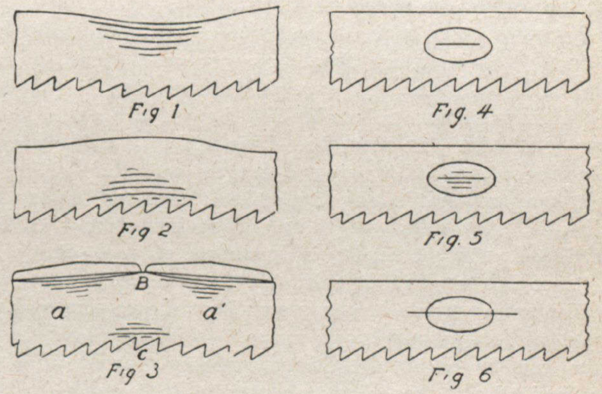


Fig 1 Fig. 4 Fig 2 Fig. 5 Fig 3 Fig 6

while others think the straight back best, and have equal success. If I receive a saw from the factory with either straight or crowned back, I continue to keep it as received, as the difference between them is a very small item—which I will explain some time in the future.

After getting the edges to fit the back gauge, the saw is ready to be tensioned, and if one is careful the edges will not have to be touched again for a long time. I have worn a 19-gauge 5-inch re-saw down to 4 inches, and have had to touch only the back edge, and to keep that along with the toothed edge, as the grinding and work of cutting made it longer.

Before putting in the tension, I go over a portion of the saw with the short straightedge and make it all as nearly level as possible with the cross-face hammer. After levelling, I raise a portion of the saw from the bench with the left hand, and with the right hand make a test with the tension level. Where I find a portion between the extreme edges that touches the drop-level and shows light on each side, it is a "fast" place, and I run the rolls over the centre of it, like Fig. 4. If that does not prove enough, I roll it on each side, like Fig. 5, repeating the treatment between the lines until it conforms perfectly to the drop-level, always confining the work within the bounds of the "fast" place, and not running over, like Fig. 6, for in doing so you are liable to put as much of the saw out of place by rolling where it does not need it as you will put in shape by rolling where it does need it. Test with the drop-level each time you use the stretcher to be sure and not over-do the work and have to roll the edges to let out unnecessary tension.

After going over the saw on the outside, I always turn it over and give it the same treatment on the inside; i.e., level it down nicely with the cross-face hammer to fit the short straightedge, and roll all the "fast" places as previously explained, so all portions of the blade will conform to the drop-level from edge to edge. You will find, by working on the inside, the saw will be driven through a little. Then turn the saw on the bench, and, with the short straightedge and cross-face hammer, give it the finishing touches on the outside. At the same time look carefully for any "fastness" you may have overlooked, but if all previous work was done thoroughly, the test at this time will show all right. After this is done the saw is ready to go onto the brackets, to be swaged and ground.

CIRCULAR SAW EXPERIENCE.

A correspondent wants to know how fast a 52-inch saw should run with a 9 x 12 engine and 80 pounds of steam to do the best work. He does not, however state the kind of wood being sawn, and, as a general rule, the softer the wood the higher the speed should be.

Figuring on a basis of 10,000 feet of tooth travel per minute, this 52-inch saw should run 750 revolutions. It will likely be found, however, especially in cutting hardwoods, that better results can be obtained by reducing this speed to 550 revolutions, or even 500. This will give a fairly good cutting speed, and by using a larger mandrel pulley to obtain the reduced speed, instead of slowing down the engine, it gives a better power and makes cleaner cutting possible at a higher feed per revolution of saw. Say what we please about saw speeds, the fact remains that due regard must be given to the power beyond the saw and the amount of feed it will stand up to. In other words, better results can be obtained with saw running 550 revolutions on a feed of 2 inches than one running 750 revolutions on a feed of 1 inch or 1¼ inches; it makes coarser dust, a cooler saw, and does better generally. Not only that, but it avoids lots of trouble that becomes incident to running saws at high speed. A skilled saw-hammerer takes pride, of course, in being able to make a saw stand up at high speed and do excellent work, but the majority of operators of small circular sawmills are not skilled saw-hammerers, and instead of trying to find out just how much they can make a saw do, a more logical thing is to study ways and means of getting the best results in a practical way with the means at hand for obtaining them. It is recognized by saw experts that too low speed has its objections, but they are not attended with the same serious effects that obtain when speed is too high. In other words, it is generally better to run a saw too slow than too fast, and there are special reasons for making note of this fact these days, because the general tendency has been to increase speed right along until we are, as a rule, running our saws too fast.

FITTING BAND RESAW.

Resaws are very liable to come off the mill with short kinks, caused by knots passing between the saw and wheel. This is so, but the resaw is no more liable to come off in such shape than the log band is, for the latter is subject to large pieces of bark, etc. I still claim it is not necessary to put the saw on the hammering bench every time it is taken off, even if the saw is only 20-gauge. There is a way of knowing whether the saw is right or not without putting it on the hammering bench every time it is brought into the filing room. After reasonable experience a filer should know the condition of his saws by the way they sound in the cut; a nice keen ring and nice, straight, smooth lumber are the surest evidences that the saw is right. When a filer becomes thoroughly practical, he pretty nearly knows what condition his saws are in, or any part thereof, by the way they feel when he is handling them in the filing room—something like the "shake" test of a circular saw. Some may not believe this, but it is a fact. By this I do not mean to say one should not use the straight-edge or tension gauge for testing tension. If saws are kinked and in bad shape every time they are taken off, it can be easily traced to careless work by the sawyer or some one, and the filer should investigate at once.

BRAZING AND TEMPERING.

After beveling the ends of saw, clean the blade 2 or 2½ inches back from the braze, with fine emery cloth, to be sure that no dirt or greasy substance can flow into the joint, then clean the bevels with a good brand of borax. Now, clamp one end of saw firmly in brazing clamps, and apply acid; then clean the other end, apply acid, and clamp so that ends of bevels just match and are perfectly straight. I then clean the silver solder with fine emery cloth, to be sure there is no dirt of any kind on it, wet the solder with acid, then wipe dry with borax and a clean cloth, and place between the beveled ends. It is now ready for the brazing irons, which must be perfectly true and fitted to the brazing clamps so they will bear alike all the way across the saw. Heat the irons so they will scale, then scrape the scale off with an old file, and apply the irons to saw quickly, letting them stay until the irons turn from a red to black—say from five to seven minutes—then remove irons and apply cold water. Take two handfuls of cotton waste, wet in cold water, and apply to both sides of saw at once. I think this gives the best results. This way of brazing and tempering is the best I have tried. It makes a good, firm and perfect joint, and one that doesn't spring. My brazes don't break in or at one side, as some do that are not hardened.—C. H.

PUTTING SAW ON BENCH.

Different people have very different ideas as to how often a saw should be put on the bench. There was a time, one says, when I thought it essential to put a saw on the bench frequently, look it over, and do something to it. I might never have found out the folly of my ways had I not been compelled to "let 'em alone." I suppose I am about the slowest and fussiest filer, when it comes to rolling, that one can find in a day's journey. I keep at it until the back is just as nearly perfect as I can get it, and tension until my plate will fit the gauge, both by bearing down and by the sag test. This is not easy to do, because to get the bearing-down test one is apt to open the plate too much. There is a happy medium, though, and when that is reached I level down, finishing on the inside of the saw. I won't pretend to say that this is the best way, but a saw will certainly run well for a long time and make nice lines; and, furthermore, won't crack. I have three saws that no one but myself has ever put up. Two of them are pretty narrow now, but wholly free from cracks; they will stand up in any kind of lumber and come ahead on the wheels. They never get rolled unless something happens to them. They have both been twisted, and neither has been rolled since the twist was reduced. Furthermore, I don't expect to roll them until they get twisted or dished again. Now, I ask any fair-minded man, what is the use of rolling them? Also, I shall have to ask some one to explain why it is necessary to put a saw on the bench every time it comes off the wheels. I have some other saws. I had one all rolled into a coil. We were sawing a stick of fat Georgia pine, there was a dodge and a squeal; then all was still as far as the resaw was concerned. This happened about ten minutes before shutting-down time, and as I realized that it was a case of twist, I left the strain on all night, hoping perhaps to help it a little. When I took it off it seemed alive until it got where it wanted to go, which was wrong side out. It took three of us to get it back on the bench where I could work on it. I fixed it and made two runs, when it twisted once more, slightly. Since then it has been doing finely, till the other day it cut off an 8-inch wire spike, striking at an angle of about 45 degrees. A dozen teeth were torn away, and I have ground a new set in. There are no cracks in it yet, and I hope to saw a lot of lumber with it, though it is but 4½-inches wide.

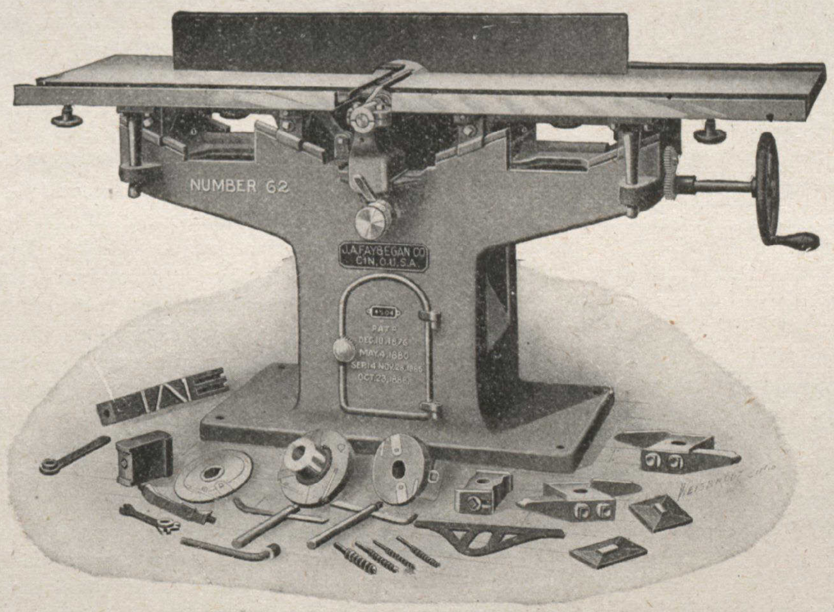
SMALL SAW-SET FOR CIRCULAR SAWS.

The following describes a home-made saw-set for swaging small circular saws. It is very simple, quickly made, and costs nothing to make. Take a 5-inch shaft collar and make a bevel one inch long, on one edge, this bevel a little stronger than the set is to be. Place the tooth over the bevel as far as desired, and, using a light machine or claw hammer, strike a firm blow. It depends on the weight of hammer how hard a blow should be given. This set will not be a spring set, but what some call a "knock set," and lasts longer than a spring set.

Speaking of swage on small circulars, will say I changed about a dozen spring-set saws over to swage saws, and ran them for four or five weeks just to see if they would do any work. Some of the sawyers (box) were complaining that the set didn't hold. I knew they had cause to complain, for they were ripping spruce, and often wet at that. It was no little task, using an upset on about 420 teeth, then grinding them to a good pitch. Saws averaged 12 inches, 14 and 15-gauge and 1-inch spacing. They cut true, but at the end of one month the sawyers complained of getting tired sooner than usual, as they had to push harder. When a nail spoiled the set, it had to be all gone over again. It caused the sawdust to fly around considerably more than the other set, so I changed them gradually back to a "knock-set"—a cross between a spring set and a swage. They ran well after that and caused no complaints. I allowed about 1-16-inch on each tooth and gave a liberal hook. If no large collar is handy, take an old gear or pulley, or anything heavy enough, so long as it has a flat surface large enough to hold the saw on. Change bevel when it gets worn.

A UNIVERSAL WOODWORKER.

The machine shown herewith is manufactured by the well-known firm, J. A. Fay & Egan Co., of 153-173 West Front Street, Cincinnati, Ohio, and is a most valuable kind of tool for any kind of wood-working shop, as it will do a variety of work that usually requires several different machines, and at the same time it does the work much better, quicker and cheaper than it can be done by hand.



No. 62 "Universal" Woodworker.

So great is the variety of work that it is entitled to the name "Universal." It will plane, out of wind, surface straight or tapering, rabbet door frames, rabbet and face inside blinds, joint, bevel, gain, chamfer, plow, make glue joints, square up bed-posts, table legs, newels, raise panels, either square, bevel or ogee, stick beads, work circular mouldings, etc., etc., rip, cross-cut, tenon, work edge moulding, etc.

The tables are of iron and each can be adjusted independently, vertically and longitudinally in relation to each other or simultaneously together to and from the path of the cutters.

For further information regarding this tool the readers are requested to write the manufacturers, who will be pleased to give full information by return mail.

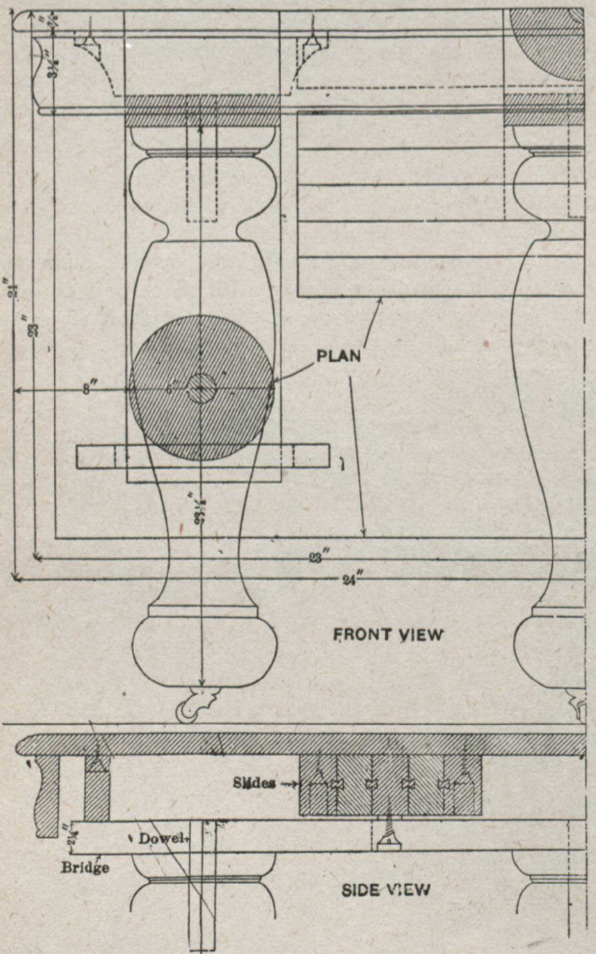
Furniture and Cabinet Making

DESIGN FOR AN EXTENSION TABLE.

The dining-table makes a good subject for a student or a furniture woodworker to study in detail drawing, as there is always an object lesson in every home. The dining-table always holds a position that renders it easy to observe its parts and the workings of them.

The height of the ordinary dining-table is 30 inches from floor to top, and the usual size of the top of the largest number of tables is 48 inches square. The rim of a table is generally 3½ inches wide.

In laying out a detail drawing of a table, first draw the front view, beginning with the floor line, then 30 inches above the floor line draw the line of top. Next draw a line ⅞ inch under the top line. This gives the thickness of the top. At the end of this stock draw the moulding needed for the edge of the table, and 24 inches from the mould draw a



perpendicular centre line for the table. Under the top stock and 3½ inches down, draw the lower edge of rim, then 8 inches from the edge of the table draw a centre line for the leg.

At 3 inches from and on each side of the centre line draw a stock line. On one side draw the shape of half the turning with charcoal, then erase the marks with a dust-cloth. A faint shadow will remain. Go over it carefully with a sharp, hard pencil, and perfect the outline. When this is done, take a tracing of the one-half and transfer it to the other side of centre line, thus obtaining the complete shape of the leg. Then at the centre line of table transfer another one-half leg, thus completing the front view. The front view of the table should be drawn in black, the plan in red, and the side view in blue. The plan should always be drawn across or under the front view.—International Woodworker.

POINTS ABOUT VENEER.

A number of things have been said heretofore about the selection of veneer, the different kinds, and where this and that may be used to the best advantage, but always there is something else to find out—something new, and here is a point: It is claimed by some that it is best to buy face veneer from one or more sources and the fillers from another. Let us look at this idea before passing judgment and see the logic back of it. The point made, and the reason given for it is, the manufacturer who makes a specialty of quality, of doing only the best kind of cutting, cannot make veneer as cheaply as the man who takes less pains and makes mostly common stock, while the man that makes cheap veneer, as a rule cannot make as good face stock as the other.

It illustrates the fact that all the market is not for the cream of a product, but that not infrequently the great bulk of the trade and the lion's share of profits may come out of the mass of business where quality is not so much an object. In faces you want quality, while in fillers cheapness is a ruling factor. Of course, some regard must be given to quality, even for fillers, but it is not necessary to have it so tightly cut as face veneer, consequently the basket factory man, or some one with a lighter machine—running lighter, too, because he does not cut with so much pressure—can turn out a thousand feet of veneer for less money than the man who cuts especially for that quality that goes to make up the faces. In other words, there is no need to pay the face veneer man's price for filler stock when you can get it cheaper from back-country mills. Sometimes the face veneer man may have a number of machines, using one with special skill to make faces, while with the others he makes common veneer to compete with the cheaper stock offered. That makes a good combination, for it enables both the faces and the fillers to be shipped in the same car and helps make up carload shipments and thus save freight.

But, generally speaking, the place to look for your fine face stock, no matter what the wood, is among those experienced manufacturers, usually located at or near the larger centres, who have a reputation for quality. Then for your fillers and plain back panel stock, take to the woods for the saving in price. It is not meant by this that all manufacturers of high-class veneer are centred around the larger cities, while all those in the woods make poor stock, but it is meant that the place to get cheap veneer is generally from the country mills, either direct or through some selling agent who handles their output. This is one place where the selling agent has a chance to do a good stroke for himself and his customers, too, by knowing where to get the best face stock, where the best bargains in fillers, and assembling them at some shipping centre so that all can be supplied to the user together. The dealer that can and will do this is a good man, especially for the smaller users of veneer, to tie to, because with his larger experience he can more readily locate just what the user needs in every case, and thus save the user both time and money, that amounts to a whole lot more than the dealer's profit.

On the subject of matching up and toning face stock there is more that can be said, too, even though it may seem to have already been pretty well covered. Sometimes it is matching that is needed, and sometimes toning. Maybe that is not just the way you would state it, but it will answer. It is like this: If you have a job in quartered oak, and it is to be heavily stained so that the original color is all practically wiped out or changed over, the main thing to aim at in jointing two pieces together is to get pieces in which the figure matches, or comes so near it that the two will go together harmoniously. Get pieces in which the tracings of the splash line have the same general contour, run in the same direction as put together, etc., and even though one piece may be white and the other red in color, presenting something of a contrast, the color will be evened in the staining till this contrast disappears, while the figure will show up nicely. On the other hand, if the work is to be finished natural, or practically so, you must frequently watch out for both figure and color. In other words, the important point is to get a harmonious tone in color. That's why sometimes it is more of a matching job, while at other times it takes on more of the nature of a toning job, because there is no chance to tone up in staining. This same logic applies to all face woods having figure and color that is used natural, and it is a good point to keep in mind.

SELECTION OF GLUE.

In selecting glue preference should generally be given to the hide glues, the ones that will spread best. The tendency of bone glue is to be so readily absorbed into the wood that either it will not spread enough or the wood will soak up so much of it before it sets that there won't be enough left on the surface to make a good joint. There are times when glue tactics must be changed, sometimes reversed. For instance, suppose you are using a close-grained wood that is, maybe, glazed a little on the surface, so that the glue does not stick to it readily. Then it is a good idea to have a penetrating glue, one that has a tendency to go into the wood, rather than to spread. On the other hand, if it is an open, sponge-like wood, you need a glue that will string out, or else you will have to size your work with a thin coat to stop up some of the pores. It is because of these and other things that people have to keep experimenting with glue—to find out what combination is best for any given purpose.

As for the cost of doing the work, that depends on so many things that it is pretty hard to give even what might be regarded as a safe starting point. The figures given above are for flat work in ordinarily well-equipped panel plants. Shaped work of all kinds costs more, though some plants may keep some shaped work within the figures named. On the other hand, it frequently costs planing mills and others doing special jobs of just a few pieces of each kind considerably more to do flat work. It is a matter of both equipment and quantity—the more quantity and the better the equipment, the cheaper it should be done. The chances are that for the work alone the cost in the average planing mill more frequently goes above than below even twice the figure named above, or $10 per thousand feet. In fact, it is not possible to give average figures on this class of work, because nearly every job is different, frequently calling for special equipment and preparations, which have to be considered carefully in each individual case.

Probably the weakest point in the average glue-room practice is in the habit of cooking glue too much. This has frequently been pointed out—that glue should not be cooked, but merely warmed till it will flow easily, and yet many keep at it, keep cooking it too much, and wondering at times what is the matter. One reason for this is the haste to get the glue ready for work; a little more rapid cooking is risked and a little more heat applied. One good remedy for this is to have a soaking tank in which to dissolve the glue before it goes into the heater, and then just a little warming up puts it in good shape—and you are safe from overheated glue. There is on this point, as on most others, a difference of opinion, but since it promises to prevent overheating it is worth trying. A tank for soaking does not cost much, and can be made by your local tinner.

BENDING WOOD.

Wood bending is based on and consists of compression. Wood does not safely stretch a particle; if it does, it breaks. So when wood is bent, the difference in the length of the wood on the inside and outside of the bend must be made up for by compression. It is important to remember this fact for several reasons. One is to protect the wood on the outside of the curve from any tendency to stretch, which may break it; the other is to not only select the right kind of wood, but also to prepare it and get it in such condition that it will compress most readily. It is because a knot will not compress readily that it makes a serious defect in wood intended for bending, and because a knot cannot be compressed readily if it is present in that part of the wood which is to be bent, it is better to have it on the outside than on the inside, though of course it is best not to have it there at all.

Any wood may be bent to a certain extent, but of course some woods bend more readily than others, and usually the more tensile strength the wood has the better it is, provided this factor is not interfered with by the unusual resistance to compression. An example illustrating this point is hickory, which has great tensile strength and bends well, too, but not nearly as easily as it would if it were not so hard and difficult to compress. Elm, which has not the same tensile strength as hickory, but is softer and more easily compressed, will therefore bend more readily than hickory, and where the strength and hardness are sufficient to answer the purpose, it makes one of the best woods known for bending purposes. White pine, which is a wood easily compressed, seems to be shy in tensile strength, and though it can be and is bent, it is not considered for most purposes a good wood to use.

What might be termed the leading woods for bent work are hickory, oak, elm, ash, and there are lots of other woods that are bent and are made to bend successfully, among them being gum, mulberry, yellow pine, willow, birch, and a number of others, but the ones named might be considered the leaders in the bent-wood industry, and the others enter more as incidentals.

There are some woods that can be bent very readily by simply soaking them in water at ordinary temperature, and many times in the bending of light articles this is all the preparation resorted to. This would indicate that water or moisture is of more importance in the preparation of bending than heat. But it takes hot water and heat both to make the best combination.

Just what proportions of water and heat are best for preparing wood to be bent is a matter in which people differ somewhat, some going to one extreme and some to another It doesn't hurt stock, and it is really good for it to be immersed in water and the water heated to a boiling point by steam. Another method, and a good one, too, is to put the stock in a box or vat and let it get both the moisture and heat by turning exhaust or wet steam into it. Some people equip a steam box of this kind and use live dry steam. This, while it helps some, is not the best method. If live steam is to be used for the heat, it is best to have the stock immersed in water and heat the water with the steam.

The bending part of the work involves more complications than the boiling, and it is rather difficult to give in detail advice as to how best to do the work, without knowing beforehand the exact amount of work to be done in each case, the kind of wood to be used, the form it is to be bent into, and the size of the piece.

One of the many points to watch out for is to protect the back or outside of the bend, to reinforce it, so to speak, while it is being bent, so that it may not give way through a sudden falling of too much strain on one point. The more thoroughly one can protect the back, not only through merely the preliminaries of bending, but the entire process, the less loss there is from breakage and the better conformity there will be to the exact shape desired. If one should take a stick of wood, and, after it has been boiled properly for bending, cut it up into short lengths, it will be found that some sections of it will be compressed more readily than others. It is this difference in compressibility that causes the tendency to irregularity in bending. This tendency leads to kinks and ruptures if the back is not properly reinforced by what are termed straps in the process of bending.

SAWS FOR VENEER.

Saws for veneer work are very thin, and require extra good care. The observance of the following method will enable any intelligent, progressive man to handle such saws successfully, however:—

First, keep saw round. This can easily be accomplished by fastening an old file onto a board, presenting it squarely to the saw and touching lightly; then move the file or jointer. If it strikes the file too much in one place, the points of the teeth will be hard, at least those most prominent. A piece of hard brick or emery wheel will not do, as it will make the teeth rounding, and not square.

Second, file square in front and bevel the back slightly. Some bevel front and back, but this is not best. Stroke the file squarely across the saw, making almost a clean cut on the tooth that sets from you, while those set toward you must "squeak" a little. This must be noticed, particularly in filing the back. Some hold the file at an angle so as to not "squeak," and get the desired level. It is understood that this bevel is but slight.

Third, be careful and file only to an edge. Use a smooth 6 or 8-inch file. Many filers soon file a saw out of round by excessive filing. The best filer I ever knew did not joint his saws at all. He noticed the front of each tooth as he filed it; if one tooth showed a little duller or bright spot, he filed the back of this tooth off.

Fourth, the amount of set is determined by the kind of timber. If green, then more set; if dry, less set and a sharper corner; that is, a clear-cut corner. For hardwoods saw should be slightly spring-set. Some run only a double swage, which is best, but more difficult to keep up, unless an automatic sharpener is used.

Buy only from the best makers. There are few who can make a perfect veneer saw, which is more difficult to make than any other saw, but when right will usually wear out without needing hammering; that is, will wear to where it needs grinding thinner. Don't let any one but a reputable sawmaker hammer or repair your saw, or it may be ruined.

Segment saws are principally used for thin, wide veneers, such as mahogany and walnut. They can be run more successfully than a solid saw and can be made much thinner; they require no hammering, if not abused. When such a saw gets sprung or out of true, send it to the maker. In gumming such saws use a soft, free-cutting wheel. Do not heat the saw. Don't use any wheel that comes to hand. A 3/8 x 10-inch wheel will not cost very much.

The proper hook is about half way. Run a short tooth with a rounding throat and good clearance on the back. Thick veneers require a little more set on collar side of saw. Expert filers swage their saws a little occasionally. This is a good plan where the corners wear badly, and is the only remedy, unless frequently jointed. Sharp, clear-cutting, regularly-set teeth are very essential.

—Electricity has undoubtedly an immense field before it. In its application to the needs of the wood-working plant, where there are, under usual conditions, a number of machines at times more or less casually employed, without going into technical details, it is generally admitted that by the employment of separate motors, and in other cases by grouping together two or three machines requiring small power to drive, some remarkably successful installations have been effected in various parts of the country.—Timber Trades Journal.

—To most of us, whose time is taken up with shop duties, the training secured by writing our experiences is evident in many directions. First, we train our hands to write what our minds tell us to; second, our minds receive special training in preparing thoughts in such a manner that they can be conveyed to others; third, our eyes are trained to see things that they would otherwise pass by. A man who writes has many things upon which his thoughts are fixed at once. This broadens his mind. He sees more things, and each is seen in more ways than would be the case did he not write. He can talk better because of this training. He reads better. What he reads is read, first, from the side of one who is looking for information, then in a critical manner, turning over the subject and comparing the way in which he would have handled the matter, with the method used by the writer. Does it pay? Yes! A man immediately broadens when he begins to write.—American Machinist.

—Many of the old-time buyers of hardwoods and veneers in the piano, organ, and furniture industries in Canada will remember E. D. Albro, who was until 1895 head of the E. D. Albro Company, of Cincinnati. Mr. Albro sold his interest in this company in January 1895, and until a short time ago devoted his attention to other lines of business. Early this year, however, he organized the Albro Veneer Company, with offices at 1932 to 1936 West 8th Street, Cincinnati, where he is again in full charge and will be glad to hear from his old friends in Canada requiring veneers, hardwood lumber, mahogany, and foreign cabinet woods.

Boxes and Cooperage

LUMBER MEASUREMENTS FOR BOXES.

When 4-4 lumber can be had that is full thickness (by which is meant that it will be plump one inch thick, then with good planing machines it may be surfaced two sides to 15-16 inch, or thereabouts, and by resawing this dressed stock on a band resaw, with a saw kerf of about 1-16 inch, two equal pieces are produced, which, when placed together, will come fairly close to ⅞ inch for both or 7-16 inch for one piece.

However, says J. M. Leaver, in Packages, as very little of the one-inch lumber that is produced nowadays will hold up full thickness (indeed much of it is actually below nominal thickness, or about 15-16 in the rough) 7-16 inch stock is not readily produced and I mention this only to call attention to the fact that there is no increase in board measure contents for 7-16 inch as compared with ⅜ inch, it being evident that as both these products are the result of resawing in the centre, a board that has been measured as one inch thick, the actual cost of stock is the same in each case.

But, if 7-16 inch stock is used for sides of boxes, the tops and bottoms must be ripped ⅛ inch wider than if ⅝ inch were used, and in like manner if 7-16 ends are used instead of ⅜ inch the cross-cutting of sides, tops and bottoms must be ⅛ inch longer than if the ends were only ⅜ inch thick.

The foregoing remarks apply equally to the results of resawing, in the centre, boards that are 5-4 and 6-4 thick in the rough, but dressed two sides sufficiently heavy to produce 9-16 inch and 11-16 inch respectively, the principle governing these thicknesses being the same as for 7-16 inch, and, of course, as in the latter case, there is no increase in board measure over and above the ½ inch and ⅝ inch thicknesses.

If it were possible (and I am not asserting that it is not possible in some cases)to obtain better prices for 7-16 inch, 9-16 inch and 11-16 inch stock than for ⅜ inch, ½ inch and ⅝ material, then the question will arise as to the rough stock being suitable thickness, and if the better prices are in reality enough better to cover some disappointments in connection with the practical working of these thicknesses.

But my object at present being that of getting the mind of the beginner to grasp the results by board measure, I must pass over the working points.

In our methods of styling thicknesses we are not at all uniform, for instance while we know that ½ inch rough, 7-16 inch and ⅜ inch surfaced mean one and the same thing so far as board measure contents is concerned we do not make sufficient allowance for the buyer's ignorance; and thus we get inquiries for ½ inch surfaced one side, which may mean just what it says and, therefore, be the product of 5-4 lumber resawed, or may be meant for ½ inch in the rough dressed one side to ⅜ inch or 7-16 inch, and so on, as far as other thicknesses are concerned.

And the beginner is apt to be confused by these points, for undoubtedly no two inquiries for quotations come to him just alike, and he is, therefore, likely to blunder either one way or the other, unless he has an opportunity of inspecting the material being used by the buyer, so, of course, if he figures on 5-4 stock where 4-4 is all that is needed to meet the case, his quotation is hopelessly high and he is apt to do some more figuring in the way of shading prices to get the business, not realizing that he is wrong in principle, rather than that his methods of figuring expense may be wrong.

We know that beginners are usually optimistic as to their ability to beat the experienced box man at his own game, sometimes excessively so. No premonition of loss or disaster exists for such, or at least if in a little time matters do not look so bright they are content to think they will get the next business offered, at better prices, and so recover some or all of the lost ground; if the box business was one that admitted of large profits, there might be some reason to expect recovery from mistakes, but as the business has been in years past, is now, and probably will remain, such hope is vain.

Nowadays so many parts of boxes are made from stock which is thinner than ⅜ inch that I am sure, however the beginner may have fixed in his mind the proper methods to figure the thicknesses already given, he blunders now and then on the figuring of the thinner parts, and, therefore, the subject becomes one of first importance.

Beginning with lumber 1 inch thick, in the rough, we have a good many boxes made from this stock with two resawings which give three pieces from the 1-inch board. Each resawed piece being, therefore, just equal to one-third of the board from which this piece was produced, such stock has, from custom, become generally known as "quarter inch"; it really is nothing of the kind; it should be called and figured "one-third inch." I think, perhaps, that as this material has in most cases been surfaced on one side and the nearest thickness on the rule being ¼ inch, it has been so called for convenience, just as ⅜ inch is the product of ½ inch of lumber. And as in figuring boxes we must always consider there are two pieces of each part required to complete the box, so we must in this case figure that ⅔ inch board measure is the proper fraction to use, and, therefore, where figuring box parts where made from ⅓ inch board, we must take ⅔ of the contents shown in the 4-4 tables of the "Box Estimator," or say,

$$12 \times 12 \times 1 = 1.000 \text{ Feet}$$
$$12 \times 12 \times \tfrac{2}{3} = .667 \text{ Feet}$$

Then we have the problem of producing four pieces from 1-inch lumber in the rough, by three resawings, which product, while figuring one-quarter of board measure, is frequently quoted as 3-16 inch; but as we must, for box parts, use two pieces for each part, only one-half of a 1-inch board is necessary to produce a pair of parts, thus:

$$12 \times 12 \times 1 = 1.000$$
$$12 \times 12 \times \tfrac{1}{2} = .500$$

And it will be evident that, if five pieces are produced from a board 1¼ inch thick, by four resawings, or six pieces are produced from a board 1½ inch thick, by five resawings, the board measure contents of the resawed product always represents the same amount as if made four pieces from 1-inch lumber.

But when we attempt to analyze the product of 1¼-inch lumber which has been resawed twice, or, in other words, from which three boards have been made from one, we find that the thin board is not susceptible of representation in thickness by any of the ordinary terms used to designate fractions of an inch, nor when we put two of these thin boards together to figure a pair of box parts do we find the problem any easier; yet by using the "Box Estimator" and taking the contents of the 5-4 tables, dividing same by ⅓ for one piece, or ⅔ for two pieces, we get the board measure contents at once. Then when four pieces are made from a board 1¼ inch thick, we know that the board measure contents of one of the thin pieces is exactly 5-16 inch of 1-inch lumber and hence for box parts, used in pairs, ⅝-inch lumber is required, so, taking the contents results from the "Box Estimator" tables for 5-4 lumber, we need only one-half of the figures there given.

Thus, in board measure

12 × 12 × ⅓ of 5-4 = .417
12 × 12 × ⅔ of 5-4 = .834

And

12 × 12 × ¼ of 5-4 = .313
12 × 12 × ½ of 5-4 = .625

For 6-4 lumber we have, for once resawing, in each piece exactly ¾ of the contents of 1-inch board, say

12 × 12 × ½ of 6-4 = .750

For 6-4 lumber resawed twice, we get precisely the same board measure contents that we do if 1-inch-thick lumber is used, and resawed in centre, i.e., for each piece of the product, viz:

12 × 12 × ⅓ of 6-4 = .500

When three resawings are made in a 6-4 board then each piece equals ⅜ of 1 inch thick or

12 × 12 × ¼ of 6-4 = .375

And, of course, box parts, being in pairs, require double the amount of board measure feet. The figures for the box parts would be:

12 × 12 × ¾ of 6-4 = .750

or just one-half of the contents tables of 6-4 lumber as shown in the "Box Estimator."

If we deal with five pieces from 6-4 lumber, we find no term in board measure which properly expresses this product of a 6-4 board after being resawed four times. It is nearly 5-16 of one inch thick, but not quite. The product is, however, just one-fifth of the contents of the 6-4 tables of the "Box Estimator," and for box parts as we need two pieces for each part then two-fifths of these tables will express correctly the board measure contents thus:

12 × 12 × 1-5 of 6-4 = .300
12 × 12 × 2-5 of 6-4 = .600

I am not aware of any great amount of 8-4 lumber being worked into boxes. Yet I do know it is used occasionally, and I think it better to illustrate this a little.

12 × 12 × 8-4	= 2.000	No resawing.
12 × 12 × ½ of 8-4	= 1.000	Resawed once.
12 × 12 × ⅓ of 8-4	= .667	Resawed twice.
12 × 12 × ¼ of 8-4	= .500	Resawed thrice.
12 × 12 × 1-5 of 8-4	= .400	Resawed four times.
12 × 12 × ⅙ of 8-4	= .334	Resawed five times.
12 × 12 × 1-7 of 8-4	= .286	Resawed six times.
12 × 12 × ⅛ of 8-4	= .250	Resawed seven times.

The foregoing figures being for one piece of each description of product of the 8-4 plank, must, of course, be doubled after resawing commences.

The 8-4 tables of the "Box Estimator" are intended for the figuring, in pairs, of parts of boxes made from 1-inch lumber, these being usually known by the term of ⅞ inch, and these 8-4 tables are also used for the surface measure contents of a pair of parts for any box.

When resawing of 8-4 commences we find that dividing the plank in the centre brings us back to the 4-4 problems, which have already been explained, but if we resaw the 8-4 plank twice we have a product which can be expressed only by saying it is ⅓ of 8-4 so far as board measure goes, and the 8-4 figures thus in pairs for box parts:

12 × 12 × all of 8-4	= 2.000	Resawed once.
12 × 12 × ⅔ of 8-4	= 1.334	Resawed twice.
12 × 12 × ½ of 8-4	= 1.000	Resawed thrice.
12 × 12 × 2-5 of 8-4	= .800	Resawed four times.
12 × 12 × ⅓ of 8-4	= .667	Resawed five times.
12 × 12 × 2-7 of 8-4	= .571	Resawed six times.
12 × 12 × ¼ of 8-4	= .500	Resawed seven times.

Now the foregoing examples of thin lumber do not cover by any means the combinations which are made by many manufacturers to suit certain conditions; there is the manipulation which takes place by resawing (not in the centre) but to one side of the board, producing different thicknesses from the same board to suit various orders.

The usual result of such proceeding is to increase labor cost by reason of slower cutting and more handling, which increase also adds to fixed expense because of decreased factory output, and there is liable to be more waste made when such combinations are attempted.

The beginner should be very careful about attempting difficult combinations. The experienced manufacturer knows exactly what these things mean in the way of cost and risk, and never undertakes them unless there is a better price obtainable for the article produced from the special combination, and a sufficient and satisfactory outlet for the balance of the stock produced while the specialty is being made.

To arrive at the board measure contents of each thickness produced by special manipulation of any board used, the rough measure of the board must always be made up, when the resulting thicknesses are figured together, nor must the saw kerf be forgotten, one-half of it belongs to each piece produced, therefore, the fractions which represent the different pieces must, when added together, equal the rough thickness of the original piece from which they were manufactured.

STAVE MILL REFUSE.

The successful management of a stave and heading factory depends largely on the profitable sale of the refuse—wood unfit for cooperage stock. A part of every block is refuse, even in stock of the choicest selection. When the rough stock is inferior, the percentage of refuse is, of course, largely more than in good wood. When there is a good and profitable sale for stove wood, the problem is partly solved, because the "clippings"—waste from the edge of the staves in jointing—are small and dry and make the best of kindling wood for starting fires. I have seen fires made with clippings that baked the most delicious biscuits, fried the sweetest pork chops and boiled coffee that was unsurpassed in the neighbourhood. When a man or a woman breaks clippings awhile to use in a stove, or handles them anyway, it is a grand luxury to pick the splinters out of the fingers and see how good it feels when it quits hurting. The heavier clippings are the better fuel, but heavy clippings reduce the width of the staves and lessen their value, hence a clipping wider than necessary to secure a good joint is not to be tolerated.

Clippings, to meet a ready and profitable sale, should be tied in bundles of uniform size and one end chucked against a board or flat surface to make all ends even. One string around the middle of a bundle is enough, a thin wire is as good, and cheaper than a string. Then sell them at a uniform price. Cull staves that are rejected at the jointer, if unfit for roofing boards, are bunched with the clippings, and increase their fuel value, because heavier and more lasting in the fire.

In circling heading, a small margin is usually allowed in the width of the "match" to insure a perfect head. However, most managers are so careful of their stock after it has been bought, sawed, stacked, dried, planed and jointed, that they put the margin to the minimum by requiring that the circlings break in two every time, unless defective stock requires a broader match to shun defects. The man that matches the heading is the one that is responsible for all the waste, or entitled to praise and credit for the saving.

Circlings are tied in bundles when they do not break, thirty pieces making a bundle. These bundles sell the same as clippings, two cents a bundle when delivered, or three bundles for a nickel at the factory. All circlings that break in two are called scraps and are handled with a shovel easily. Many people prefer circlings to clippings, because they are stronger fuel. Circlings are always thoroughly dry unless allowed to get wet after they are made. One person can take a circling on a block and with a hatchet split off the long corners, then break it in the middle, unless it is too strong in consequence of too much timber having been wasted in making it. A bundle thus prepared makes a batch of wood that is nice to have in any family. Circlings and clippings are sold at almost fabulous prices in localities where kindling and dry wood are scarce.

A large amount of undried refuse drops from the heading saw. All except heading is refuse. Bad sawing, bad timber, iron bolts, dogs, nails and spikes all tend to assist in the production of refuse. If blocks are split with a saw, the first piece from the block may be good heading, but if split with a maul and wedge, the first piece is always refuse; also, the last of every block is always refuse. It may thus be seen that unless there is profitable sale for stove wood it will not pay to buy inferior timber for use in a stave and heading factory; even then I believe the most inferior sticks should be taken with care at reduced price. As a rule, consumers do not clamor for stove wood that is over sixteen inches long; therefore, when our people saw long heading they pass the refuse to the cut-off saw and cut it in two, making short stuff, for which they find a ready sale at good prices.

A large amount of first-class wood is spoiled and becomes refuse in consequence of the ignorance, inexperience and carelessness of the operatives. A great amount of refuse drops at the heading saw from the inexperience and inattention of the sawyer, because he fails to place the block fairly against the gauges, and one end or one edge is made too thin, and it is refuse. Again, the sawyer too often thinks a block is finished when there is another splendid piece of heading on it, which becomes refuse as soon as he drops it. And, again, often the sawyer keeps the dogs adjusted too far from the saw, so that when the last cut in a block is placed against the gauges, the dogs will not grasp it for lack of a little more thickness; whereas, if the dogs were ¼-inch from the saw, as they should be, another piece could be sawed off with safety. Then, frequently, the saw to give clearance, cutting eight pieces from a block wastes kerf is too broad. If it cuts 1-64 more kerf than is needed 8-64, equal to ⅛-inch. It is very often noticed that at the finish of a block it only lacks ⅛-inch of being thick enough for the dogs to grasp it, and a good piece of heading must pass off as refuse. A foreman who is not a practical heading sawyer will not recognize these minor wasteful details or be able to correct them.

Large quantities of refuse also drop from the stave machine. All culls that will not do for roof boards are fuel. The last piece of each stave bolt, called a "core," is a beautiful size for a stick of stove wood, and when these and the culls are cut in two at the cut-off saw, they produce stove wood that consumers seek with energy. Often a core is dropped when another good stave could be cut from it, if the stave-cutter had known his business and been careful. Almost any man will be surprised at the enormous number of roof boards that can be selected from the culls as they drop from the stave machine. Thousands are soon accumulated if the selection be closely made. Roof boards sell readily for 25 cents a hundred; no drying, stacking or jointing; they cost nothing except to select them.

HOW FRUIT BASKETS ARE MADE.

A writer in the Toledo Times Bee thus describes the manufacture of fruit baskets in that region. From the rough log to the finished basket is a quick process to the myriad of skilled hands to which the labor of manufacture is allotted. And their work is of such a high degree as to merit the commendation of the most critical fruit-packer, for to be successful the basket-maker must be as honest as the fruit-grower is in packing and shipping, and all cripples are thrown away in the infancy of their make.

The bark is taken from the rough logs as an initial process, the tree trunks being stripped of all outer covering. An endless chain arrangement hauls the now dressed log into the factory, cutting it the desired length for the several uses required, by the steam saw. The big veneering machines carve the wood in huge continuous sheets of the thickness desired for the splints to be used—whether for the main basket splint for half bushels or for the rims of the different sizes or grades, as the case may be. From the veneering machines the wood sheets are placed on to the splint-cutting machinery. This huge cutting device has a long blade, operated by steam power, continually working up and down, the wood sheets passing through an inch, or the desired width, after the rising of the huge blade for a second heavy drop on to the wood, and so on until the entire veneered product is cut into the desired splints.

For bushel baskets a splint in length 62½ inches, 1¼ inches wide, and ⅜-inch thick is used for the top-side enforcement, while a thin paper-like splint, much shorter and wider, is used for the body of the basket. For half bushel baskets a splint 46 inches long, 1 inch wide and ⅛-inch in thickness is used for the top rim, the bulk build of the basket splints varying with the kind made, the splint in all instances being thin for the body manufacture. The average-sized splint for half bushel manufacture, however, is about 32 inches long, and the body splint of the bushel basket is 32½ inches long, 1⅞ inches wide.

In the manufacture of the bushel basket, after the splints for the trunk basket and for the rims and handles, a braider and tacker is required. The bushel braiding machine is built on the order of a large circular stand. At two inch intervals are grooves in the top of the braider. Into these grooves the bushel splints are fitted by the braider, the opposite end easily fitting after the one end has been inserted. When all the grooves have been filled, large, heavy tacks are driven through the centre of the braid, firmly held with a tin button. The finished braid is cast on a pile and the process continued. The tacker then picks up the finished braid, placing it on the tacking machine. The device has a large iron form, the shape of the inside of the finished basket. To this the braid is placed, being held on the form by a pinion in its middle. A large handle lever pulls the form into a wedge, a trifle larger than the form itself, causing the basket to assume its embryo shape.

Now the rim is tacked along the top, with a small reinforcement rim half way down the basket. This finished, the part basket is piled up and later sent upstairs to the second floor of the factory, where the small rim on the bottom is tacked on, and where the expert handlers nail on the handles with 1¼-inch wire staples. The handles are bent by being shoved, in the early condition of the wood, through the steam boxes, as is also the log before being placed into the veneer and cutting machines. The handles are bent and placed on edges in the handle-holders. The baskets are then entirely finished and taken to the dry-rooms, where, at an exceedingly high temperature, the baskets are thoroughly dried within a few hours. The covers for bushel baskets are packed in dozen lots and given to the growers separately.

The manufacture of half bushels, pecks, and fifths is on the same order as that of the bushel makes. The forms, of course, suit the size of the basket, and the braider machines have the grooves fitted square instead of round. The forms fit the form-socket by foot-lever, too, instead of hand-lever. The work of manufacturing halves, quarters and fifths, and the other sizes, is much easier than that of bushels. The handles for these smaller sizes, which are larger than the handles of the bushels, are bent in the same manner as the bushel handles.

The speed in manufacture of baskets by skilled workmen is a wonder to the onlooker. The braider no sooner completes the braid than it is jealously snatched from the pile by the tacker, who, with his mouth as a tack-box, nails around the sides and rims in lightning time.

TRUNK BOXES AND TOOL CHESTS.

For quite a long time, probably ever since built-up lumber from veneers has been in use, the best trunk boxes have been made of veneers.

There are now some cheap trunks made of solid lumber because it is cheaper, but all the better trunks have both the boxes and the tops made of veneers, or rather of built-up lumber. The traveller, of necessity, must have a strong trunk, substantially fastened together to stand the wear of handling in and out of baggage cars, and to get the strength and size desired frequently involves so much weight in a trunk that when it is filled it runs over the free allotment weight of 150 pounds, and he has to pay for what is called excess baggage. Naturally it doesn't take many trips or many payments for excess baggage, to use up as much as the trunk cost, and the majority of travellers would rather pay two or three times the price of the trunk originally, and have it made a few pounds lighter, provided they could get the same strength. The way to get this, to get the highest degree of strength, is by the use of three or five-ply built-up lumber made of veneers.

The wide use of veneers in this manner, and the success their use has attained, suggest the possibilities of further extending it in various other lines. Take the line of tool chests, for example, which is quite a large line when we consider the entire country, and here, as in the trunk, business weight is frequently quite an object. Strength is always an important item, and unquestionably in the making of tool chests, as in the making of trunks, strength and lightness of weights can be obtained by the use of veneers. This applies not only to big tool chests, but also to the smaller ones used by carpenters in carrying certain of their tools about their work. The tools themselves make weight enough, and light, strong boxes should appeal especially to them—sufficiently that the difference in the cost of making them should be readily paid.

Not only that, but there is another reason why the tool-box people should emulate the trunk people, both in construction and finish. The carpenter or millwright's tool-box, made and finished like the trunk, with end handles on it, can be packed with overalls and jumper any time and checked along as baggage, whereas if he used the regulation box he would have to let it go as freight or express. There are many points in favor of the extensive use of veneers in making tool-chests and boxes, both for woodworkers and for some of the metal-workers, and it is a line that both the veneer men and panel manufacturers might look into during the present slack period and make a start toward extensively developing. It doesn't call for fine veneers, but rather for tough native woods, and if once fully developed it should afford quite a market for veneers and built-up stock, both for bodies and tops, just as to-day the trunk trade furnishes a good volume of the business.

HORIZONTAL BAND RESAWS.

Little or nothing is usually said about this machine, though it is one of the best machines that has ever been put on the market for box factory work. It not only increases the output of a box factory 50 per cent., but it saws the stock much nicer than can be done on a vertical resawing machine.

Some people have an idea that the vertical band resaw can cut more box shooks in ten hours than can be sawn on a horizontal machine, but as one who has had experience with both vertical and horizontal resaws, I say it is impossible to put as many box shooks through the vertical resaw as can be put through the horizontal machine in ten hours. Why? Because a horizontal machine that is up-to-date is equipped with an automatic hopper feed, with a steel chain and steel bars with which to deliver the stock to the saw. The completed shooks can be placed in the hopper, feed in large bunches, and each piece is delivered to the rolls before reaching the saw, by this automatic arrangement; and the beauty of it is, a continuous feed is maintained as long as the shooks are kept piled in the hopper feed.

The advantage the horizontal band resaw has over the vertical is that boxes 20 and 26-inch wide, made out of pieces that are 1½ to 3-inch wide, can be resawed on the horizontal in one piece, whereas on the vertical machine it is necessary to saw one piece at a time. Another thing:—If the boxes which are being sawed are, we will say, 26-inch wide and not any more than 18-inch long, it will certainly keep the man feeding the vertical machine on the jump to keep one piece close behind the other, unless the stock is fed on a very slow feed; and even at that it would be utterly impossible for the resawyer to pick up the complete boards and put them in the rolls of the vertical machine, if they were 18 or 20-in. wide and very short.

At present we are making boxes out of Balm of Gilead lumber. Any one who has had experience in fitting saws to cut this lumber will admit it is a tough proposition. I would rather saw hard maple any time. The boxes are 19-inch wide by 25⅜-inch long. I was watching the horizontal machine at work this afternoon and timed the machine on slow feed. It was turning out twenty-three pieces to the minute. We were running on slow feed because the stock had to be tied up in bunches, and the boys doing the tying could not keep up if the pieces came out any faster. When resawing stock that does not have to be tied, we turn out about forty pieces to the minute of this same stock.

It is impossible to do this work on a vertical machine, unless the double tongue and groove are made so tight that the pieces have to be driven together, so they will hold while the resawyer is turning them up to be put in the rolls of the machine. One cannot put as many pieces through the vertical machine as can be put through the horizontal, even then, because if the feed were fast as the horizontal, and the pieces very short, they would be out of the rolls before the resawyer could get hold of another piece. Then, again, a good many boxes are not double tongued and grooved. It would be out of the question to drive these pieces together to hold so that they could be picked up and put into the rolls of the vertical machine, without coming apart. The only way this box could be resawed would be to saw one piece at a time until the whole width of the box had been sawed. This would be a very slow way indeed.

Buying a horizontal band resaw for box factory work is a very important undertaking. The buyer should not take the first that is offered unless he is sure the machine has all the necessary equipment for his work. He should see that the machine is equipped with a good automatic hopper feed, with steel chain and steel bars to deliver the stock to the rolls. He should also see that the chain is so constructed that the steel bars can be easily spaced for different lengths of stock. And he should see that the machine is equipped with a sectional roll, so that pieces of uneven thickness may be fed through as though the stock was all of uneven thickness. The next important thing is to see that the machine is constructed so that the cut will be close to the driven wheel, as this will insure a large capacity. One more very important thing to see to is the latest improved straining device. This, on a horizontal band resaw, should be very sensitive, and so arranged that it can be easily adjusted.—W. Thompson.

PROPER JOINTING OF STAVES AND HEADING.

By James Innes.

What is a theoretically perfect joint on staves? It is a segment of a circle, the diameter of which is governed by the length and bilge of the stave; in other words, if a stave 30 inches long, with a ¾-inch bilge, was laid on the ground; a peg driven in the ground and 16 feet away from the centre of the stave; a string attached to this peg, extending to the outside edge of the stave at the centre, should travel exactly along the outside edge of the stave, and if continued in the circle meet the opposite end of the stave, after completing the circle. Thus:—

By using the above method, what the old-time coopers called a "round barrel" is produced, tight at the head, quarter and bilge; provided the staves are manufactured with proper circle, jointed with a slight under-cut, and no staves put up so wide, that they will buckle in.

While the above is both theoreticaly and practically a perfect joint, a satisfactory joint can be made on staves varying considerably from the above, even the "cock bilge," and producing a tight barrel; providing that at all times the quarter is straight enough, so that the staves at their ends and the bilge come together without leaving openings at the quarter.

The barrel, however, is never as strong as when the staves are jointed on the circle (as above), as it is only the quarter hoops that hold the staves in place, and if these hoops are released the staves spring out at once in an attempt to form an arch.

The principal errors to avoid in jointing staves are, first, to put too much under-cut on the staves; and next, the breaking away of the staves on the under edge when jointing.

Providing the staves have too much under-cut, when the barrels are shaved it is liable to leave an opening where the wood is shaved away, and where steam trusses are used often causes buckling in. This matter, however, can be easily avoided by the cooper.

The breaking away of the staves on the inner edge can be absolutely prevented by the jointers having their knives sharp, their bed-plates square, and on no account allowing the staves to tip when jointing.

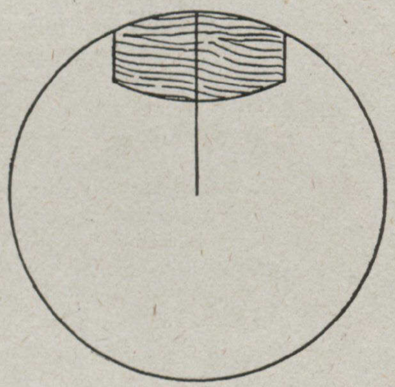
If the staves are dry when they are jointed and the above rules are conformed to there will be no trouble so far as the joints on the staves are concerned.

Nearly every old cooper you speak to will tell you that the proper way to joint heading is to leave a slight opening in the centre; in other words, they say leave your heading slack in the centre.

This is a relic of by-gone days, when all heading was air-dried. When the heading was made, and put up into bundles, out of what was supposed to be thoroughly seasoned timber, and kept in a warm, dry place for months, the outside of the bundles would naturally dry more than the inside, as, no matter how long heading boards have dried on the yard, when they are turned up and stored in a dry place, they will still season. The old-time coopers found that the heads shrank on the outside to some extent, and consequently, if they were left open in the centre, a fairly tight head was the result when they came to use them.

In these days, when heading is all supposed to be kiln-dried, and should be kiln-dried, it should be jointed with a perfectly straight joint.

To get a good joint on heading with a wheel jointer, it should always be jointed with the grain, otherwise a small joint will not be made. Where a saw jointer is used, the best saw-joint is undoubtedly made with a large saw, dropped on the centre of the board. Some coopers prefer a saw-joint, others a wheel joint, but it makes no difference, so far as a perfect head is concerned, provided the board, when being jointed, is kept perfectly flat and at right angles to the wheel or the saw, and all wane taken off.



The principal faults in heading joints are; Leaving wane on the edges of the centres or inside of the cants; jointing agaisnt the grain, causing the heading to tear, and not jointing the wane off defective timber.

There is generally a good deal more trouble caused to the jointing of the heading after it has left the factory than at the factory on account of the heading being stored in unsuitable places, and if kiln-dried heading is stored in a place where it is exposed to damp it will swell and shrink. according to the weather, and the joint is bound to go off.

Provided manufacturers will see that the heading is jointed on the square, perfectly straight, and the coopers take care of the heading, after they receive it, when shipped direct from the factory, there is no reason why a perfect joint should not be on the heading at all times.

COOPERAGE STOCK MARKET.

Toronto, June 24, 1908.

The weather through the month has been very favorable for seasoning cooperage stock, and the mills are now beginning to catch up on their orders, and coopers are getting better supplied with cooperage stock than they have been for some time.

The weather has been favorable to the crops; the danger to the apple crop is now practically over, and every indication is that there will be a good, fair apple crop throughout the whole of Canada where apples are raised.

The wheat crop, both in Ontario and in the West, promises to be the best harvest for years, which is especially true in the case of Ontario, the wheat throughout the whole district promising the best crop for years, so that if nothing unforeseen happens between now and our harvests there will be more Ontario wheat on the market than there has been for a long time.

The demand for apple barrel stock is now exceptionally good for this season of the year. Most of the small coopers throughout the country feel safe in ordering at least one car of apple barrel stock for prompt shipment, and larger manufacturers buying, both for prompt and future delivery.

The general trade throughout the country is also very good. While there is not as much cooperage stock being used for flour at the present time as usual, this is no doubt caused by the great fluctuations in the wheat market, but as soon as the market settles down there will be a big run of flour in wood.

The sugar trade is using more barrels this year than it has done for two or three years past, and indications are that more sugar will go into wood this year than for some time.

Prices show an upward tendency, especially hoops and heading. There are not a great number of mills in Canada who have the proper equipment to kiln dry heading, and, as there is not only a heavy local consumption, but also a large export demand for Canadian heading, the mills with kilns are running to their full capacity and marketing their products at remunerative prices.

In all probability there will be an advance on prices on all lines by the 1st of July, as most mills are now pretty well cut out of logs put in during the winter, and will have to truck, which, of course, makes the logs cost considerably more. We, therefore, look for a considerable advance in all kinds of cooperage stock about the 1st of July.

J. S. Emerson, of Vancouver, has disposed of a half interest in his lumber business for about $250,000 to P. D. Roe and Robert Abernethy. The property includes the Emerson cedar mill at Port Moody, the four tugs, "Erin," "Shamrock," "Evergreen," and "Afton," and the logging business scattered at various points along the coast between Vancouver and Broughton Island. It is the intention of Messrs. Emerson, Roe & Abernethy to be immediately incorporated as the Emerson Lumber Co., Limited. Incidental to the large sale was the disposal of the McRae mill at North Vancouver by Mr. Emerson. The purchaser was D. W. Grant, with whom are associated several others. The new owners have taken over the plant and will proceed to erect a small shingle mill. The new concern will be incorporated immediately as the North Vancouver Lumber Co., Limited.

Some one has written: "A little drop of oil, a little bit of care, saves a lot of toil, avoids a lot of wear," which, although it barely escapes being a platitude, is nevertheless worth remembering, especially with machines designed in the old way. The modern method of designing machinery, however, should be that of making each bearing self-lubricating so far as possible. The idea that all machines must necessarily require a lot of personal attention in the matter of oiling every bearing is nonsensical. There is no more reason why each bearing on high grade machinery, at least, should require personal attention than that a footbridge should be built without railings. Let the machine tend to its own lubrication, and we make it much more efficient and durable. The constant need of attention to lubrication becomes a drudgery and is a waste of useful effort, which might better be employed in increasing the output.—Machinery.

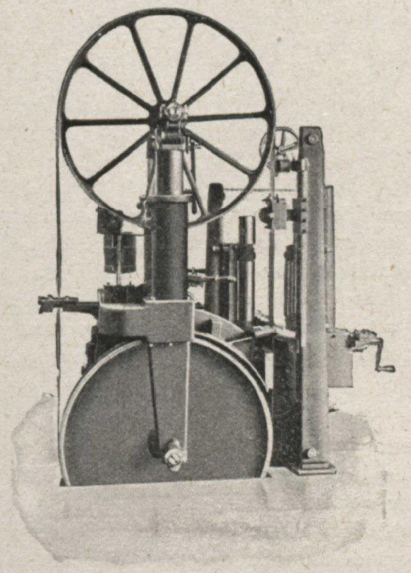
Machinery and Mill Equipment

CLARK-DEMILL BAND RE-SAWS.

The No. 132 and 204 band re-saws made by the Clark-Demill Co., Limited, Hespeler, Ont., are machines which are taking particularly well on account of their exceptional merit. The No. 132, 48-inch, has feeds as follows: 15, 28, 41, 54, 67, and 80 running feet per minute, while the No. 204, 54-inch, has feeds, 15, 32, 49, 66, 83 and 100 running feet per minute.

These machines embody all the conveniences and attachments that are necessary or desirable for any kind of re-sawing within the capacity of the machine, and have ample power, both on the blade and in the feed works, for any reasonable demand, while all parts liable to breakage are reduced to a minimum, and a complete system of numbering and lettering applied and available when repairs are necessary.

All the adjustments are easily and quickly made, and those necessary for a change from one class of work to another are all made from the operator's position at the working side of the machine.



Back View.

The frame is box shape, very heavy, with broad base, which, when properly set, prevents all vibration of the machine when running. The bottom spindle is 2 11-16-inch diameter, has four bearings, two on frame, one outside of pulleys, and one outside of saw wheel. The top spindle is 2 5-16-inch diameter, with double bearings.

The wheels are of a form and dimensions which have been found correct from experience. They hang between heavy vertical columns, which are rigidly bolted to the base. The top wheel is raised and lowered by screw from front or back of machine, and may be adjusted independently when necessary to level the upper spindle. The lower wheel is very heavy, with a solid web in centre. The upper wheel is as light as possible, consistent with strength. The faces of both wheels are accurately finished on their own journals, ground in a special manner after the wheels are placed in position on the machine. Every wheel is tested for running accuracy before being shipped.

The feed works are driven by belt. The arrangement is the most simple possible, every adjustable part being within easy reach of the operator at his position. The rolls are driven by spur and bevel gears, all cased in, making the motion smooth and noiseless even at the fastest speed. Six feed rolls carry the stock to the saw, all of which are driven by cut gearing. The right hand rolls are rigid in their boxes, but the left hand rolls are elastic so as to grip uneven stock and hold it firmly up against the rigid rolls, thus making a powerful feed, even on very unequally sawn lumber.

The self-centering attachment is so arranged that by one movement of a handle the rigid roll becomes elastic, so that you have a complete self-centering machine, or by one movement of the handle the right hand roll becomes rigid again. This special feature was invented by the Clark-Demill Company, and does away with the use of a wrench to make your machine self-centering.

The rolls will tilt from 0 to one inch in six inches, allowing of the successful sawing of clap boards and other bevel work. They are held perfectly rigid without the using of a wrench.

The blade is strained by special double-acting knife balance levers with detachable weights, the strain being determined by figures on the weights. Blades up to 4 inches wide, 24 feet 6 inches long, from No. 19 to No. 22 gauge, may be used.

The guides have adjustable hardened steel back, flat roller, with front and side blocks, adjustable on planed ways. The lower guide is adjustable. The upper one is counter weighted and instantly adjustable vertically to the width of the stock. We also furnish a back guide to steady the saw on its upward travel.

The saw runs within an inch of the centre of the back roll. When doing bevel sawing the feed works can be drawn back by one movement of a lever so that the saw cannot strike the rolls while they are tilted. The rolls cannot be tilted until the feed works are drawn back from the saw.

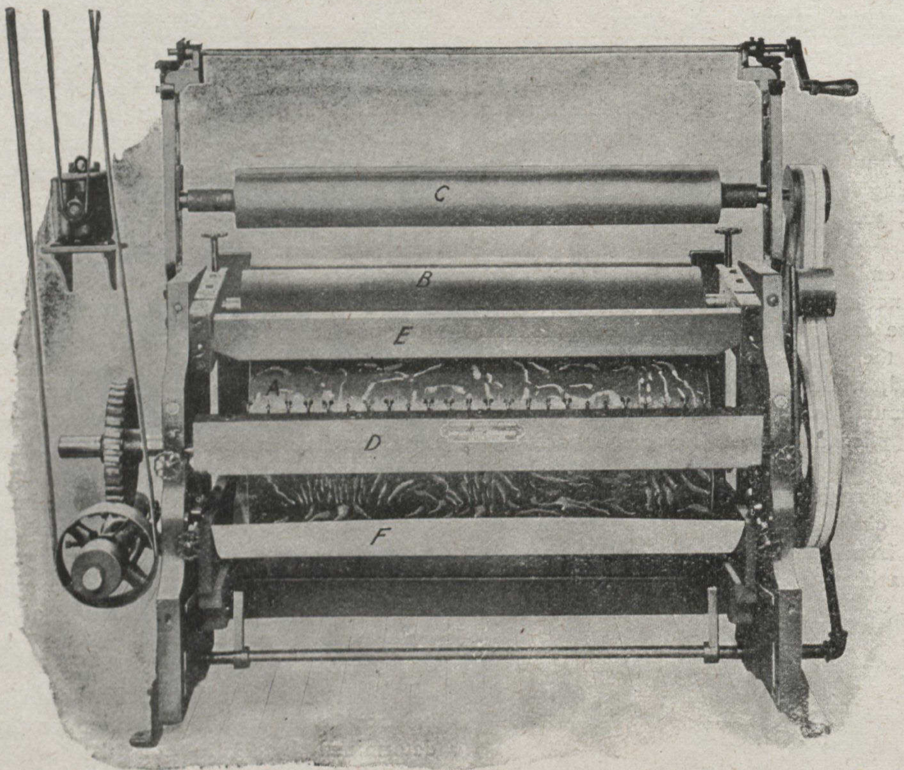
Cleaners are provided on both wheels. A packing box is attached to the lower wheel guard, which should be kept filled with oily waste to soften the gum which often collects. It is then removed by scrapers, fastened to the frame of machine.

—Col. Sam. Hughes, in the Dominion House, spoke in favor of the Government putting on a duty on lumber coming from the United States into Canada. He contended that it was unfair that lumber should come from the United States into Canada free of duty, while lumber going into the Republic had to pay a duty of $2 a thousand feet.

—The sawmills in British Columbia are experiencing a quiet time. W. A. Anstie, secretary of the Mountain Lumberman's Association, who has just returned from making a tour of the district covered by his organization, states that about one-half of the mills are running, and, while some more will start up within the next few weeks, yet there will be many which will not run at all this summer.

IMITATION WOOD GRAINING MACHINE.

Some time ago the Posselius Bros. Furniture Manufacturing Company, Detroit, Mich., constructed a machine for making imitation quartered oak. After getting it into suc-



cessful operation the results were so astonishing that several manufacturers went to them for the machine, which Posselius Bros. then made for them. Their results have been similar to those obtained by the originators, and the latter are now placing the machines on the market. They can be made to imitate plain or quartered oak, mahogany, walnut, elm, ash, and in fact, any kind of wood with open grain, because the wood itself is used to print from, and this assures a correct imitation. The rollers for the different woods are interchangeable, and can be replaced in a few minutes. It is built on an iron cylinder, so it cannot get out of shape. The machine is made in two sizes, 36-inch and 60-inch wide. It works automatically like a printing press, and will take in stock from a piece of veneer up to 5 inches in thickness. It can be operated by any ordinarily intelligent person, and it is claimed that one operator and a couple of boys can do more work with this machine than twelve men with any other so-called machines or pads now on the market.

THE CARE OF BELTS.

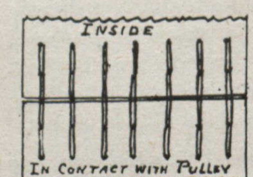
Don't overload a belt.

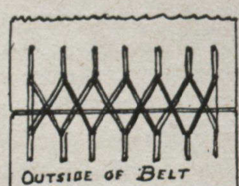
Don't run a belt too tight.

Don't use a single belt where you should use a double.

Don't run flesh side to pulley, as the strain on a belt is the contacting part next to pulley, and the hair side of a belt is the toughest. Keep your belts clean; also your pulley.

Don't use rosin; a little castor oil will keep your belts clean and pliable.





Don't run outside laps on belt points first, as the short turn will open them.

Don't lace a heavy piece of belt in with a light piece.

Don't make your lace holes too large or put too many holes on a belt, as it weakens it. I find it pays to splice a piece in your belts, and only use one lace joint. Start holes half an inch from end and edge of belt, half an inch apart. Take corner off the end of belt so it will not cut laces. Double-hinge lace holes are the same as single, only three-quarters of an inch apart on the first row. Take the corner off, and start to lace from the centre to both edges.

I recommend this style of lacing to be the strongest and most serviceable for general use. I use a quarter inch lace for single belt and three-eighths for double belt. Commence in the centre and lace both ways, using the first row of holes. Work back to centre on second row, straight lace to pulley and cross on the outside. Study the cut and you will have no difficulty.—H. B.

—Considering the many people who seem to find soap so useful around machinery, it is a wonder some enterprising soap manufacturer doesn't bring out a special machinery brand or two—one guaranteed to cool down the hottest of troublesome journals, and another that is a sure cure for slipping belts. Then there could be a special cheap kind to compete with mud for daubing around the boxes while babbitting.

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.

J. N. Saunders' sawmill at Hymers, Ont., has been burned down.

* * * *

S. G. Fitzgerald, of St. John, will erect a sawmill at Oromocto, N.B.

* * * *

The Gordon Pulp and Paper Co.'s sawmill at Dryden, Ont., has started operations.

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The shingle mill sawyers at St. John, N.B., are out on strike for an increase of wages.

* * * *

Wm. Allen's portable sawmill at Pontypool, Ont., has been destroyed by fire. Loss, $2,000; not insured.

* * * *

Jas. Chalmers' planing mill at Lindsay, Ont., has been burned down at a loss of $5,000; covered by insurance.

* * * *

A. J. Bishop's sawmill at Conn, Ont., has been destroyed by fire. Only partially covered by insurance.

* * * *

W. Scollon's woodworking and pump-making plant at Manotick, Ont., was destroyed by fire at a loss of $1,000.

* * * *

L. Hansen & Sons have established a sawmill and fruit box factory on the Kettle River, six miles below Grand Forks, B.C.

* * * *

A small fire broke out in Smith's sash and door factory, Renfrew, Ont., but was extinguished in time to prevent much damage.

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The St. Anthony Lumber Co.'s big sawmill at Whitney, Ont., is running day and night, giving employment to about 200 men.

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The Moose Mountain Lumber and Hardware Co., Limited, Regina, Sask., has been authorized to increase its capital to $250,000.

* * * *

The Rainy River Lumber Co., Rainy River, Ont., will build a large sawmill at Fort Frances, Ont., to cut lumber for the Duluth and Chicago markets.

* * * *

Paul Perkins is organizing a company to build a sawmill and lath mill at Ranier, Ont. They have already secured a large quantity of logs on Rainy Lake.

* * * *

John Carew Lumber Co.'s sawmills at Lindsay, Ont., were damaged by fire on 8th inst. to the extent of $14,000. The fire originated in the shingle department.

* * * *

The River Valley Lumber Co., Central Blissville, N.B., has been incorporated with an authorized capital of $24,000. R. B. and J. B. Smith, of that place, are interested.

* * * *

Walter Tyrrell, Lindsay, Ont., will start a factory for making wooden limbs. He is the inventor of a contrivance by which the ankle is caused to bend like a human foot.

J. C. Gibson, of Winnipeg, has bought out the Eburne Shingle and Lumber Co., Vancouver. The capacity of the plant, a few miles south of Vancouver, will be doubled.

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Nicol Bros.' planing mill and sawmill at Owen Sound, Ont., with a large quantity of cut lumber, were destroyed by fire. Loss, $12,000, only partially covered by insurance.

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Geo. Andrews, of Lindsay, Ont., was killed a short time ago in the Firstbrook Box Co.'s factory, Toronto, while attempting to put on a pulley while the machinery was in motion.

* * * *

W. McKelvey, of Stratford, Ont., will establish a small factory for the manufacture of a special article of furniture at Galt, Ont. He is asking the council for a free site and exemption from taxes.

* * * *

The Cline Furniture Co., of Stratford, Ont., and Morlock Bros., of Guelph, Ont., will probably amalgamate their businesses and build a large factory in the latter city to employ two hundred hands.

* * * *

Bailie Bros., of Aylmer, are building a new sawmill on the site of their old one, destroyed by fire some years ago. The new mill, which will be completed by the 1st of August, will have a capacity of 30,000 feet a day.

* * * *

A fire broke out on the 3rd inst. in P. Kyle's sawmill at Merrickville, Ont., by which the building and contents were totally destroyed. Loss about $5,000. It is believed to be the work of an incendiary. Insurance light.

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La Compagnie Manufacturier du Village de Disraeli (P.Q.); capital, $10,000, has been incorporated to build lumber mills, make door and window frames, etc. W. Cantin and Jos. Boucher of Disraeli, Que., are members.

* * * *

The Robert Bell Engine and Thresher Co., of Seaforth, Ont., manufacturers of sawmill machinery, etc., have just purchased the Coleman Works property adjoining their premises, including buildings, etc. The factory will be greatly enlarged.

* * * *

Robert Campbell, a carpenter working at P. W. Gardiner & Son's planing mill, Galt, Ont., was the victim of an accident by which he loses two fingers. Mr. Campbell was operating a jointer, when his right hand was caught in the machine and crushed.

* * * *

The Yellow Head Pass Lumber Co., Vancouver, has been incorporated with a capital of $250,000. Among the provisional directors are A. Carney and Lester Clapp, Vancouver. The Company has large timber limits on Fraser River and will erect sawmills.

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The Stanley Railway and Manufacturing Co. will erect a woodworking mill at Ryan's Brook, N.B. It is talking of taking over the York and Carleton Railway and extend to the Grand Trunk Pacific, near Napidoggan Lake, N.B., in order to gain increased facilities.

* * * *

Louis Denault was instantly killed in Smith's sawmill at Callender, Ont. He was striking a log with an axe, which caught in a pulley overhead, whirled around the shafting and struck the man with great force. Death resulted from the wounds in a few minutes.

* * * *

The F. H. Rice Lumber Co., St. Louis, Mo., contemplate establishing a sash and door factory in Victoria, B.C., with a capacity of two thousand doors a day. They will install a plant at a cost of $100,000. This Company has acquired control of a sawmill at Cowichan, B.C.

* * * *

John B. Pike, president of the Pike & Richardson Cooperage Co., Chatham, Ont., which owns eight mills, and is one of the largest cooperage concerns in Western Ontario, died recently at the age of sixty-six. He was the originator of the first patent hoop-coiling machine and several other useful inventions.

* * * *

Field Brothers, of Victoria, B.C., have purchased from E. S. Knowlton and M. Cameron fifty sections of timber at Bella Coola for about $65,000. They will erect a sawmill at Bella Coola within a few months to supply the demand for lumber that is expected to come with the development of the North.

* * * *

Z. C. Eldred, of Jackson, Mich., and H. Earle, of Detroit, representing a Michigan syndicate, are closing a deal for the purchase of fifteen square miles of limits on Vancouver Island, owned by Dr. A. P. Proctor and associates, of Vancouver. A mill is to be erected as soon as transportation facilities are afforded by the Esquimault and Nanaimo Railway.

* * * *

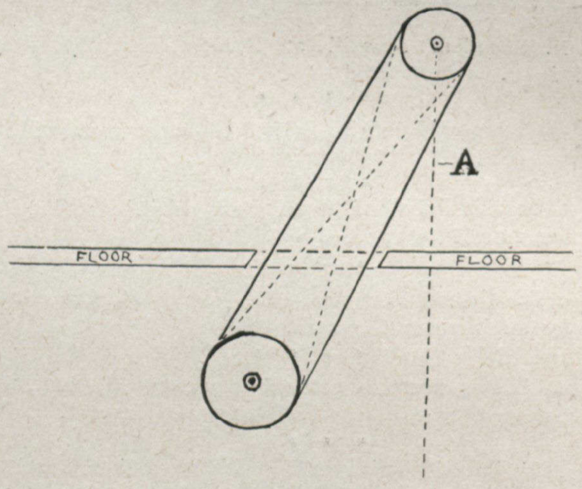
A strange story comes from Golden, B.C., of an attempt of some Hindu employers of the Columbia River Lumber Co. to murder a white foreman by throwing him on a circular saw. Four Hindus disobeyed instructions regarding lumber being shipped. The foreman, a Frenchman and hot tempered, reprimanded them severely and threatened to discharge them. Seizing him they were carrying him to the big saw, when a young white man came on the scene, picked up a slab, and laid out three Hindus, when the others turned and fled.

QUICK METHOD FOR FINDING LOCATION OF BELT OPENINGS.

The very nature of the millwright's work makes him familiar with easy methods of doing this class of work, but the average machine hand has fewer opportunities of acquiring knowledge in this regard. I have quite often seen men who were excellent at operating woodworking machinery know very little about installing same. In their efforts to find the right place to cut the belt opening they will tear up two or three unnecessary feet of flooring. The accompanying illustration shows one way of doing this work well.

Let us suppose you are about to place and drive a counter-shaft, which must be placed on the floor above the line shaft, or for that matter more than one floor above. The same lines are followed out in any case. When you have placed the counter-shaft in the desired position, hang a plumb-line from centre end of counter-shaft to floor. (See dotted line A.) Bore a hole in the floor and pass the line through. Go below and attach the plumb-bob, and when it settles true measure the distance to centre of line shaft. Then take the distance from centre of line shaft to the floor above; also all other necessary measurements as per illustration, including diameter of pulleys.

Now, make a scale drawing. This will show exactly what you want to know. Solid lines in drawing show



straight belt, dotted lines cross belt. I venture to say you can take these measurements and make the drawings in less than half an hour. The benefits of following out this plan are, you will have no unnecessary flooring to rip up, and later on to replace. It also shows you the location of any beams or joist that may be in the way. Of course, it is understood how to avoid these:—R. Pearce.

Condensed Advertising

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

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.

ORSON GASHMEIER,
Box 5, Bridgeport, Ont.

SIMPLE STYLES.

The last few years have wrought radical changes in the ornamental features of woodworking, changes in the style and method of production. The main changes in style consist in getting away from the maize of intricate scroll lines of one kind and another, which formerly occupied a conspicuous place in practically all efforts at ornamentation in woodworking. To-day in the place of this, no matter whether it is in mill work, furniture or cabinet work, there is a decided breaking away from these intricate lines, either in carving or scroll work, and the general tendency is to use plain finishes, straight lines and square corners so far as is practicable without becoming too extreme in the matter. There are, however, certain classic carvings and scrolls that are persistently adhered to more or less through all changes, and we have them with us yet; but even here there is a decided change in the manner of production. Much of the ornamental wood work, especially in standard designs of carving, is now done in composition, moulding and shaping them in wooden moulds so as to get the grain, then attaching to the outside wood with which it goes, so that when finished an expert cannot tell from the outside appearance whether it was carved out of wood or is a composition product.

It must not be thought from all this that there is an end to wood-carving, for there is not. Right along with these ornamental products in composition there are to be seen both hand carvings and machine carvings. The hand carving is now mostly of special and massive design, on some of the more expensive mantels and house trimmings and cabinet work. Most of the regular patterns now carved, such as egg and dart mouldings, and, in fact, almost any pattern that is frequently repeated, is now done by machinery, for which purpose there seems to be a variety of machines, some of them working on one plan and some on another, and all of them producing carved work at a much smaller cost, and frequently more delicately done, than if cut by hand. The most striking thing about it all, however, is that most of the ornamental products are not formed and made at wood-working institutions, but are now purchased outside.

ADVERTISERS' INDEX