CANADIAN WOODWORKER

Vol. I.] APRIL 1908 [No. 2

PRINCIPAL CONTENTS

See Index to Advertisements, page 38.

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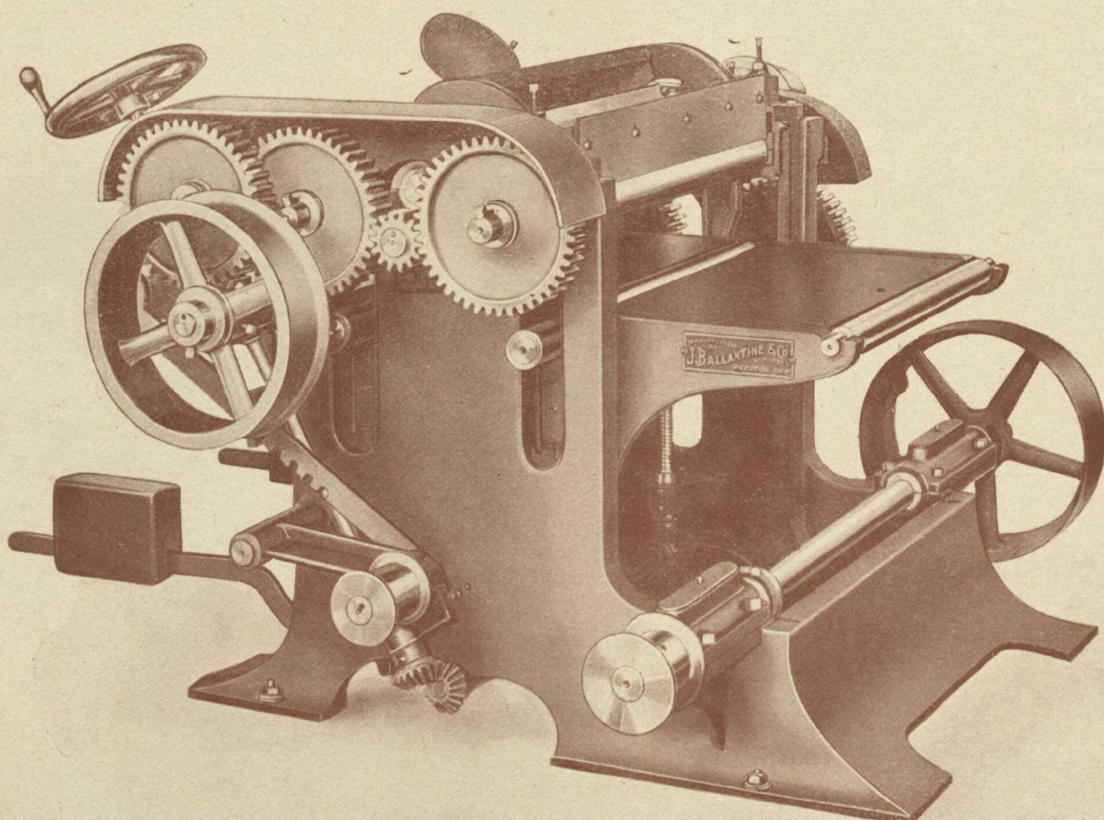

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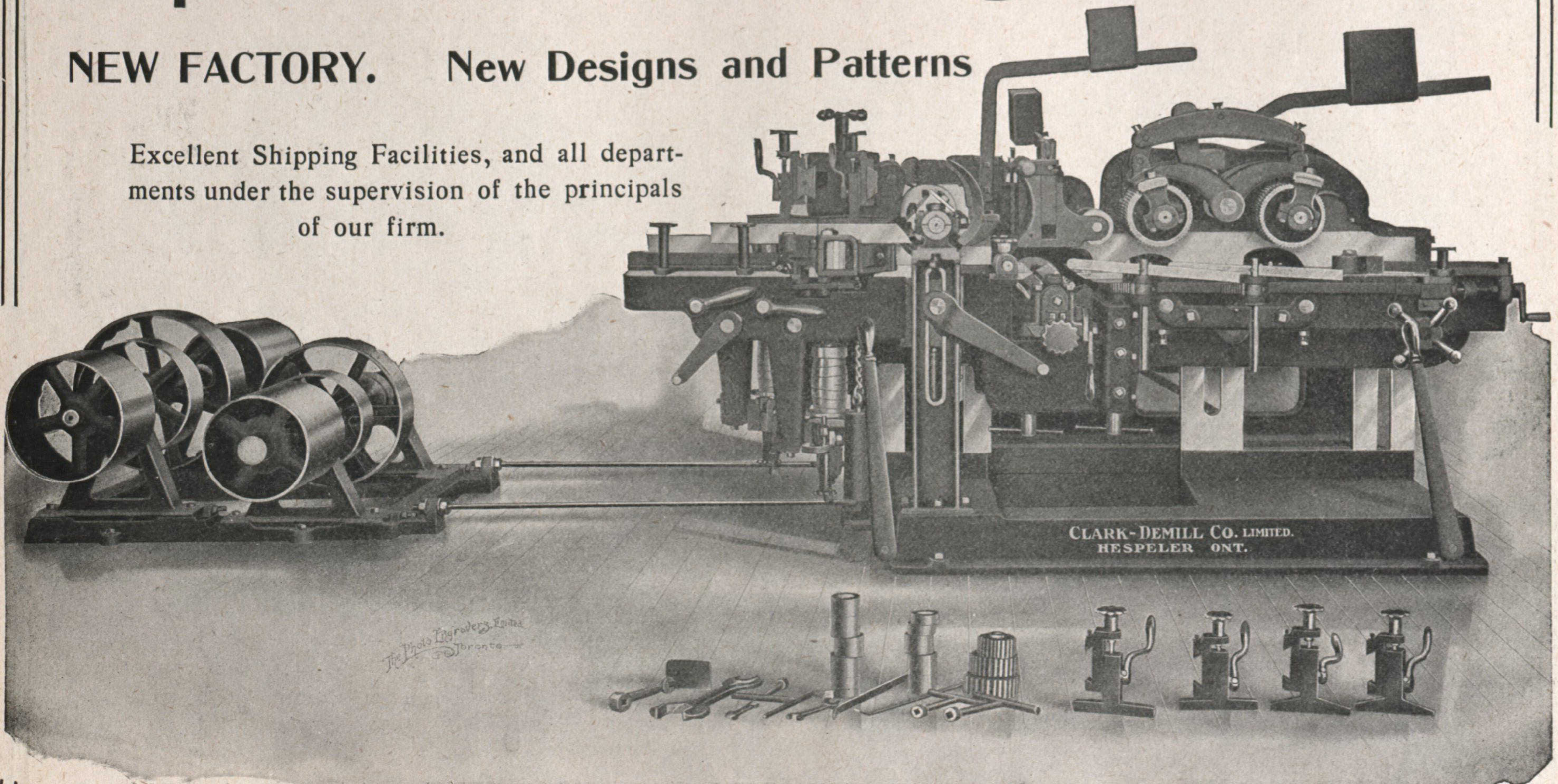

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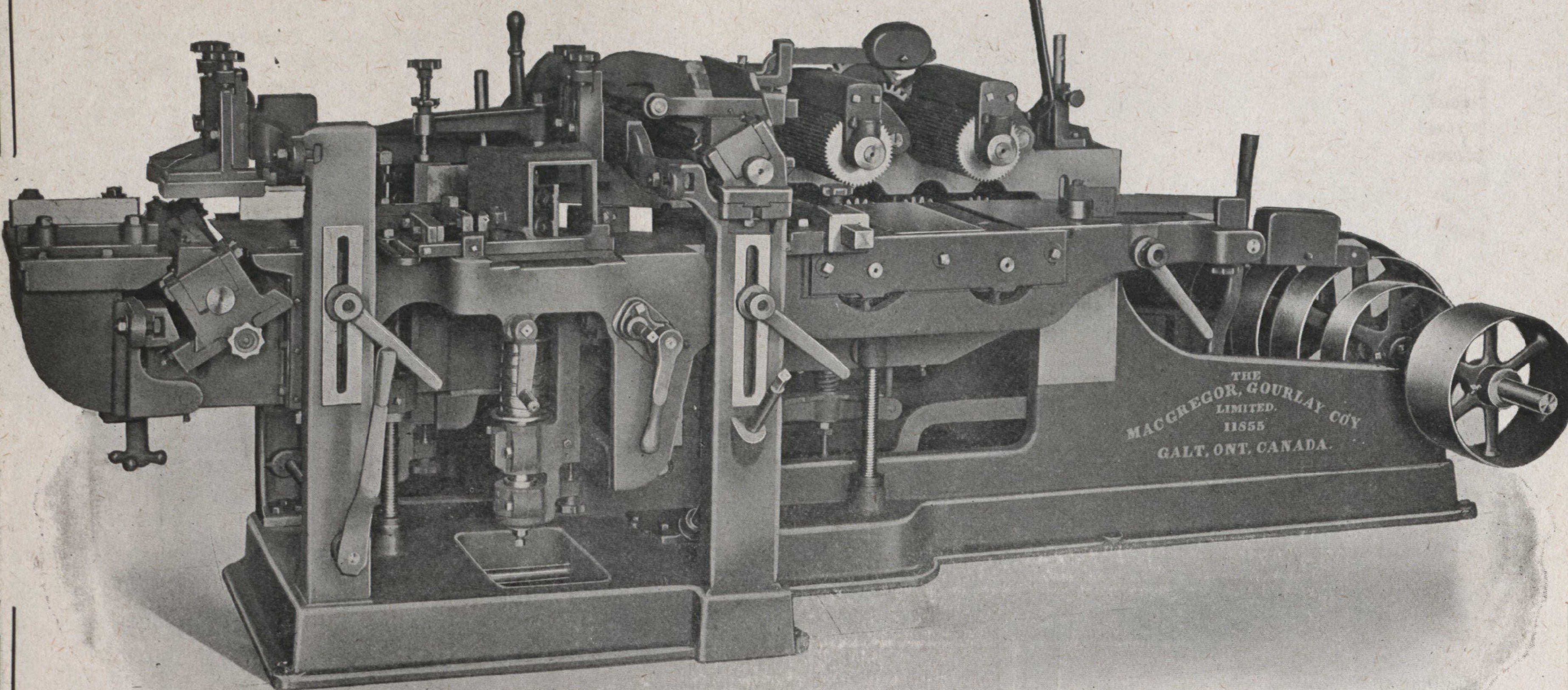

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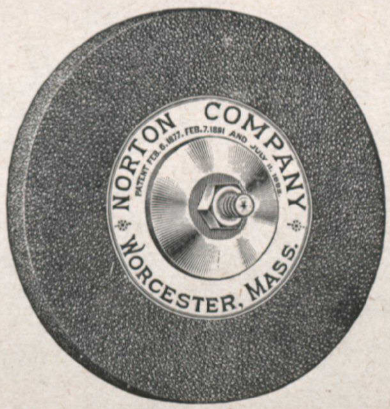

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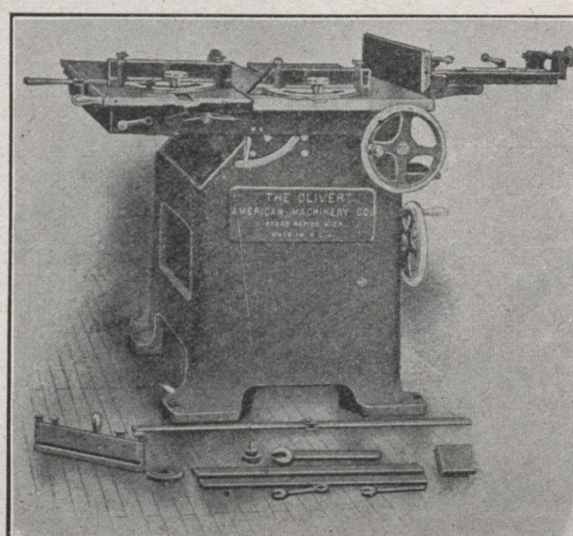

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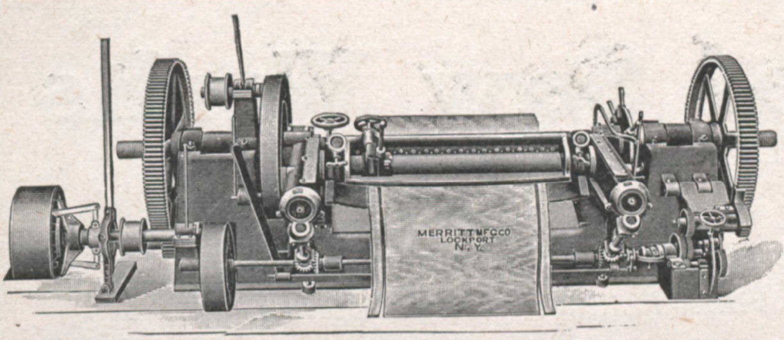

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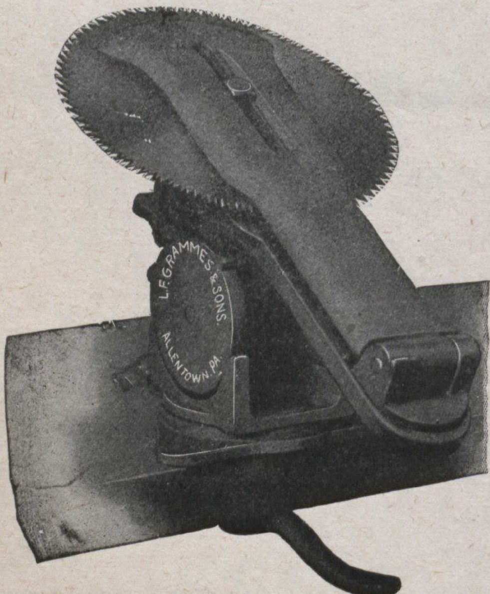

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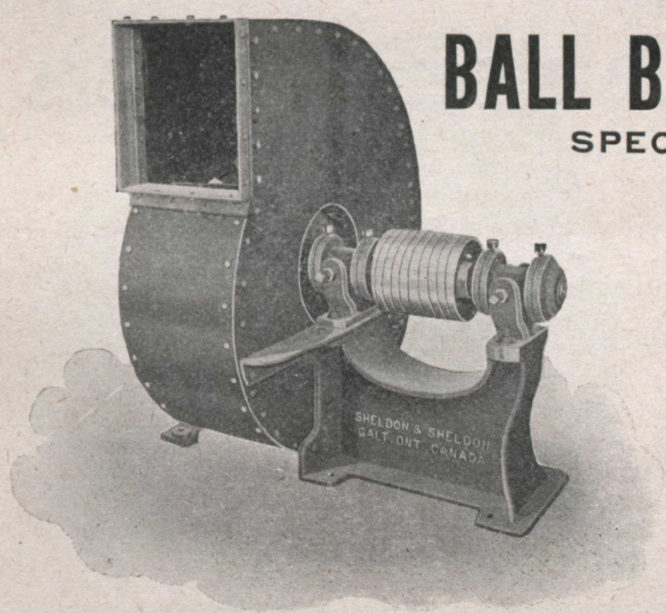

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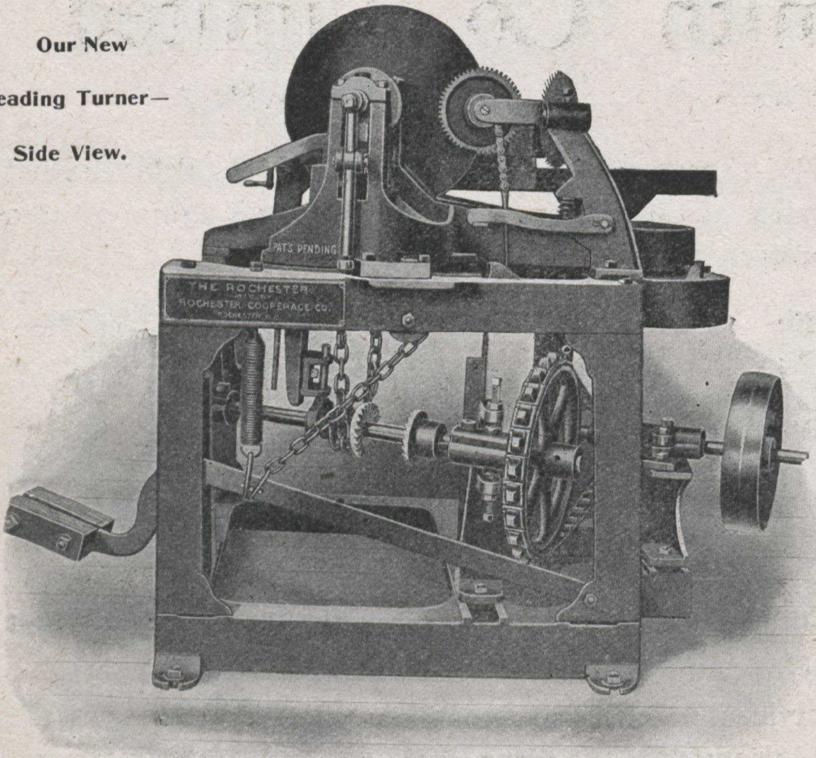

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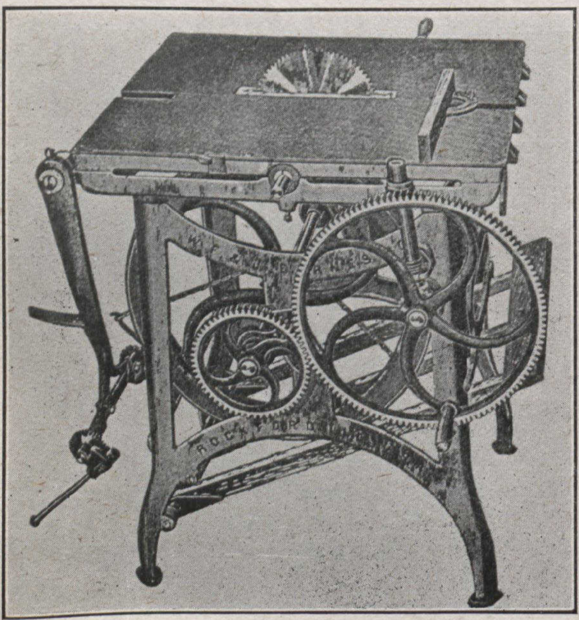

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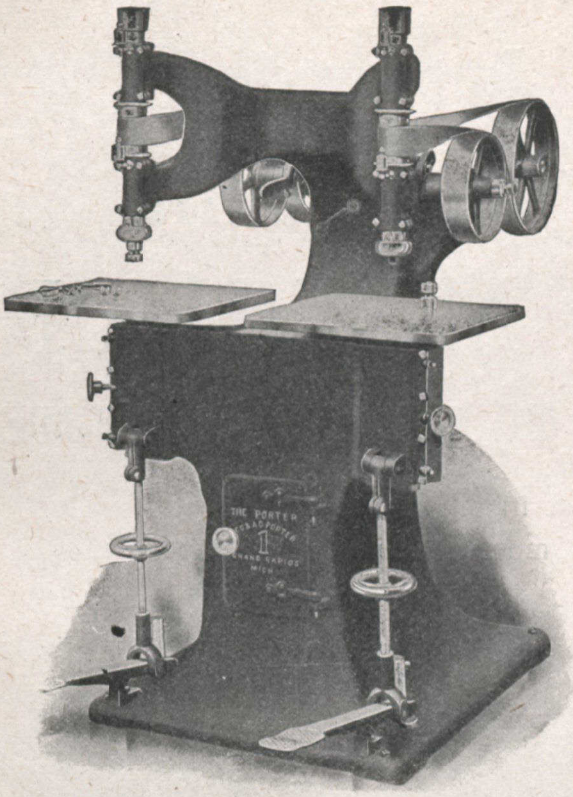

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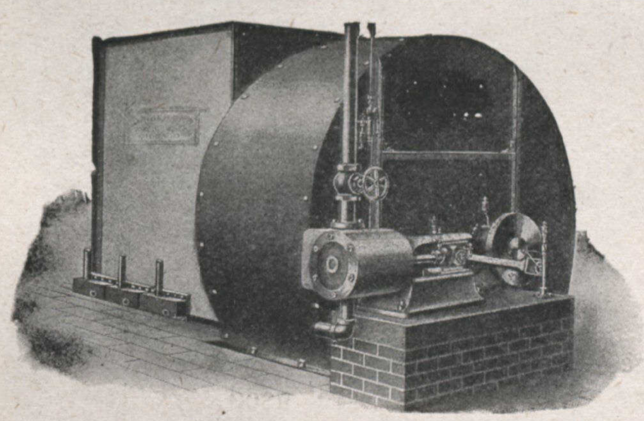

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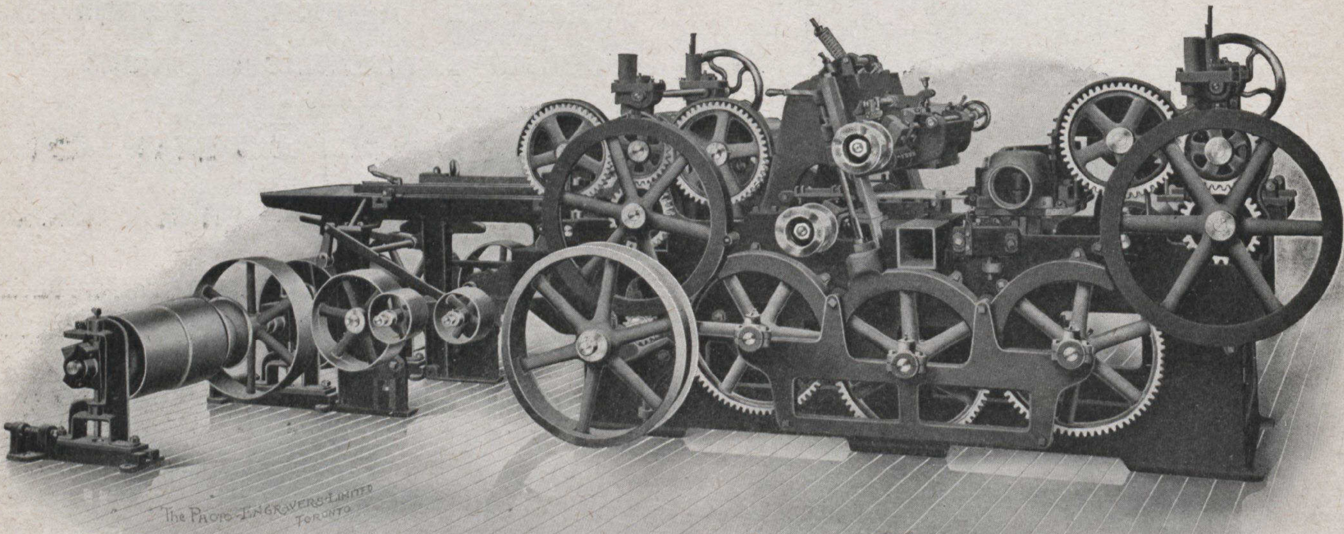

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Canadian Woodworker

A MONTHLY JOURNAL
FOR ALL CLASSES OF WOODWORKERS

Vol. 1 TORONTO, APRIL, 1908 No. 2

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.
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BIGGAR-WILSON, Ltd., Publishers

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

SUGGESTIONS BY MACHINE MEN.

In most woodworking establishments there is a praiseworthy feeling of community of interest between the mill-owner, the foremen and superintendents and the men who operate the machines. This free intercourse, and the opportunity it presents for making and receiving suggestions, are a great help to the cause of technical education in its most practical aspect. Should an operative be in doubt as to the why and wherefore of any part of a certain process, or of a piece of mechanism in a given machine, he should feel at perfect liberty to ask questions from his superiors. This would encourage the spirit of investigation among the hands and give them a greater interest in their work. Many mill managers recognize this to be the rule, and there is in effect, if not in practice, a Question Drawer; but there are many who seem to believe it to be their duty to keep as far away from the "help" as they can. In addition to this, among the hands there is almost always a certain proportion who are gifted in the mechanical direction, and they would be capable at times not only of asking questions, but of suggesting improvements. In his daily work, if he is a man of any inventive capacity at all, an operator of a planer, jointer, bandsaw, or other woodworking machine will sometimes have an idea as to the improvement likely to be caused by an additional attachment, or by a slight change in the arrangement of those already in use. The foreman in charge may be or may be not a man of broad enough calibre to take up these suggestions for what they are worth; and the operator is not encouraged by the treatment he receives to make any demands upon his own time or thought beyond what his daily task calls for.

If, however, the latter were encouraged by the management to ask questions on any point not clear, and to make any suggestions which occur to his mind, he would have an incentive (even apart from any pecuniary reward, though that would be a good idea, too), to go on in the work of thinking out problems in woodworking practice and making improvements in the machines in daily use. By this means not only would the hands become more contented, but the mill management would quite likely receive practical hints worth in the aggregate, perhaps, thousands of dollars.

THE FORESTRY CONVENTION.

The woodworking industry in all its branches—the sawmill, the general planing mill, the furniture factory, the vehicle maker, the handle manufacturer, the box and barrel maker—has a vital interest in forestry, the question which, taking into consideration the fact that all the future is the stake at issue, is the most important before the people of Canada to-day. We are not so badly off in respect to wood supplies as are our neighbors to the south; but we cannot claim superior virtue on that account; it is due mainly to the fact that, as Canada is a younger country than the United States, it has not yet had so much time to play ducks and drakes with its resources. These are still enormous, and if we will only learn by experience to take immediate steps to preserve them, the future may still be ours. The Convention of the Canadian Forestry Association, which took place last week in Montreal, was admirably adapted to bring out the best thought upon the way to do this in the most thorough and economical manner. The Association may be said to embody the ideas of those who have the mental capacity and the disinterestedness necessary to the taking of broad views for the betterment of their country. This is shown by the fact that statesmen on both sides of politics, the most eminent ecclesiastical authorities of all denominations, are now found in the forefront of those who urge the most careful Governmental action for preserving Canada's forests. Other patriotic citizens are fast falling into line.

At the convention Archbishop Bruchesi urged the need of forest conservation in the interests of future generations, and spoke of some interesting experiments carried out by the clergy near the monastery at Oka, where out of 65,000 trees planted out only 5,000 failed to grow.

Hon. Sydney Fisher addressed the convention, and uttered a warning as to the consequences that would attend the wasteful and unscientific methods now in vogue of treating the forests of Canada. His announcement that the Dominion Government had set aside as a new forest reserve the whole eastern slope of the Rocky Mountains was greeted with applause. He urged that reforestation should be carried on among the hills from which flowed the tributary streams and rivers emptying into the St. Lawrence, both on the north and south sides. He showed how the business men as well as farmers were interested in forest conservation, for without forests we would have an uncertain rainfall, and fluctuating flow of water in the rivers, to the damage of our water-powers.

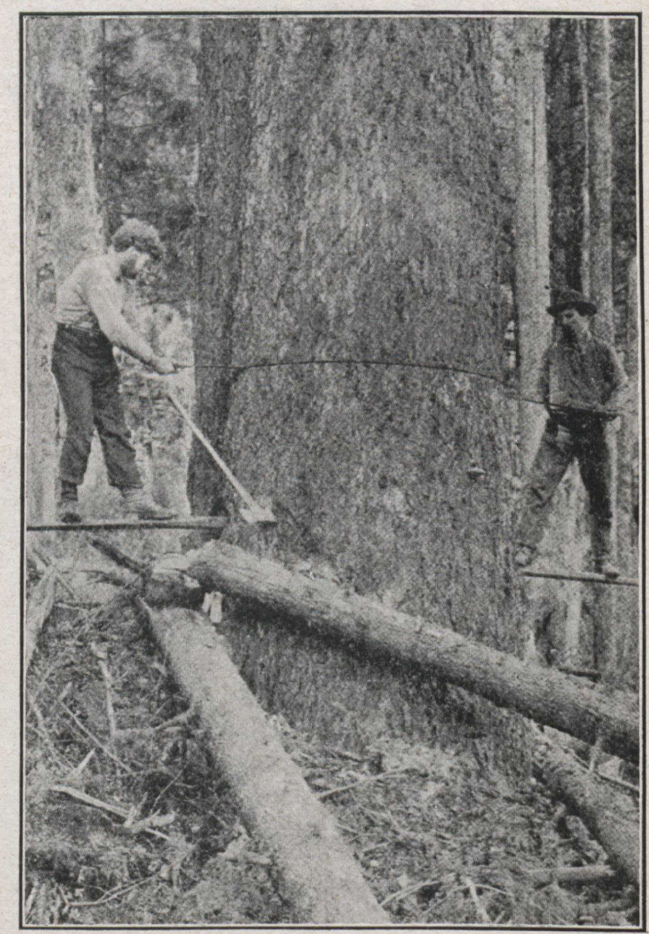
The most outstanding, forward step made in the Forestry movement in Canada during the past year was the establishment of a School of Forestry at the University of Toronto, under the principalship of Dr. B. E. Fernow. Dr. Fernow is one of the best-known figures in the history of Forestry in the United States, and the work of himself and his school in Canada will be watched with sympathetic interest by all those interested in Canadian Forestry. The Dominion Government has added to the staff several trained Foresters. The distribution of trees for planting on the farms of the prairies is being continued steadily, an average of 2,000,000 per year being now maintained with the prospect that the product of the nursery will soon be considerably increased.

THE DOUGLAS OR BRITISH COLUMBIA FIR.

Th accompanying illustration shows a giant specimen of the Douglas fir, otherwise known as Douglas spruce, red pine, Oregon pine, etc. It is found in the coast section of the North-western States, and as far North as Central British Columbia and Alaska. The tree is very beautiful, with straight round trunk, bright drooping foliage and fine red lish cones; it reaches a height of 150 to 200, or sometimes 300 feet. Its bark is thick and deeply furrowed, coated with ruddy scales.

The heartwood is light reddish or yellowish, while the sapwood is nearly white. The grain varies from four or five rings per inch in small trees or in heartwood, to a fine, even grain with perhaps forty rings to the inch. They are usually well marked, the summer wood showing dense and dark, the spring much softer. The wide-ringed wood is somewhat spongy. Owing to the difference in the texture of alternate rings and to the long, regular fiber, the wood splits easily, particularly when dry. For this reason, it is pleasing for inside finish and panel effects, when slash-sawn, as the porous spring wood readily absorbs stains, and the dense summer rings are little affected; any desired shade may be produced.

The timber is used extensively in ship-building. Every great ship-yard in the world contains quantities of spars made from it; it is also used widely for piles of wharves, and in fact in every location where heavy timbers of great durability, hardness and toughness are required. In its best grades it is the strongest of the large conifers of this continent, and is cut into every form of lumber, from rough timbers to fine-grained, clear stock for flooring. In the coast region forests are found which yield, it is said, from 50,000 to 100,000 board feet to the acre, and trees will average five or six feet in diameter of bole, and stand straight and towering for 300 feet. Thus it is possible to obtain exceptionally large and long pieces; sticks 24 inches square and up to 100 feet long are regularly listed among merchantable grades. The wood is fairly durable when exposed to the weather. These features make Douglas fir an ideal structural timber, while small trees ranging from one to three feet in diameter are unequaled for spars, because of the straightness, slight taper, and great length of its trunk.



The Douglas or British Columbia Fir.

—There is before us the initial number of the "Canadian Woodworker," a new monthly journal for workers in wood. The publication is attractive typographically, and presents in concise form considerable information of a practical nature. The publishers, Messrs. Biggar-Wilson, Limited, Confederation Life Building, Toronto, are to be congratulated on the excellence of their production, which will doubtless meet with deserved success at the hands of the Canadian woodworking industry.—Canada Lumberman.

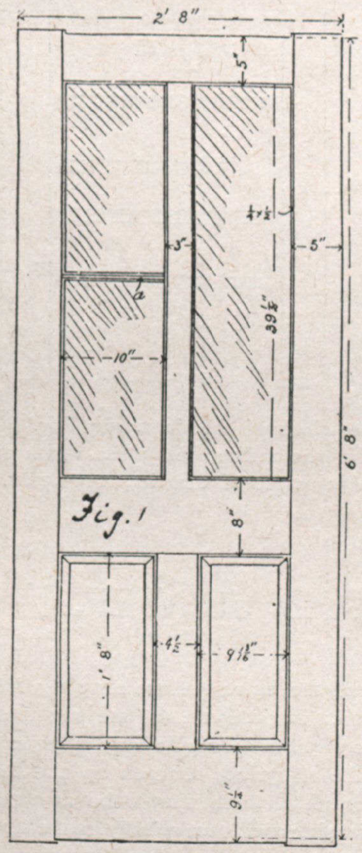
System in the shop is a great thing, and should be encouraged till it gets to a point where it threatens to interfere with brains, and then it is time to put a check rein on it. Brains will beat system any day, and they should never be made a sacrifice to it.

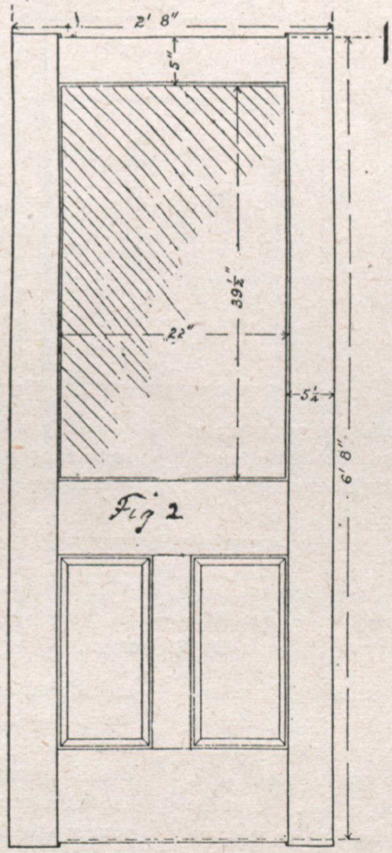
Planing and Molding

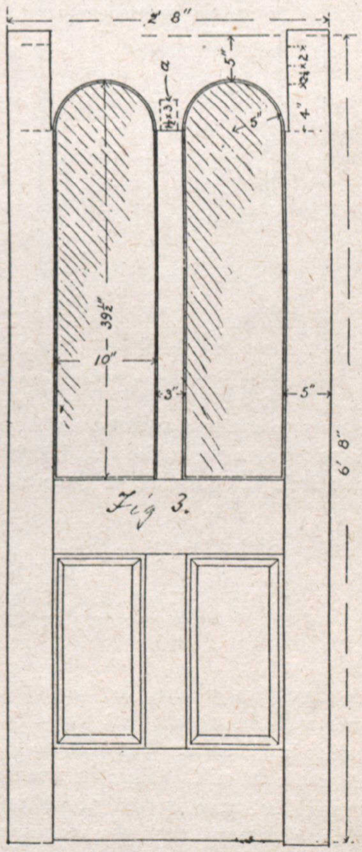
A FEW GLASS DOOR DESIGNS.

The accompanying cuts represent six standard glass doors regularly made with two panels below, although they are sometimes made with three panels. This is especially true of the one-light door like Fig. 2 in the common sizes, while all six are often made the same pattern below when the door is unusually long. In Fig. 1 is illustrated the two-light door A, showing the location of the cut-bar in case a four-light door is desired.

A main point to be kept in mind in laying out a glass door, is the proper and economical size for the glass. And as these doors are all illustrated with a putty rabbet, ¼-inch, and the stiles and rails of regular stock width, as well as standard panels below, we make the glass even inches by gagging the mullion at 3 inches over all. In a 2-8 door this will call for a 10-inch glass, while the length will be 39½ inches. The length may be modified to suit the glass by using a 4½-inch top rail, but with all the styles calling for pattern tops it is not a bad thing to have a ½-inch extra glass. It is better to hold to a standard whenever possible to do so without loss of time or material, and in the case in hand, if the stiles should be stuck with the door pattern both sides and the sticking cut away on the glass side to admit a stop, the opening would be just 40 inches long with a 5-inch top rail. Fig. 2 shows a 5½-inch stile and a 5-inch top rail, which is necessary to make up with an even-width glass.





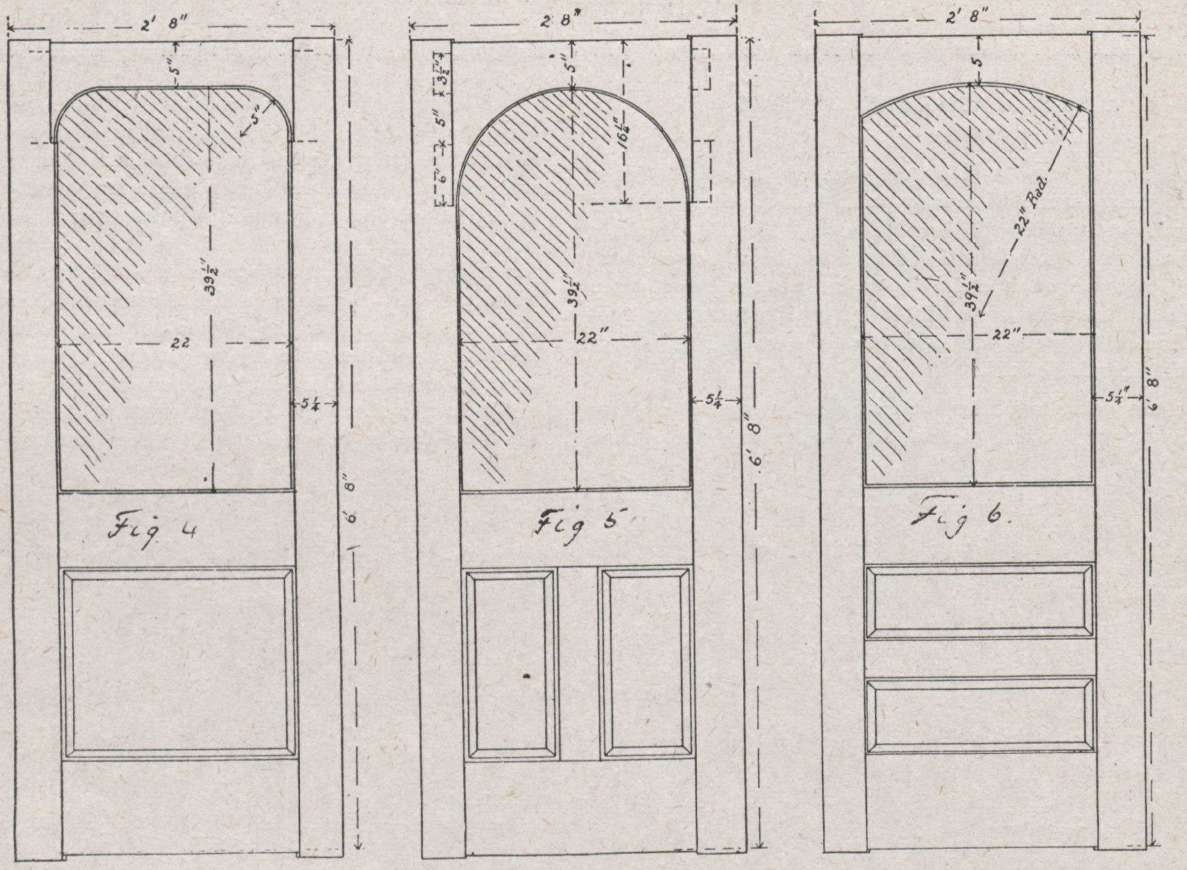


The making of circle-top glass doors has proven a stumbling block to many beginners in the door department, although the principles governing the execution of a good job are few and simple, but nevertheless important. In the first place, leave the regular rail margin on top and then dropping down half the width of the light, lay off the semicircle for the glass line, allowing a big 1-16 all the way around; then pull the compasses in the ¼-inch and draw the cutting line, but do not cut the circles out before the tenons and mortises are made. In laying out the length of the top rail, do not forget that it cuts into the stiles about an inch or less, according to the kind of wood used, and therefore the rail must be longer between the shoulders and the tenon must be made square, for the sticking will have been cut away from the stile.

Another feature not less important is the relishing of the top rail and the corresponding mortises in the stiles. Inspection of Figs. 3, 4 and 5 will show that at the bottom of the semicircle the rail is very short, consequently the tenon should be left as wide as possible before making the middle relish. This relish should be 2½-inch, in case a door relisher is used. If the relishing is done on a band saw, the width of course will not matter.

The mortise in the top rail, as shown at A in Fig. 3, should be made as deep as possible so that the tenon on the end of the mullion will strengthen the short grain of the rail. It is the practice in some places to shape the circles after the door is glued up, and taken altogether it is not a bad practice, as it will save more stock than the extra help amounts to.

Figs. 4 and 6 have been varied in the matter of lower panels merely to make a variety, as the standard patterns in regular stock doors have the regulation two vertical panels below; and it is not possible to give all of the variations in this work. The circle corner shown in Fig. 4 is laid out with the same radius as the two-light circle-top door of the same size, so that it is an easy matter to always get it proportioned correctly with the width of the door. In Fig. 6 is shown a segment-top glass, the radius being the width of the glass, according to the principle of drawing segments.



THE GENERAL PURPOSE PLANER AND JOINTER.

By R. Pearce.

Conditions that obtain in one or more shops are not always met with in others, but the desire to accomplish as much work in a given amount of time is to a greater or less extent the same in all. This in itself is quite reasonable, and no thoughtful man is likely to offer objection. But he has a right to demand that the machines he has to use, in common with others, should be kept up to the highest point of efficiency. This article will deal only with the general purpose planer and jointer. No reference whatever will be made, unless as an illustration, to other machines that are operated and kept in condition by one man. With the individually-operated machine the interest is confined to one man and his employer.

Go into almost any woodworking shop where the planer and jointer are free for the use of all who may have occasion to use them; more often than otherwise you will find them totally unfit to do even fairly good work. This defeats the very object and purpose for which they were installed.

In the case of the jointer, too little care is taken to see that the ends of the knives only are used in jointing the edges of boards or facing narrow stock. The centre of the knives should be reserved for wide material without having to take off or grind the knives before exacting full duty from the previous grind. Right here, let me say that no matter how good your equipment for grinding may be, if you are called upon to take off grind, sharpen up and readjust your knives more often than there should be any necessity for, your up-to-date faculties will not wholly make up for loss of time that may be occasioned by carelessness. Any loss in this respect is not always the result of ignorance but more often, indifference and lack of consideration for others. How often have we seen a man approach a jointer with the object of jointing a few boards; he finds the fence set right over the centre of the knives. Does he move it? No. Not unless the knives are very dull, when self-interest compels him to do so. His performance is repeated many times a day by others, occasionally varied by different widths of stock that are yet not wide enough to make it absolutely necessary to move the fence.

But when a man has in hand a lot of kiln-dried hardwood, knarly and cross-grained, the widths of which may be from 8 to 12 inches wide, he has to face unfair conditions brought about by the men who preceded him. Does this appeal to you? Before this man can do his job, a job on which he may have to keep his time, he will be put to the trouble of trueing up the knives. You may say the knives are bound to get dull. That is readily admitted, but in most cases part of the knives have been used much more than the rest, and it is necessary to file away the high ends in order to make them true with the bed. These high ends have not earned anything towards time spent in grinding, and besides have proved a nuisance to the last workman using them. If the knives had been used evenly this trouble would not have occurred.

Keep the above facts always in mind. Use the ends of knives whenever working narrow stock. By so doing you save much time and largely do away with frequent grinding and filing before wide stock can be worked on the machine, which has been placed in the shop, not for you alone, but for the general use of all.

Now the general purpose planer also. The way in which this machine is overworked makes it almost impossible to have it always in such shape that it will perform the work it was designed to do. That is, to plane accurately thin panel stuff or veneers and stock up to 6 x 6, one class of work following the other closely, but fed by different men.

We have all been treated at exhibitions to a demonstration of this machine planing stock less than a sixteenth of an inch thick with the greatest degree of accuracy, and sometimes this stuff was not more than six or seven inches long. The feed is free, the delivery good, no chipped ends or waves to be seen, and the speed of feed is so fast as to excite comment. Perhaps a doubtful onlooker will make the request that a piece of 6 x 6 be dressed. The request is complied with; the doubter is satisfied of the machine's ability to work equally well thick or thin material. This machine is sold, and in due time installed and placed in the care of a good machine hand. No one but he operates it. It is entirely in his hands, and it is quite safe to say that it will give good satisfaction for the investment. But, if this machine has been installed in a shop for the free use of all it becomes a general-purpose planer in every particular, for the system of running some shops makes a one man machine impossible, and this is the concern of the proprietors only. It is generally, as I have said, overcrowded and out of commission hours at a time undergoing frequent overhauling and repairs before it is fit to dress any work requiring absolute exactness. Permit me then to mention some of the causes. Say the machine has been put in first-class order and has just completed the dressing of hardwood veneers and then panel stock. It is in this condition when it is required to size up a lot of wet and icy hemlock, a class of work usually done on the heavy planer. But the heavy machine is busy at the time, so we consider this a case of emergency. It is surprising how often these emergencies occur. However, the job must be done, and the man in charge starts up. But the feed balks. The pressure bar is raised. It helps a little. But the wet side next to the bed makes it stick more or less. By the aid of one or two men who have witnessed his difficulty he succeeds at last, by much pushing and pulling, in getting the first plank through. As he has a number of planks to dress, and perhaps the waggon is waiting—don't forget this is an emergency job—he conceives the idea that if the lower rollers were raised up more purchase will be obtained, and the wet side will not press so close to the bed. The feed responds well now, and little trouble is experienced in rushing the job through.

One cannot blame the man for adjusting and setting the pressure bars to suit his case. But I do think that the other men have a perfect right to object if he leaves the machine in this condition, as is often done, not even taking the trouble to wipe the bed and rollers. If the job has been done just at the closing hour a rusty machine will be seen in the morning. It may be that this man himself will be the first to have occasion to use it again. If so he will have but little trouble in adjusting to suit his purpose. Take it from another point of view. A young man is instructed to plane a few hundred feet of strips, and also to make a good job. Being young he is not up to all the tricks of this machine, and its users, which have given experienced men a little worry. As soon as the first strip is fed to the knives, inexperienced as he is, it is apparent that all is not quite right. Before the piece is half through it skews round on an angle, making it necessary in order to release it, to lower the bed. On trying a second time he may perhaps get a strip through only to find it is simply chewed right up, and, this was to be a good job. He lowers the pressure bar, it helps some, but the lower rollers are much too high for thin strips. He knows nothing of this, and in the meantime his foreman is wondering why it is taking that fellow so long to plane a few strips. It is the man who leaves a machine in this faulty condition who will, on finding a belt about to break, stop only long enough to make temporary repairs, leaving the real work of mending the belt thoroughly to some one else with perhaps, a hurry-up job.

Some of my readers may incline to the view that where any or all of the conditions I have touched upon, exist or are allowed to prevail, the foreman alone is to blame. Well, sometimes he is. But I have dealt with affairs placed entirely, or almost entirely, in the hands of a group of men whose self interest and welfare would best be served by a little thought for others.

REQUIREMENTS FOR A GOOD OPERATOR.

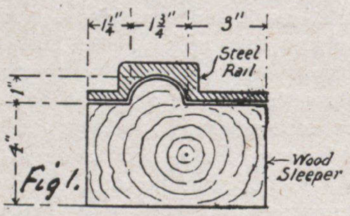
It is not enough that a man be a mechanic, and it is not enough that he be an artist; and yet again it is not enough for a man to be both, for some of the finest mechanics in their lines have not the machinery instinct and can never understand or make friends with a machine. Besides being an artist, mechanic and machinist, the operator should be a man very painstaking, yet alert and quick of motion, swift and true in judgment, always present-minded, and, above all things, not afraid to work.

The first requirement is that of accuracy or the ability to make moldings like the patterns or drawings; the second requirement is that of speed, or the ability to turn out a sufficient quantity of work to leave a reasonable profit for the employer. These two requirements comprehend all that any concern will ask of an operator, but the work of making first-class moldings at a high rate of speed becomes a serious problem, even with the best operators, when there is a great diversity in the work, mismanagement of the floor, or limitations of the machines. To be a good molder a man requires some little knowledge of figures, especially of common fractions, so as to be able to make the rule calculations in his head; he should also know the multiplication table up to 16 times 20, so that he would not have to stop and figure with a pencil to determine whether his stock was holding out or not.

In Germany nearly all the factories are now equipped throughout with electrical apparatus. No doubt such equipment is very much more expensive at first, but it pays in the long run.

A MOLDING PROBLEM.

The idea is to cut a wood sleeper (see Fig. 1) supporting a steel rail, to be used for light cars on narrow gauge roads and for contractors' purposes and general industrial use, a very simple arrangement for such work where the rails are usually moved about as conditions require.



It will be noticed that the sleeper is made out of a 6 x 5-inch timber. The specifications require it to be cut from the solid. Upon inspection one will see that there would be considerable waste if all were cut out on the molder in the ordinary way and made into shavings. To take the timber to the rip saw one would have to go through four operations in order to save the two pieces marked A and B, in Fig. 2, which would cost more than the material saved would be worth. In that case it would be better to make shavings, although it would be very hard for the machine and a costly operation at best, for the belts and cutters could not stand the strain very long; and, furthermore, the material is common stock, with hard knots, which are likely to break in such a heavy cut.

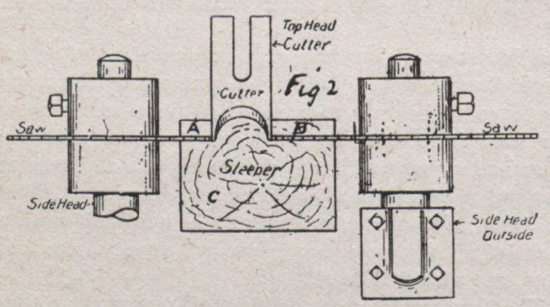
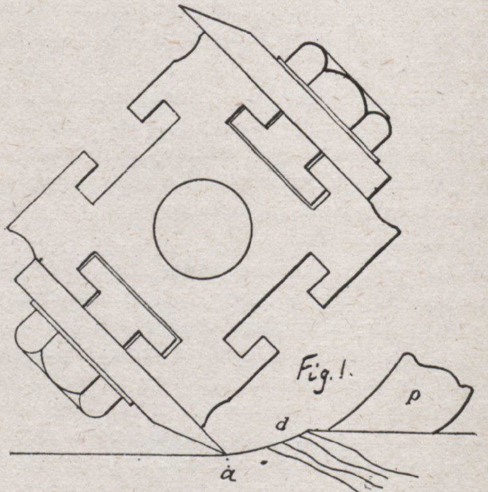


Fig. 2 shows how the difficulty was overcome and the pieces saved in one operation, a very neat and ingenious piece of work and a very great saving. It will be noticed in the cut that the top head cuts the bead first to full depth. The side spindles are equipped with collars, as shown. There being no screw on the ends of the spindles, the collars could not be tightened in the ordinary way, which would be preferable, so the method shown was used and worked very successfully. One will notice that there are two pins in the collars, which pass through the saws and keep them from turning.

It will also be noticed that the lighter saw cut is performed by the inside head, thus leaving the heavier cut where it will have the largest swing and may be watched to the best advantage; a heavier belt may also be used. The sides of the bead cutters are not beveled as is ordinarily the case, but are filed with shallow creases, to act like saw teeth and preserve strength. This was a very good idea and worked very satisfactorily. The sketches explain the rest better than words.

MOLDING CROSS-GRAINED STOCK.

What is the best way to attain smooth cutting in hard and cross-grained stock? Many say that this kind of work is best done by turning the faulty piece, but I have never gotten satisfactory results from it. In a hand plane, where the knife slides under and removes a continuous shaving,



the cap or chip-breaker has the desired effect; but in a molding or planing machine the action of the knife is entirely different, and like results require different methods. Very rarely indeed is it the case that we can apply the same rules to machine work that we do to that done by hand tools, and I think this case is no exception to the general rule.

The cut of a planer or molder is shown, exaggerated in

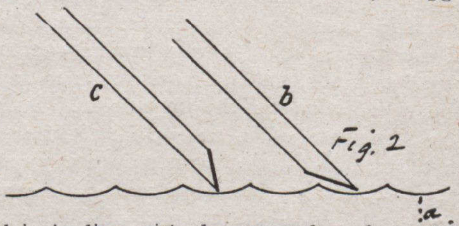


Fig. 2, and is in line with the general surface of the work only at the point A; before this point it is downward, and after that, upward. A knife like C would have a tendency to pound down the grain of the wood at the first part of the cut, and would lift up much harder during the latter half than one set in the ordinary manner, as at B.

Referring to Fig. 1 the shaving is very thin at the point A, growing gradually thicker till it reaches the full thickness given by the feed at the top of the stock. From the point A all the power exerted in planing goes to lift up on the fibres of the wood and to produce the cracks shown as starting at D and running with the grain.

A capped or reversed knife, cutting harder, will have a greater tendency to start these cracks, making smooth work thereafter impossible (or only possible through the pounding down of the grain), than a thin knife set in the ordinary manner. Stop a piece of stock while cutting in a cross-grained place, and take it out, and you will find that the cracks which cause most of the roughness start above what will be the finished surface. (See D, Fig. 1.)

Cutting of course is done much more easily at a high speed than at a slow one; and, though a large part of this ease is attributable to the momentum of the head, that doesn't account for all of it by any means, and a high speed, as high as is compatible with steady running, together with a slow feed, does much to lessen the upward strain on the fibers, while these conditions give more value to the inertia of the wood and the pressure foot, thus lessening the objectionable cracking.

Good work can be done with the knife turned over, and I have seen good work done on a lathe by a "scraper," but it is slow. To get smooth cutting against the grain, one should have knives ground as thin as is compatible with the material, set in the usual manner and with sufficient clearance, high speed, slow feed and a heavy pressure foot set as close to the knives as possible. If I were going to fit a special knife I would bend it forward, like those used in coping.

W.

THE SMALL PLANING MILL.

While among the men running small planing mills in our country districts there are to be found some very bright, wide-awake men, full of mechanical ingenuity and business ability, many of them are making grave mistakes in the way they take care of their machines. One common error is the general use of one machine for both surfacing and flooring. There are times when circumstances render it practically imperative that this same machine be used for surfacing of box boards and finished lumber, and even square timbers, but that does not alter the fact that to get the best results from a planer a flooring machine must be a flooring machine and a surfacer a surfacer. Take a sawmill, for example, that only has capacity to justify the use of about one planer, and in one sense it is logical to get a combination machine and do all kinds of work on it. Still, if a large percentage of the work is dressing and matching flooring, the chances are about three to four that the flooring will wear the planer bed out of level, so that when it comes to doing a nice job of surfacing on wider stock there is trouble in camp, on account of the unevenness of the plane.

Where the plant is large enough to justify not more than one machine, the right thing to do is to install a flooring machine and use it for nothing but flooring, ceiling and similar work, and then have a surfacer to do the plain surfacing on wider stock. Of course, there is a chance to lessen the trouble somewhat, even in using one machine, by shifting the run of the flooring from time to time, so that instead of wearing one part of the bed down, it will work over different parts of the bed alternately. The trouble with this is, it calls for the shifting of the cutterheads, and that is one thing the average country planer operator doesn't like to do more than he can help.

Another mistake along the same line, which does not happen as often now as it used to, is in the buying of machines that are too light. There are some machines put on the market for making flooring that are excellent machines and elegantly balanced, but they only weigh about half enough. It may take a little time to demonstrate this fact, but just as soon as the operator of that machine gets his knives a little bit out of balance you get the demonstration all right, and it is hard to get rid of it. In fact, the planing machine is one machine that there is very seldom too much weight put into. There are some ponderous machines on the market, but I have the first instance to meet with where a man found fault with or condemned a planer for being too heavy when going steadily. In practice, especially where machines are light, and not infrequently where they are heavy, there is, to judge from the product, a great deal of trouble experienced in doing smooth work. There is surfaced lumber that comes from some of the southern saw mills that, were it turned out by the receiving planer in an up-to-date wood-working plant in a city, the planer man would lose his job. Sometimes this poor work at the smoothing planer is due to the working of green stock, but more frequently it is due to setting the planer knives out too far.

MACHINE TROUBLES.

Sometimes the knives of a machine may be out of balance very badly, in which case the operator will probably soon discover the trouble himself, but if they are out only a little they may cause the head to jump enough to make waves if it is not up very close in the journals; while, if the cutters are in perfect balance, the belt may hold the head in place.

Waves are sometimes caused by warped lumber which is too strong for the machine to hold down and feed through. There is no remedy for this, but the chip-breaker and feed rolls should be loaded down to the limit and the stops worked as tight as the feed will permit.

A perplexing experience is sometimes had with wavy work in connection with the inside heads on a machine, the arbor frames of which were insufficiently supported by the column intended for that purpose. The remedy in this case is to set the head so that the cutting line corresponds to that of the other heads, and then brace the arbor frame solid and leave it there.

Bad and lumpy lacings in the belts, or a short piece considerably thicker than the rest of the belt, will often produce waves, especially in side head work. Speaking of side head waves again reminds me that they are sometimes caused by the arbor having some little play up and down. Ordinarily this will make no difference, but if the side knife reaches over the cut, the hardness of the wood may cause the whole arbor to lift, as it takes but little to raise it when it is whirling around 4,000 to 5,000 times a minute. Slack belts on the side heads will often permit them to slow down almost to a stop and then pick up again and run full speed for awhile, after which the operation is repeated, giving the edge a choppy look in places. Some men never notice this slow-down unless the head stops, and, of course, look for the trouble in the wrong place.

The bottom feed rolls might be set up until the chip-breaker could not hold the stock down firmly to the bed, in which case there would be plenty of waves in the molding. The rear bed might be too low and let the under side be cut rough from hanging off the main bed without support. This trouble is always followed by a chopping of the end of the piece, and can nearly always be detected at once by the racket which the bottom head makes with the loose board.

The clipping of the last end of the molding as it feeds out from under the chip-breaker can only be remedied by careful feeding and a snug pressure bar. When it is possible, the stock should be fed with the bow side up, which will guard against clipping at either end, besides being much easier for the carpenter to put on. When a board must be fed with the last end curling up, there is no way to keep it from clipping more or less when it slips out from under the chip-breaker, and the heavier the lumber the deeper the clip.

When knives are set on two or more sides of the head according to the scale, and only one of them will cut, it shows that the head is out of shape; and this may happen with a new head as well as any other, for the shops do not always appreciate the importance of this point. The head should at once be planed over, and planing on centres is the only sure way to get it absolutely correct. If a head is defective in this way, and has lips, they may be dressed down with a file so as to greatly improve its usefulness.

One of the most annoying things that happen to the feeder is to have one of the heads stop and the stock crowd ahead until the feed stops. To get it back quickly, lift the feed rolls, loosen the pressure bar and stops and take the heavy hammer and drive the piece back until the head will turn. If a big sliver catches and stops the feed, take the chisel and hammer and cut the sliver off close to the board. If the feeder sees a head slow down and stop, he can generally throw the feed off before the piece is crowded ahead too far, and so can back it up by hand without stopping the machine, in case the belt stays on the pulleys. Slipping belts may be detected by the heat they generate in the pulleys upon which they slip.

The trouble of knives working out from under the caps while running is annoying, expensive and dangerous. They generally start with springing, and if the operator is familiar with the accompanying sounds before referred to, he will nearly always be able to stop and fix up before the tear-up. The same precautions suggested to prevent springing apply to crawling bits.

Molder men often say they have bolted the bits down tightly, when it was very plain that they had only stuck them on with their fingers and forgotten to use the wrench. In most cases, if a knife is put on as tightly as possible with the fingers under a freely running nut, it will not leave the head until just as it strikes the wood; and if the wrench has been used at all it will not fly out at once, but will gradually work out until it strikes the bed or flies out from under the cap.

ART IN THE MOLDER.

The combination of knives, as well as the combination of molding members, makes possible the production of massive designs and beautiful effects not attainable in solid units, and brings some of the largest work within the capacity of the moderate-sized machines; and, while some of the architectural freaks are discouraging, the molder man always finds some way of getting them out. Some draughtsmen seem to never grasp the truth that a beautiful and graceful cross-section of a molding may develop a very lifeless, indifferent surface, and that a correct surface, viewed from the level of the eye, may lose all its beauty if raised considerably, or sink into insignificance if placed near the floor. The importance of this knowledge will appear to the operator in due time. It is as difficult to produce the carved wood as it is to make the original drawing, and while there need not be the artistic initiative required in an architect there must be the appreciation of artistic quality and the ability to demonstrate it in form and finish.

CANADA NEEDS ALL HER WOOD.

It is now apparent to all intelligent observers that a timber famine is in sight in nearly all the northern and north-eastern States, from Maine to the Rocky Mountains, and but for lumber supplies obtained from the Southern States (from which section more than one-third of their entire lumber cut is now derived) this vast territory would be forced to look even now to Newfoundland and the north of Europe for timber to supplement its scanty stock. Canada needs all her timber for her own development, and has not a foot to spare except to her future loss. The only extensive home resource of the United States is to be found in the States bordering on the Pacific, which now contain two-thirds of their whole remaining stock of coniferous woods, but which is so far removed from the great consuming markets of the East that it would be cheaper to get such lumber from the Baltic or White Sea than from the Pacific, owing to the high cost of railway transportation to all Eastern markets—the freight charges alone to Chicago being $16.50 per thousand feet and $23.10 to New York, with correspondingly high rates to all other Eastern markets, thus making the transport of common lumber almost prohibitive. And this fact of distance between producing and consuming points is a serious matter when considering the question of timber supply. Canada must learn the lesson, and learn it quickly.

TRADE INQUIRIES.

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

1530. **Wood Working Machinery.**—An English firm of manufacturing joiners desires to have particulars of any new improvements, etc., in woodworking machinery, and is open to hear from Canadian firms interested.

25. **Pulleys.**—A Manchester firm at present buying in the United States asks for catalogues and prices of wrought iron pullyes from Canadian manufacturers.

29. **Pulleys.**—A Manchester firm asks for catalogues and prices of wood split pulleys from Canadian manufacturers.

38. **Pine Squares.**—A Manchester firm asks for prices of pine squares, sizes 4 inches x 4 inches, 5 inches x 5 inches, 6 inches x 6 inches, 7 inches x 7 inches, from Canadian manufacturers.

49. **Wood Blocks.**—A Liverpool firm asks for prices of wood blocks from Canadian manufacturers.

207. **Box Boards.**—A Manchester firm asks for prices and sizes of box boards such as ordinarily cut in Canadian factory and would welcome samples.

249. **Machinery.**—A North of England company manufacturing wood-working machinery of all kinds wishes to arrange with some Canadian resident firm, who possesses the necessary connection, to introduce and take up the sale of its machinery.

There is no greater mistake made by the planing mill fraternity than running stock through machines without getting it to a uniform size. Owners complain of broken machines and how much it costs for repairs, yet they insist on pushing stock up to a machine without ever thinking that there is a limit to the strength and endurance of iron and steel and leather. Ordinarily a machine ought to feed 4-inch stock, dressed four sides, up to 50 lineal feet per minute at least, but with such stock put through without being brought to a uniform size, a cutting speed of 30 lineal feet is all an ordinary machine will do safely.

The knives can make or mar the success of a planing machine, and also the man operating it, if he is not able to discover and remedy the trouble.

Boxes and Cooperage

THE VENEER BOX.

By S. B. Anderson.

The use of the veneer box has been in the past, and, in the nature of things, must be in the future, confined very largely to the fruit package trade. Veneers are especially adapted to this style of package, which must be light and generally of small size, used quickly, and, above all, must be sold at a very low price. The question of the growth of the veneer box trade along other lines than that of fruit packages is a question of adaptability, as the point of cheapness of an article is a matter of little importance until this point is settled. The ordinary veneer package is not adapted to the general use to which the regular sawed boxes are now applied.

Many efforts have been made to perfect a veneer package, or perfect a method of manufacturing a veneer package, so that it might be substituted for a sawed package. The recent strong advance in the price of lumber for box manufacturing purposes has greatly stimulated this search. There are now being exploited certain patent boxes, or certain methods of manufacturing veneer boxes with patent machinery. These packages have the advantage of strength and lightness, an excellent combination of virtues. The practicability of this package depends on the ability of the manufacturer to buy his supplies cheaply and to do his work economically. I have grave doubt about the cheapness of this package. The good quality of veneer required, the expense of the cleats and the assembling, I am inclined to think, will rob it, in a great measure, of the element of cheapness. Still, it has left the virtues of strength and lightness, and, for some purposes, it is a very excellent package. If, in addition to its good points, it can be made at sufficiently low price, I believe it will gain and hold a footing.

An ideal package is one made from two-ply veneer, but the high cost of this material puts it out of consideration, except for some high-class boxes. While the veneer box cannot supplant the sawed shook of commerce, I appreciate its adaptability to certain special purposes where strength and high quality are demanded. This package is bound to appear more or less on the market, but it will not seriously affect the box trade. The nailed-up veener box will have its field among very cheap boxes intended for light filling and where an expensive box cannot be afforded. The patent cleated veneer box will also have a place. This is where lightness and strength are necessary, and, if it proves possible to produce cheaply enough, may supplant some of the old-style boxes, and, consequently, cut into the trade more or less.

The rapidly-growing demand for boxes, together with the growing scarcity and consequent high price of lumber, are bound to force consumers to search diligently for a substitute for the ordinary sawed box. I know of nothing that can take its place for a box, when a heavy weight is to be carried, but when the contents are light, some other style of package will be substituted. Whether this package will be built of veneers or of paper, the future will determine. I am inclined to think that for some years yet the veneer package will hold the field against paper. It will be only when the cost of the veneer package becomes too high that the paper will come in. At present the veneer package can be made at less cost than the paper. If timber continues to advance, the line will shortly be crossed where paper will be less expensive than veneer. Then the latter must give place to the former, as the sawed box is to-day giving place, for the purposes indicated, to the veneer package.

The whole question is a question of cost. Certain cheap goods demand cheap packages. This demand must be met. The sawed box is out of the contest, and the field is held at present by the veneer package, and, I think, will be held as long as the raw material remains at the present prices. With the cheap, light package, supplied by the veneer box manufacturers, the demand for sawed boxes will still, I apprehend, practically absorb the output capacity of the box factories.

As it appears to me, the important question confronting the box shook manufacturer is not how he is to meet competition of veneer or other cheap packages, nor hereafter to be on the market, but how to continue to get supplies of lumber at a figure that will allow him to hold the large portion of his trade now using a good package. The giving over of the light box to the veneer manufacturer, or the paper box manufacturer, will help to reduce the demand for box factory lumber and help to steady the price and hold it within reach. It will also help to enable him to continue making prices that will pay a living profit and allow his customer to live also. The veneer box is here, and will continue with us. Its field is limited and will continue so, unless some of the various patent devices prove practical, which term includes not only quality and adaptability, but also cheapness. When this thing happens, the box shook manufacturer will welcome it, as it will come as a relief to the strenuous struggle for raw material.

CHUCKING A BLOCK.

A hard thing to teach a new operator on a veneer machine is to chuck up a block as it should be. An old operator can tell from the way the sap flows in the end of the log just when to stop, but even an old operator can't very well explain to a green man so that he will know when his block is chucked up tight enough. If a man is afraid of hurting his machine, and don't chuck up his block tight enough, it slips the first time he gets the knife into it well, and then it often means a spoiled block; either it will split open or it is so scarred on the ends that it is practically impossible to hold it with the chucks any more, and the only thing to do with it is to roll it out into the scrap pile. Putting a block in a veneer machine is different altogether from putting a log on the carriage in the sawmill. Even though a sawyer does not take much pains in placing the log on the carriage, he is sure to get some good out of it, while a log poorly chucked into a veneer machine is frequently a log lost entirely, because if it splits or spoils at the end until there is no chance to chuck it again it can't be worked.

After a man has spoiled a few blocks by not chucking them up tight enough, and has been reprimanded about it in good shape, he goes to the other extreme and strains his machine by chucking too tight. In fact some men chuck blocks up so tight that the machines simply strip themselves, but that is rather hard to do on some of the modern machines, especially the big ones. Machines that are made without the end frames being anchored together at the top sometimes have the foundation bolts strained and broken from chucking too tight, and all machines have the nut and threads of the chucking spindles strained considerably from the same cause. Of course, it is always hard on them to chuck a log as it should be, and they are built to stand hard usage, but it is no use to make it harder than is necessary, for the repairing time comes soon enough.

Some of the modern machines have a double set of chucks, which are a great improvement. There is one set 16 to 18 inches in diameter that will hold a log without having to be set in so tight, and then as the block is cut down small this chuck can be thrown out with a lever and a smaller one set up in its place without hesitating but a moment in the work. With this combination of two chucks there is a double advantage. It is very seldom that a block is split or slips in the chucks, and they also enable the running of a smaller core. Where we have only one set of chucks and the work runs very heavy, it becomes necessary to use a rather large chuck, and, of course, this means a large core left in the center, while if we have two sets of chucks you can have a small core and still have a double grip on the block.

Another point the operator has to learn to observe is when a sliver gets crosswise on the edge of his knife and begins to scar the wood instead of cutting, it needs immediate attention, for as the body of the knife is being fed forward steadily with a forced feed, that part of it which stops cutting immediately begins to set up a mighty pressure, for it must compress the wood in the block and keep up with the balance of the knife, or else the knife must break. There are some instances on record where the knife and knife carriage have been broken from this, but it is unusual. Still, there is a strain set up so quickly that it requires an operator to keep his eyes open, and, besides the strain to the machine, he is spoiling veneer right along. The part that does not cut means just that much taken out of the veneer, and when the obstruction of the knife is removed, and it starts cutting again, it takes a cut clear around the block to put the block in shape for making veneer again.

To go back to the trouble of chucking up, we can trace a part of that, and a few other troubles, to the desire to save time by cutting stock in double lengths. It is just as natural for the veneer man to want to cut certain stock in double lengths as it is for the sawmill man to want to cut 8-foot material from 16-foot lengths. But there is quite a difference between working a log in a veneer machine and working it in a sawmill. Say, for example, we want to cut a lot of panel stock 30 inches in length. We figure on saving time and making more money by working it out of blocks enough over 60 inches to give us the two 30 inches net after trimming with the score knives. Generally speaking, we do save both money and time by doing this, but we also increase our troubles and difficulties. For one thing, it requires more care and time in chucking up a block, and then if the center is not good there is always a chance that it will slip in the chucks. And even if it holds, there are other troubles that some men know not of.

As the block gets small in cutting, as we get down close to the final core, these long blocks gradually spring away from the knife in the center until the final core results as you will see, with the center ½-inch larger than the ends. Now, in getting this enlarged center we have been injuring the veneer made during the last few turns of the block, because it is a self-evident fact that what timber is left in the core belongs on that veneer, and as it is not there the veneer is thin on one end. When we sum up this loss in quality, and the loss from splitting blocks in chucking, and the additional time required in handling long blocks in machines, there is really nothing saved by making 30 or 36-inch stock in double lengths. Also, if the veneer is to be used for panels or something where the specifications require some exactness in thickness, there is a chance to have our troubles added to by complaints from the customers after the stock is delivered.

SOME COOPERAGE WOODS.

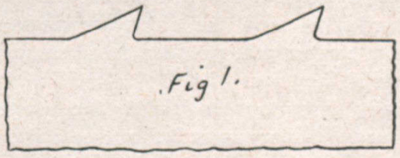
Sweet gum has become a high-priced wood. When gum was unsaleable in the north, an enterprising lumberman shipped a large quantity of it to Europe and sold it under the name of "satin walnut." They were well satisfied with the wood, but when they discovered that it was plentiful and cheap in America the trade was discontinued. Now, however, many thousands of feet of gum lumber are being used for furniture. Some cooperage concerns alternate sweet gum staves with oak and sell it for oak, and it "goes." A prejudice exists against sweet gum, however. Tell people it is gum and they condemn it, notwithstanding they admired it under another name. Gum is always sawed, because riving is impossible in consequence of its peculiar grain, or its lack of grain. Sweet gum is a choice wood for flour barrel heading. The demand is so strong that stave factory men are not able to pay the price for the best quality of gum logs. It makes good flour barrel staves, but owing to the fact that the grain cannot be consulted, the staves are not always smooth.

Black gum rots readily, and every tree is, without exception, lock-grained, that is, part of the grain twists around the tree to the right and part to the left, making a complete lock or braid, so that splitting is out of the question. In sawing it, you find it difficult to decide whether you need a cut-off saw or a rip saw. When any kind of wood is twisted the grain runs around the log; if sawed into heading straight with the log, the sawing will be across the grain. This requires great care at the planer. Any kind of wood is liable to twist, but lock grain is comparatively rare in ash, oak, beech, poplar, linn and others. Lock grain, it is said, never appears in chestnut. Black gum is always lock-grained, but the heading it makes does not reveal the grain so it can be consulted at the planer. Willow was rejected until recently. It was supposed to be fit for nothing but to drive a limb into the ground, top down, and grow a tree backwards and call it weeping willow, for use in the graveyard. Now, however, it is being used extensively for heading. It makes fairly good heading, but is difficult to saw, because the bark hangs to the saw teeth and chokes the saw. The heart of willow looks like oak, but an expert easily notices the difference in the grain. Willow planes and turns very nicely. For a long time red oak was considered worthless, but it makes the very best of heading and staves. It is difficult to dry, however, which makes it hard to handle, even after it is dry. It is very heavy and takes fewer bales to load a car than gum and most other woods.

BAND RESAW FOR BOXES.

The following is a description of a band resaw in a box factory:—It is a 54-inch machine, and stands on a 3-inch floor, with one 6-inch wooden post directly below the mill, the remainder being supported by the regular floor and timbers of the building. This mill runs at a speed of 480 revolutions per minute, at which speed it has a decided vibration. We are resawing box shooks from 4 to 28 inches in width. In stock from 4 to 12 inches I run 100 lineal feet per minute, and in the wider, slow down to about 15 feet for the 24 to 28-inch.

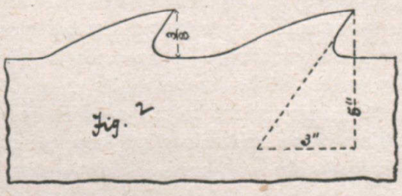
We have for stock eastern pine, hemlock, spruce, chestnut, hard pine, fir, etc., all more or less mixed together in the same piece. We are allowed 1-16-inch for kerf; that is,



13-16 full must make two pieces of 3/8-inch each, and one 1/8-inch must plane two pieces of 1/2-inch. We use 19-gauge saws, 5 inches wide (when new), and we average a cut of about 20,000 feet per day, surface measure, after resawing. Saw does not run all the time.

I have used only two saws in the last year, and have not had a saw crack during that time. Have ground off about 1/4-inch from each during the year. I changed the shape of teeth when I came here, about two years ago, from Fig. 1 to Fig. 2. I tension my saws to a 34-foot circle gauge, and crown the back just a little; but as I have no concave back guide, fit them nearly straight. The wheels are slightly crowned.

We carry 1,500 pounds strain on 5-inch saw and 1,400 on 4 1/2-inch saw, changing saws about twice per week, although



the amount and kind of sawing make a difference. I look them over for tension every time they come off the mill, and swage about every third grinding, side-dressing to about 1-16-inch. Was troubled with my new saw braze, as it was soft. Took it to the forge, and, heating the brazing irons to a good red, held one above and one below until the color run to a deep blue, then with some wet waste cooled the braze, and it ran very well after that. Have been up against twists—short ones. I take them out with cross-face hammer; long ones I let alone, as they do not seem to do any harm in my work.

In regard to saws cutting hollow, when one of my saws cuts that way I take it to the hammering bench and usually find it a little dished on the side to which it runs. A few blows with cross-face hammer on opposite side usually fixes it all right."

WASTE IN COOPERAGE STOCK.

For the reason that if the blocks are extra long it is convenient to place the match in the head-turner, a good deal of barrel heading is often sawed two inches or more longer than the diameter the finished head is to be. But this practice has several disadvantages. Even an inch longer than is needed works a hardship on the heading saw and sawyer, because all that inch becomes above the center of the saw and requires an extra push on the part of the sawyer. Then the greater length of block to cut through brings more strain on the saw, the belt and everything affected. When the heading is stacked for drying, the extra length makes more lap and prevents the ends from being thoroughly dried as soon as the middle of the pieces. Then, if the middle is dry and contracted and the ends wet and expanded, when it is circled, the unavoidable result is the joint is no joint at all, because the ends of the heading contracted more than the middle, and maybe the middle expanded. A good joint in finished heading must show daylight in the middle, and it will be readily seen that a very little expanding or contracting will spoil the joint. It is well known that 3/4-inch is plenty to allow for the heading to be longer than the diameter of the finished head, and more than this is only entailing trouble and loss, to accommodate the whims or ignorance of comparatively inexperienced men.

Extra width in matching is wasteful and intolerable. For example, a flour barrel head is to be 17 1/8 inches in diameter and heading is matched together 18 inches wide. Although 17 1/2 is enough, in practice many foremen allow it to be matched 19 inches wide. Then the matcher man will stretch it some, and often it is 20 or more inches wide when only 17 1/8 is to be used. Suppose a lot of machines are turning out some 2,000 sets of heading a day, which equals 4,000 heads. If the match for each head is one inch broader than is needed, it entails a loss of 118 sets of heading, which, at 5 cents a set, will show a loss of nearly $6 a day.

No one item of wastefulness is allowed to become lonesome, however; if tolerated in one department, it will force itself into every department. The matter of leaving a few staves or a few pieces of heading lie, unstacked, here and there, to curl and twist and ruin by sunshine and atmospheric action, is a loss that will help to make it necessary to reduce the men's wages. Another way to waste cooper stock is to allow finished staves, heading or hoops to lie unpacked, or, if a bale becomes bursted, allow it to lie unattended and spoil. Heading becomes mismatched, staves become twisted, cupped or curled so they don't fit in the hoops properly. This is prevented by being baled. Hoops are not rebaled when a bale becomes broken, because it is impossible to straighten the hoops that have been once wound into the coiler, and just as impossible to re-coil the hoops that are thus crooked; but the hoops are just as good as they were before. They should be tied together and shipped on top of the load in the car. If properly handled, the few that will be loose can be saved in this way.

An experienced heading man said that if a planer is adjusted right it will never "kick." A planer should be so adjusted that the heading will plane equal thicknesses anywhere in the planer, not thinner on one side than on the other, causing the head-turner to throw out the thin pieces of heading with dangerous violence, because the piece thrown out was thinner than the rest that were in the clamps at the time, and the clamps did not catch firmly on the thin piece.

THE SLACK BARREL.

The average man looks on a barrel as simply a barrel, and seldom thinks of the important part it plays in many industries. He never stops to think how seriously trade would be handicapped if the barrel supply were suddenly to give out or if some individual or corporation succeeded in cornering the barrel market. This is particularly true of the "slack" barrel. In the cooperage trade barrels are commonly classified as "tight" and "slack." The slack barrel is used to hold commodities which are not liquid, such as lime, salt, cement, flour, sugar, vegetables, and a great many other articles. In many respects the slack barrel is an ideal container for such materials. It is strong, durable and easily handled. The articles which it contains are thoroughly protected, and after being once used, the barrel may be again used and re-used for many different purposes, and after having served its time as container it has a final use as firewood.

Some of the commodities which were once almost entirely packed and shipped in barrels are now being handled in sacks, but the users of the barrel insist with much reason that the barrel has no superior. It is the strongest package on the market, is sanitary, and is easy to handle. A sack, on the other hand, is often damaged in transit, and when it contains food stuffs, the material is likely to be contaminated. This contamination arises not only from unclean cars, but also from the products coming in contact with other articles which seriously affect them. Protection against damage by moisture is often especially important.

There is a lively contest between the makers of barrels and the makers of sacks, to secure the trade of sugar, flour and cement manufacturers whose products were once chiefly put up in barrels and which are now extensively put on the market in sacks. The sack, of course, is a cheaper package, and the increasing scarcity of timber and the rise in price make the situation doubly difficult for the manufacturer of slack cooperage stock.

The ordinary slack barrel, says a circular issued by the Forest Service of the United States Department of Agriculture, consists of some sixteen or seventeen staves, two heads of three pieces each, and half a dozen hoops. No complete statistics are available upon the amount of timber annually used in the manufacture of slack cooperage, but reports indicate that last year there were produced over a billion staves, over 200,000,000 sets of heading and more than 300,000,000 hoops. Many wire hoops are also used. It is probably safe to say that altogether more than 800,000,000 board feet of timber are used annually in the manufacture of slack barrels in the United States, and that if the barrels which are made in a single year were stood on end side by side, they would cover an area of over 80,000 acres. And in Canada the consumption is also enormous.

Because of its great strength and toughness, elm has long been the principal wood used for staves for high-class barrels and for hoops, and it will be the favorite until the supply is exhausted. There has been a very great increase in the use of gum for staves within the last few years. Basswood has always been the preferred wood for heading because of its soft, even grain, but it, too, is being gradually replaced by gum.

So far, forest utilization has been of the most wasteful kind and only a relatively small percentage of the actual wood contents of the trees has finally reached the consumer in the form of some useful article, whether that be board or stave or shingle. Studies made by the Forest Service, Department of Agriculture indicate that in the manufacture of staves and hoops, only 50 to 60 per cent. of the contents of the log which goes to the mill finally emerge in the manufactured form, and that, with heading, perhaps no more than 25 per cent. of the actual volume of the log finally goes into barrel heads.

Much of this lack of utilization cannot be prevented, yet there are possibilities of greater economy than is commonly practised. For instance, upon careless inspection, logs are often assumed to be suitable for stave bolts and are cut into lengths which are multiples of 32 inches, and are subsequently found to be fit only for heading, which requires 21-inch lengths. This causes much waste which could have been prevented by a more careful determination at first of the purpose which the log was best fitted to serve.

Waste also occurs sometimes because logs lie in the woods or on the yard until they are too checked to use. Waste is increased, too, if the bolts are split instead of sawed, since in this case the first and last staves cut from each bolt must be discarded because the sides are uneven. Hence a given volume of timber will produce more staves if the bolts are sawed than if they are split.

It is equally important to utilize the waste which unavoidably occurs. Every part of a tree may serve some useful purpose. Manufacturers of slack cooperage stock are confronted by the same problems which are now meeting almost every user of wood, an increasing scarcity and a correspondingly higher price. The farm woodlot has frequently furnished timber for the maker of hoops and staves and heading, and it is the opinion of some who are best informed upon conditions in the slack cooperage industry, that if properly managed these woodlets could be made the source of supply for a large proportion of the timber required for barrels.

THE GRAIN IN STAVE WOOD.

A man buying, inspecting and receiving timber should know a wind-shaken or knotty stick, and what effect these defects will have on the stock to be made of it. He should know when the bolts or heading blocks are not too short. He should know and remember that stave bolts must be split right. So to cut staves correctly the grain of the wood must be thoroughly noted. The stave bolts must be properly prepared, otherwise they must be trimmed more to work with the grain. The extra trimming, in consequence of bolts having been improperly prepared, is expensive, because it consumes time that might have been consumed on good staves if the bolts had been right; and the trimming also cuts away a large amount of valuable timber, or timber that would have been valuable if it had been handled right.

When a stave which has been worked into a barrel, afterwards loses its concave shape and becomes convex towards the inside of the barrel, it has surely not been cut with the grain. This item of loss is greatest on staves that change their shape before they are made into the barrel, and are unfit for the poorest quality of culls. All woods do not show the grain on the stick like oak, but the stave-cutter must know and consider the grain as if he could see it, when he is cutting staves from such wood as cottonwood and other woods that do not show it. Some think these woods can be cut any way but it is shown by long experience that they do not hold their shape and do not cut smooth. A stave-cutter that insists that the grain of these woods need not be consulted makes many defective staves.

Query Department

Question.—What would you advise me to do in the event of a planer journal giving trouble through heating?—" Z."

Answer.—Planer journals become troublesome from heating. A journal will heat if it binds anywhere, and it often heats when it doesn't seem to bind at all. But when there is a case where a cylinder journal has become sprung through bad treatment or neglect, it is a good deal of trouble to work with it all day and slop everything up with oil, trying to keep it running. I remember a journal which would heat in spite of every attention. For over a week this went on. The following Sunday the planer man took off the cap of the box, took out the cylinder and cut out the middle of the bearing for one-third its length, both in the frame of the box and the cap, and replaced them, with the result that the machine ran all morning without any trouble, to the amazement of the feeder, who had been used to working half his time keeping the boxes from burning out. The idea was to remove friction from that portion of the journal not in a true line, and the remedy was effective.

A PULLEY WORKING LOOSE.

A split pulley with a wood bushing can be put on a shaft so it will hold for any service for which the shaft is heavy enough; but wood has one defect against which all, especially woodworkers, should always be on guard. It will shrink and swell. A wood bushing is, of course, supposed to be perfectly dry, and doubtless most of them are so when they leave the factory, but they often have many chances to absorb a little moisture before they are put up, or, it may be, get a little damp after being put up, then shrink again.

In putting on or tightening up a wood bushing, the first essential is to see that it fits the shaft, for therein lies its holding power. If it is too small, of course it can be worked out, though the job is well worthy of the best workman on the premises. In new work, however, it generally fits; and, when readjustment is called for, the hole is generally too large. Then appear a multitude of devices and makeshifts, some of which would scare a mudturtle. Some people plane off the edges of the bushing and screw up the bolts some more, sometimes putting something between the bushing and the hub of the pulley, while others wrap the shaft with a piece of leather, and many resort to a piece of sandpaper.

The writer has attained the best results by using plain paper tightly wrapped on the shaft, being careful to use just enough so that, when compressed, it will make the bushing fit snugly all around, just as when it was new. Too much is as bad as too little. Paper, tightly compressed is a very firm substance indeed; and, in this position, holds much better than leather, which is rather slippery and too elastic for the purpose, and fully as well as (I think better than) sandpaper. Sandpaper is " good grit," but grit, indiscriminately applied, isn't good for machinery. The glue and sand, on sandpaper, rather tend to prevent that close-fitting contact that is so essential to a good grip; and, admitting that it holds as well as plain paper, when it does slip, there's something done which were better undone. An even firmer grip might be attained by wetting the paper before wrapping it on the shaft; though, as it would be necessary to let it dry thoroughly before the pulley was put on, it would probably be best to use paste instead of water to moisten it with, in order to guard against its unwrapping as it dries.

CEMENT FOR LEATHER BELTS.

In an ordinary glue-pot soak over night a pound of good fish glue in a pint of cold water. Heat this up, stirring until completely dissolved. Then add one ounce of dry white lead. When the mixture has been again thoroughly stirred and is nearly cool, add one ounce of grain alcohol, and stir it well in. Heat up the cement again when it is wanted for use. In the use of this cement care should be taken to have the laps freshly and smoothly cut, and as clean as possible. The cement should be evenly spread with a brush over both surfaces, and the surfaces placed in contact as quickly as possible and on each side of the lapped belt should be placed a previously-warmed board, and the whole clamped together for an hour or two, according to the width of the belt, its thickness and the amount of strain it will have to stand. This cement can be made in larger quantities by observing the same proportions, and when cool it may be cut up into small pieces, and kept in good condition in a fruit-jar tightly closed. When it is wanted it will not be necessary to heat up more than is wanted for the job in hand.

A man need not necessarily be a good workman to be a good foreman, but he certainly should be a good judge of good workmen.

The handy man does not have any particular calling, but he is so useful about a wood-working plant that not many try to get long without him.

The best foreman is not always the man that knows the most, for he is frequently the man who merely knows how to get the best service out of others.

A careful study of a mass of data and tables of strength of materials seems to show that, roughly speaking, wood is stronger in proportion to its weight than steel and that, for a given weight, the lighter woods are stronger than the heavier. Relatively to weight, white oak is one of the weakest of woods and yellow pine one of the strongest.

Often, when in need of a flat pulley, only a crown pulley will present itself. Now, we all know of several ways to crown a flat pulley, but when a friend of mine proceeded to flatten a crown pulley (wood) with a rasp, the obvious simplicity of the thing almost killed father, says a writer in the American Machinist.

Belts are frequently run too tight, either through stress of circumstances or through a lack of proper attention. A belt is too tight when it is tighter than is necessary to pull its load continuously. When the load is so heavy as to make it necessary to tighten belts to the straining point, it is good policy to seek ways and means to increase the width of the belt.

Saw Mill Department

TAKING TWISTS OUT OF SAW.

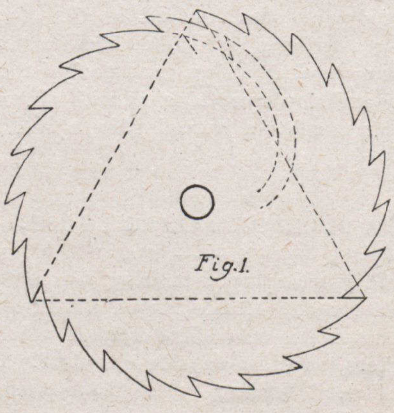
Some people say a twist can only be taken out of a band saw by help of a twist-face hammer. I believe it can be done easily enough with a roll, however. Most people will say the twist will go when the saw is put up to the three vital points, but I know that in one saw I had, there was a crown of 1-32-inch in 7 feet, tension to the usual amount, and as level as possible, yet when laid upon the floor it looped about half the width of the blade, or 4 inches. I placed the irons on the roll, and rolled one-third of the way back and front, inside and out, giving just enough pressure to carry the saw along. This reduced the twist about 50 per cent.; after thinking a moment, I decided to roll in the centre, and one-quarter front and back, both sides, and that fixed it. The twist had absolutely vanished in twelve minutes, and, although the operation had dished the saw, it would stand up on the floor plumb and nice.

Now, when it comes to fitting bands, a filer is justified in any method of procedure that will do away with the hammer, as it soon becomes obvious to the said filer that a hammer is the band saw's worst enemy. I have used the hammer and didn't have a crack; then the roll came, and I feared my inability to roll tension in as accurately as I had hammered it in. Furthermore, I did get three or four cracks about this time, and, of course, laid them to my poor roll work. I resolved to be more careful, but have since changed my mind, and believe the cracks were caused by gum on the wheels, because for a long time the saws were tracked away back on the wheels, and there is a strip about ½-inch wide on both wheels where the swaged teeth have picked the surface rough so that it is impossible to keep the wheels sufficiently clean—and two strips of gum ought, it seems to me, to be able to develop four fractures in three plates in fourteen months. My saws go better since I changed the shape of tooth, and will take 12-inch hard pine timber on the fast feed.

Now, as to grooving saws. A grooving saw is simply a rip saw so thick (⅜ or ½-inch) as to prohibit the use of a spring set. I would use a bar swage if I had one, as that is, I think, much better; but in order to obtain a clearance, I upset. It does sound paradoxical to speak of a saw without the semblance of a corner, and on log circulars no doubt the corners would not disappear to such an extent; but I would call attention to the fact that if the corner is gone we must make another. When I speak of this condition, I allude to circulars varying from 10 to 24 inches in diameter and from 7 to 12 gauge. These saws are used on a large saw table with a 1½-inch mandrel, which is driven by a 35-horse-power motor. The stock is everything from boards to timber, hard and soft, clean and dirty; rocks, nails, etc., with the accent on rocks and nails. The saws generally stay in the cut until the corners are so far gone that the saw begins to smoke.

I have tried two methods on this class of saws, the first being the upset, the latter being a reversal of the spring set. I discontinued the upset because it would not make a corner strong enough to stand the above-mentioned nails and rocks. It was very discouraging to upset a 7-gauge saw and then find numerous corners gone on the first run, so I let them go, and when the corners wouldn't come out by grinding, I set the teeth the other way and got my corner—and it is the strongest corner, after all.

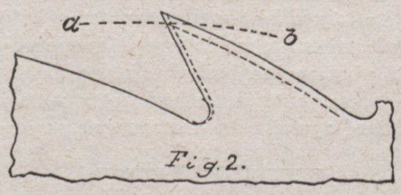
As to the contention that in grinding the face of the tooth the shape is altered, I think that not only filers, but the



manufacturers of circular saws, will back up the following.

By consulting Fig. 1, it will be noticed that the back of the tooth has apparently a circular outline; apparently only, for as a matter of fact it is a convolute or spiral curve. This curve is known as the periphery line, and may be carried clear to the eye of the saw. Regardless of the size of the saw, if the face of each tooth is formed by a straight line that forms one side of an equilateral triangle of such size as will just fill the circle of said saw, we have the ideal tooth outline, and by always keeping this line, relatively one side of such a triangle, it is an absolute impossibility to alter the shape of the tooth. Such a tooth cannot become slim or weak. Let us consider such a saw at work. Suppose the saw to be 24 inches diameter, with 48 teeth, which makes the teeth practically ½-inch space. Supposing this saw is making a 3-inch cut—that is, 3 inches of feed for one revolution. It is obvious that each tooth cuts a shaving 1-16-inch in thickness. If we could draw a circle 1-16-inch smaller than that of the saw, we should find that where the said circle crossed the face of the tooth (Fig. 2, a b) we should notice that the saw is dull only outside of this line.

How shall we sharpen? This dull point is but a trifle over 1-16-inch long, but is probably less than 1-124-inch deep. Consequently, if we sharpen on the back, we must grind or file 1-16 off all along the periphery line, and the saw is ⅛-inch smaller when we are done. On the other hand, if we grind or file on the face of the tooth, we will have less than 1-124-inch to grind to obtain a sharp point, but we shall not



lose anything like ⅛-inch in diameter. Considering the size of said saw and the gauge as well, I think it obvious that such a saw will stand up and rip for a long time; and I contend that every semblance of a corner will be gone when it comes up to the file room.

These conditions are true in conjunction with the upset swage, only to a greater extent. If in upsetting we use the face of the tooth for a guide, we lose in the size of the saw, but by reversing we get the spread more quickly, save the size of the saw, and incidentally save lots of time in grinding, as we can grind up the face of the tooth quicker than the back; for, though we have just as much in thickness, we have only half the length.

As to saws cutting smoothly, I can't see that it makes any difference whether a full swage or a spring set is used, but it makes all the difference whether the saw is sufficiently open, level, etc., and all teeth the same length, with all giving the same amount of clearance. I do think, however, that the full swage takes less power, given the same clearance, than the spring set, as the former cuts clear across the kerf, while the latter cuts about three-quarters across the kerf, first from one side and then the other. To prove this, notice the points on a dull spring-set saw. The dullness does not extend evenly clear across the cutting points as in the swaged tooth, but on the outstanding corner is twice as dull as that portion of each tooth that cuts the thickness of the plate. So we see that the spring set will obtain a stipulated amount of wear in about half the time as the full swage.—J. H.

AN ENGLISH CRITIC ON OUR SAW PRACTICE.

An English writer, accustomed to the sawmill practice, in respect to setting and sharpening, etc., of his native country, makes some comments on the methods pursued in Canada and the United States. Speaking of the tools used in England, he describes the saw set and the gauge. The gauge is a piece of steel, generally from an old frame saw, which is filed into elaborate designs, to suit the taste of the owner, and to gauge the projection of the side of the tooth. It has two pieces left on it, to touch the saw, and a third part is arranged according to the set the saw requires. It is possible with the two tools to set the spread of the teeth to within an hundreth part of an inch.

With regard to the speed they can be used, it will be granted that if all the teeth are set to within 1-1000-inch, even a swage shaper will not effect a more accurate result. He says he does not know how long it would take to use that tool on a 34-inch circular with ⅝-inch spaced teeth, but has set those teeth in seven minutes, and the result has been clean, accurate sawing.

Then, again, take thin, ground-off saws that have to cut twenty cuts in 3 inches, 11 inches deep. Would it be possible to use the swage on their teeth, he asks. I doubt it very much. Perhaps this is all high treason to American woodworkers, but when I read of so many difficulties and see the results of much indifferent sawing on some ash, oak and poplar boards that are imported into England, perhaps it is as well that we should speak out and ask why do you pin your faith to the swaged tooth.

It appears to this writer that the great factor in favor of swages is indifferent sharpening of the saws. The principal part of a tooth is just where your swaged point comes, and if, when a saw set is used, that portion is worn round, and there is no sharp edge to sever the wood, then the sooner it is swaged out the better for all parties. But once the principle of sharpening is understood, there is no need for this swaging, if a set saw will give cleaner results and require less sharpening. As far as this Englishman has seen of English and Canadian sawing, the former is smoother and more accurate.

A swaged saw will have the advantage of presenting more surface to the wood. A set saw, with slightly beveled tops, will only have half of its teeth cutting the wood; the inclined part which is below the meeting of the two different lines of angles will be overlapped by the teeth on the opposite side of the range. What is objected to is the result of swaged teeth; they leave the wood in such a ragged condition.

There is considerable discussion about cutting bevel siding without whiskers—whether the boards should have a shave before or after sawing. Bevel siding is another name for English feather-edge boards, which are cut without hirsute adornments. There is no need for any special requirements beyond accurate sharpening and setting of a ground-off saw, to cut them without whiskers, for the sawn sides should be as smooth as the planed ones. He admits they in England are behind in the tensioning of saws, which is a point that is not thought of, yet upon it depends the successful running of the saw.

Speaking of the amount of set used this varies with men and work, yet it is considerably less than the five to eight gauges favored by many. "I am in favor of as little as possible," he says, "varying it according to the wood. On our automatic cross-cut saws, used for cutting paving blocks, I use two gauges for deal, spruce and red gum (satin walnut, please, when a cabinetmaker's wood), and four gauges for jarrah and karri. For ripping saws I use two gauges for deal and pine, three for jarrah and four for teak. The last named wood requires extra space, as the corners of the teeth wear away through the same in the crevices of the timber. A swage would do well for this wood. For cross-cutting so that the ends will make a clean joint, I have hollow-ground saws, 10 and 11-gauge on tooth and 13 in the center of the saw. These, I need not say, with one exception, do not require any setting. I find, when cutting kiln-dried jarrah blocks, that the saw will leave a black mark on their ends, so I show them the saw set and spread about ½-gauge, so little that it scarcely moves the teeth. These hollow-ground saws have to turn out clean ends, without any marks upon the wood, which has to be perfectly smooth and free from any breaks or whiskers. Set on frame or gang saws varies according to the wood. If they are to cut mahogany, walnut or timber of a similar nature, two gauges will be sufficient, for more set would allow the saws to roll in the wood and the boards would be then finished with an undulating surface. I need not say that such results are not desired, and woe to the unfortunate filer who gets his saws so that the wood comes out like that, for, verily, it is the sack. Elm, oak, chestnut and other native timbers require more set—elm about 4 gauges.

Perhaps some one will prove to me the advantage of swaging. I bring an open mind to the subject and am willing to be convinced, but up to the present believe that the sole reason for its existence is the insufficient grinding or filing of the front of the tooth. Just another point: Does not swaging shorten the usefulness of a saw?

Saw-makers do not know all about saws, but if they didn't know more about them than lots of others who run them, we would have much more trouble than we do.

* * * *

A rip saw without a guard is one of the most dangerous machines in a wood-working factory, and there are more of them without guards than with them to-day.

THE BAND RESAW.

I remember a band resaw, a combination 42-inch wheel machine, which, when it arrived at the mill, had been some little time in use, though for all practical purposes it was new. When it arrived the practical man assembled the parts, figured his speed, placed his pulleys and put on a saw which came with it, but which had been plenteously brazed and showed hard usage. After placing the saw on the wheels and straining spring tension to what he thought the right thing, and tilting the upper wheel to make the saw teeth clear the face of wheel, he started up and fed some narrow strips of soft wood through. They went through all right, of course, and that meant, of course, the machine was all right, so it was turned over to the foreman as ready for business. The foreman, not claiming to be an expert on such machines, having at that time had more experience with circular resaws, felt no special anxiety about trying the band saw, but considered it rather light for the purpose. He wasn't much in favor of combination machines in general, but decided to give the machine the fairest kind of trial.

When it came to getting the machine ready for work, investigation showed both upper and lower guides in very bad condition, being scored to such an extent as to endanger the saw by catching and twisting the blade. The guides were taken out and trued up lightly, then replaced, and side guides adjusted so as to relieve the chattering; then the back guides were adjusted so the saw, while in motion, would run clear and free. Still the saw was rather more noisy than he cared to have it, but after a careful examination he could see no reason for it, and finally concluded the fault was in the saw, as it was rather badly brazed. He finally let it go. It would go through 2 or 3-inch fairly well if not crowded too fast, but after an hour or two it was found necessary to stop and braze several places, the cracks coming on the front edge of the saw, and not usually at the roots of the teeth, but all along, anywhere. He looked again to the back guides, thinking the saw probably crowded back, but found them all right; brazed and tried the saw again, with the same result.

It was then decided the saw was at fault, so a new one was ordered, 2-inch blade, 20-gauge. When this came they again went over guides and bearings to see that all were tight and guides free, put on the new saw and started up—but there, again, was that everlasting clackety-clack and noise as bad as before. After trying in various ways to stop the racket, the stock was fed to it and fairly good work done with stock from 2 to 12 inches wide, on a slow feed. After a couple of hours' run the machine was stopped, and in looking over the saw it was found to have nearly a dozen cracks on the front edge, just as the other had done, some of them requiring a braze; others were simply touched with a cold-chisel—a light blow at the root of the crack.

They had others examine the saw, and all told them the back guide was at fault—the saw ran too hard on it, stretching the front edge—but they went over these parts and were satisfied the trouble was elsewhere. They finally concluded the saw might be too hard, and to make another trial of a new saw, using the other meanwhile, but were obliged to braze several places after every run, and finally the saw was even beyond brazing, and useless, unless cut down to 1-inch. When the new saw arrived it was looked over and found slightly crooked from brazing, which was remedied, and the saw placed on the wheels. The guides were all right, but when the machine started the saw made a great racket and seemed to flop on the wheels. They then concluded to look after the speed a little, and found it rather faster than the general run of saws of that size, so changed the pulleys, reducing the speed about half the excess, then started the machine again, with somewhat better results, making a fairly good run. There were not so many cracks as usual and not as far back, so they concluded to reduce the speed to what was usual for that size machine, hoping to end their troubles; but although it reduced the number of cracks somewhat, they still appeared, and it was only a question of a short time when it would be necessary to order a new saw.

When they ordered a new saw they made up their minds to overhaul that machine from foundation to garret, if possible, and find out the trouble, so one day they took off the saw, swung the feed clear, and taking a plumbbob, dropped it from the top of the top wheel to see where it stood with the lower wheel. Then they found a surprise party. They had supposed that of course when the machine was set up the wheels were lined up, and so had never given them a thought. The bob showed a sad state of affairs. The lower wheel set back full ¾-inch from the line of the top wheel, which was as far back as it was possible to get. The lower wheel was fully ⅜-inch too low at that end of the counter-shaft, which made the saw run on a quarter-twist nearly, and all the strain on the front edge. No wonder it cracked! It couldn't very well do anything else.

They expected that would be an easy job, as all saws have an adjustment for raising and lowering one end of the counter-shaft, but when they came to look this up they found it had been used to the limit, and still was a long way from being in line. After looking the thing over a while, they took the shaft out, cut the babbitt from the bottom of the box next the wheel, then replaced the shaft, blocked the wheel up level with the top wheel and brought it out to line with the face of top wheel by putting a washer between wheel and box, then poured the babbitt. It took considerably more babbitt to raise it where it belonged, but it answered the purpose. They then fitted the cap and found that the bob showed the wheels in line, so were ready to give it a trial when the saw came. When the saw was placed on the wheels, strained up and the machine started, the racket had disappeared and the saw hugged the wheels in good shape. This looked quite encouraging, and when the stock was presented it simply went right through it in a straight line, and has been doing that for some time, without cracks or kinks.—" H."

LINING UP A MILL.

This is the way one man, who by the way has had considerable experience in the business, describes the best method of aligning a sawmill: First, I nail a support at front end of the track, with the carriage back at log deck. Then I fasten a line on this support and on the carriage, taking a level to plumb the line with the track iron; take either edge of the " V " track, or, if the edges are much worn, strike a center and use that.

Square this with a line or a long straightedge; if a straightedge, it must be perfect. In squaring these lines use a triangle, as a square is too short to do accurate work, but is close enough to make a mill run. Square the bottom wheel with this line by using two more lines, fastened on suitable supports. If straightedge is used, they can be fastened to that—one line for each edge of the wheel towards the log deck. When you have moved the wheel so that each edge measures the same from these two lines, the wheel will be in line with the track. I do not like to line from the face of the wheel, as sometimes a wheel will wear more on one edge than on the other, and one edge will measure more in circumference than the other, hence the wheels will hardly be alike on the face, unless just ground.

When this lower wheel is in line with the track, it is easy to line the top wheel with it. I fasten a stick on each edge of the wheel—towards the log deck—put a line on these, each exactly the same distance from the edge, and let it drop past the edges of the lower wheel, then move the top wheel until both lines measure the same distance from the edges of the lower wheel. In lining up I always have a saw on the wheels, under full strain, same as when running; this draws the wheels and boxes into the same position as they are in when running. I have found considerable difference when the strain was on and when it was not.

After getting the lower wheel in line with the front half of the track, I run the carriage up to the other end, out of the way, put my line on the back half of the track, and see if it lines up exactly as the front half did. If not, there is a bend in the track, probably caused by the pounding of the nigger; this will show it quicker than a line the whole length of the track. Some prefer to line the top wheel with the track first, then set the bottom wheel with that, saving one set of lines, but I prefer to set the lower wheels first.

Now, about changing saws for hardwood or hemlock, instead of having them able to cut both. Some people seem to think we change saws every time we change logs. The fact is, the saws will cut any kind of timber, no matter how mixed, at any time of year; but is that any reason to think they are doing their best in any one kind of timber? It is all right if you are always sawing mixed timber, but if you have a run of six months all on one kind of timber, and you do not experiment with any changes in your saws, how do you know that the saws are doing their best in this particular kind of wood? My saws will stand 16-inch feed in all kinds of mixed woods—maple, birch, ash, oak, hemlock and pine—but they will stand a great deal more than that in either of these woods when fitted for it. But for a few days' sawing I never make any changes, no matter what the timber is, not even in the swaging. We have cut at least a dozen different kinds of timber, all with a hemlock saw, and it was no trouble to find feed marks that measured 20 inches; but some of these logs could have been cut on much faster feed with a saw fitted for it. For these reasons I shall continue to change my saws whenever the timber is changed for any considerable length of time.

TWISTS IN CIRCULAR SAWS.

I will remind my readers that band saws are not always twisted when they assume a twist. If one edge or the other become elongated, the saw will assume a twist when it really has none, but needs tension. The same with the circular; if the rim gets too long by gumming, it will assume a twist when it has none, but when uniformly hammered, it straightens out.

I will describe such a saw, as many good filers get mixed up in such cases and get into serious trouble. Stand saw on floor, balance it, and give it a gentle shake. If the rim trembles while the centre remains steady, it is a sure indication of a loose or long rim. If centre trembles more than rim and saw shows a twist by rolling it one-fourth revolution, it must be removed. Be careful to hammer no nearer than 3 inches of the rim, or you might get rim too long at this place, which will cause trouble. Be extremely careful not to hammer too much near collar. It is very important to first get some tension in any saw that is twisted, and nine times out of ten the twist will be gone.

Circular saws are much more difficult to handle than bands. If they were given the tension nearly on a circle clear across saw, as with the band, there would not be much trouble, but a circular saw may be evenly and uniformly tensioned, yet have a twist, or rather a ridge, running from eye to rim. Such a saw will make good lumber and cut true, but will not run steady out of the cut.

Why doesn't some one tell filers how the faces of their hammers should be? Some filers, with narrow saws, us no roller, and others use the round-face hammer more than they ought to. Let me say that if it does not make a round spot on saw, in the course of time, your saw will not lie parallel on the floor and you will wonder where the trouble is. Again, the long-face may be in such shape as to aggregate rather than remove a twist, and surely so if it is not properly applied to the saw. Reckless blows allow the hammer to cut or dent the saw, which will surely ruin it.

I like the long face of my hammer shaped so that it will not cut or dent the saw and so that it will change the tension as little as possible. Of course, all filers know that in removing a twist the saw must not be hammered to mar the edge on anvil. I caution men more about denting and cutting a saw with a hammer than anything else, for, as stated, it ruins the saw. I know that some filers want too sharp a hammer, so as to put tension in quickly, but they do not consider their employer's interest. The saw will require more set, and no saw, circular or band, will run well with too much set.

Would like somebody to tell me why the majority of band filers run more set or clearance than is run on the circular? The average set on a well-fitted 14-gauge saw is exactly a No. 8 gauge, making six gauges of clearance, and I have, in cypress, seen nearly seven gauges. Now, my circulars do their best work on four gauges, and never, on a fresh swage, do I give over five gauges. Take a cross-cut saw and give it a trifle too much set and see how quickly it will be brought back.

Filers should run less set and sharper saws, but if the saw is full of knots and is marked with the hammer, then more set is necessary. Strike solid blows; rebound blows will ruin a saw. Use a good levelling block or a heavy, smooth anvil, with the proper oval to face.

MAKING A BAND SAW.

The running of a band saw properly requires a deal of skill and experience. The manufacture of these saws is very much the same. They are rolled from large pieces of steel until the right thickness is obtained, 14-gauge being the standard, and usually left full for grinding and polishing. The very best of steel that can be obtained is used in band saws. Fluxes such as aluminum, and alloys such as nickel, are useful, and are used in the manufacture of steel, but these, in the absence of high-grade material and the proper percentage of carbon, will not produce fine steel having the qualities of toughness, elasticity and edge-holding.

A band saw blade is placed in a large furnace, 75 to 100 feet long, and left until the proper heat is obtained for tempering. It is then taken from the furnace and plunged into a long trough filled with whale oil. When cold, the teeth are punched by an automatic machine, and it is then tested for temper; if found soft or too hard, it is retempered.

The blade, after being tempered, usually comes out badly twisted. Some are long-face twists and some cross-face twists, then comes the cross-line twist, which runs the entire length of the saw. Sometimes part of the saw will have long-face twists and part cross-face twists. All twists are taken out of blade with the cross-pein hammer, and tension put in with the round-face hammer to the amount desired. Tension levels are used that are made on a circle, so as to have the tension even throughout the saw.

The blade is then ground between two large grindstones running opposite directions from one another. Great care is taken in grinding to keep the stones true so as to grind the saw alike on both sides. Should one stone become hollow-faced and the other remain square, you will find the saw blade to be ground level on one side and rounding on the other. It would be impossible to level such a saw alike on both sides. After being ground the saws are polished and brazed together, and hammered and tensioned before they are put together.

THE HICKORY SUPPLY CLOSELY WATCHED.

Automobile and carriage manufacturers, along with the men of the allied vehicle industries, are giving very serious consideration to the question of the future supply of hickory timber. This wood, which is one of the most important of all woods, since no satisfactory substitute for it has been found, plays a more important part among the commercial timbers than many people realize.

For automobile and carriage wheels, where strength, toughness, and resiliency are essential qualities, no other wood has been found in this country that will take the place of hickory. Manufacturers say that no steel or wire spoke has yet been found that will withstand the wear and tear of the hickory spoke, and for this reason the welfare of the vehicle industry seems dependent upon the conservation of the hickory supply.

Three of the largest associations of hickory users in the country, the National Wagon Manufacturers Association of America, the Carriage Builders' National Association, and the National Hickory Association have completed a series of co-operative tests with the United States Forest Service, and the trade considers the results highly important. The tests covered a close study of the properties of different woods used in vehicles and implements, supplemented by mechanical tests to ascertain the relative strength of different woods and different forms of construction, and to test the accuracy of the present system of grading.

In a report of the tests made by H. B. Holroyd, forest assistant, and H. S. Betts, engineer in timber tests, of the Forest Service, the fact is brought out that there is an error of over 50 per cent. in the grading of vehicle stock, due largely to the prejudice of the manufacturers against the use of red hickory. It is shown that in clear stock, weight for weight, the red hickory is as strong as the white. By bringing this fact to the attention of the manufacturers, it is hoped that much of the hickory which was formerly left as waste in the woods will be utilized by the trade and thus prolong the rapidly disappearing supply of hickory.

Such practical results as are given in the report, which a letter to the Forest Service at Washington will secure free for anyone who wishes it, show conclusively the value of such studies in solving problems connected with the grading of stock, the utilization of new for old woods, and the conserving of our future supply of timber. The supply of good hickory in the United States is known to be very limited. The cut last year for lumber was a little less than 150 million feet, and it is estimated an even greater amount was used for automobile and carriage wheels, axle caps, gears, axles, poles, single trees and neck yokes, and it is figured that at the present rate of cutting the supply will last about fifteen years.

Reports are made from time to time of the discovery of suitable substitutes for hickory in foreign countries. The two woods which come nearest to having the quality of the hickory seem to be one of the eucalyptus and the crowfoot elm, both of Australia. Only time will tell whether these woods will prove satisfactory substitutes. In the meanwhile, American hickory users will be obliged to conserve the present supply and take steps to guarantee a future supply by encouraging private planting of the tree, whose wood is becoming more precious every year.—United States Forest Service.

GOOD ADVICE TO YOUNG WOODWORKERS.

To the Editor of Canadian Woodworker:

Dear Sir,—The first issue of the Canadian Woodworker has now arrived. I welcome it to my home, and will say of it that it is a smart, tidy, well got up journal of its kind, and well worthy of the support of the craft in Canada, and I hope for the benefit of the rising generation that this new educator may prove a blessing to all who study its pages, whether young or old.

When I was an apprentice, nearly thirty years ago, we did not have access to such helps, and had to find out for ourselves many things that would now be hard to explain. But necessity, ever the mother of invention, enabled a few to arrive at a solution of the problem. Let me say right here mechanics are born not made. The facts are that some are born to rule, and will rise because of their perseverance, while some are indifferent and do not care. Such will always have to take second place on the lines of mechanical ability, and have to do the drudge work, go where they will.

The ambition of every apprentice should be to be one of the best, and to accomplish this he should study earnestly. An apprentice should have in his home a drawing board and books, and he should learn to draw. Let him copy plates and cuts as they appear from time to time in this journal. Study details, for the man who studies details makes few mistakes. An apprentice who takes in every show or drops in at the saloon to take a smile once in a while never sets the world on fire. We often see mechanics the worse of drink. This should never be. I tell you temperance in all things is a jewel.

Business wants sober men. Let the apprentice lay line upon line, precept upon precept. Let him keep a cool head and a clear brain, a clear mind and sharp tools, and he is bound to have success. And one day he will be thankful for a journal like your valuable paper, The Canadian Woodworker.

Rome was not built in a day, and the man who lays by him in store will one day find a gold mine in knowledge, in disposition, in character, in temperance, and truth. An apprentice should never have a swelled head. He should be humble, for humility is a jewel. Let him learn that they who have served well are most fitted to rule, and his future will be bright.—Yours, etc.,

V. Lightheart.

Hamilton, Ont.

If ten men in a factory waste ten cents' worth of time each, it is not much to them individually, but it is a dollar to the proprietor.

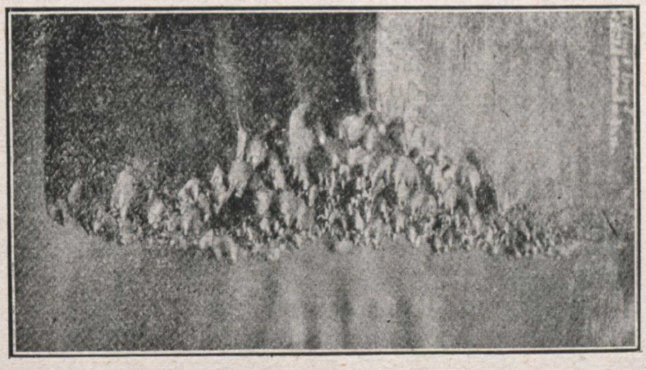
Furniture and Cabinet Making

SOME BIRD'S-EYE EFFECTS.

It has long been a matter for speculation, what causes those beautiful markings on wood which go under the name of bird's-eye grain, a common theory being that they are caused by a bird of the woodpecker species, pecking little holes through the bark. One of the most popular and beautiful woods for veneer purposes is the bird's-eye maple. While

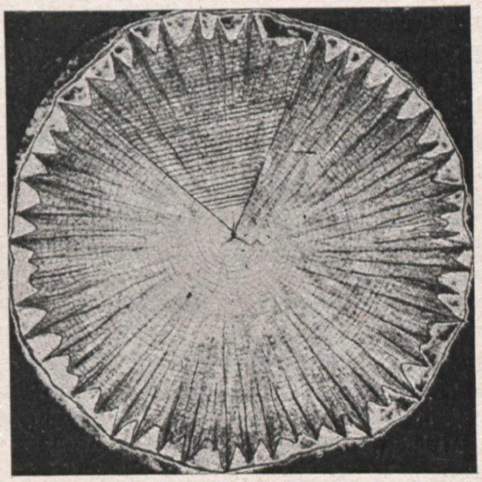
Cross Section of Maple Block Showing the Figure

not expensive, compared with some other fancy cabinet woods, its markings are of uniform size and color. Some specimens show more spots, or are more thickly pitted than others, but in all the specks themselves are so similar, that if there is any difference at all it is so small that it is unnoticeable, except on c'ose inspection. The wood is of light yellow or cream color, the spots being a shade darker than the background. The wood has a glossy appearance, and on account of its hardness and close grain, is susceptible of a very high polish. These spots or specks are usually about one-eighth of an inch in diameter, and they run near this size in all hard maple containing bird's-eye figure.



The Conical Points which form the most prominent kind of Bird's Eye Grain.

The peculiar rough cone-like projections on maple shown in the engravings are caused indirectly by close perforations in the bark, causing gaseous pressure to emit vapor and raise lenticles (or glands, so to speak). Some of these secrete a much greater amount of the lymphatic matter required for the building up of the woody substance of the tree than others. This causes them to build up small cone-like projections, with points as sharp as needles. These pierce through to the outer surface of the bark, where they come in actual contact with the atmosphere. This increases their action and growth, and thus are built up these spinous projections, or little sharp pointed cones shown in the illustration, at the very apex of each one of which is one of these secretive glands, or lenticles. These points keep growing outward, and increase in numbers to keep pace with the increasing size of the tree, from year to year. They have a line or flinty vein from where they start to the surface of the log, and it is said to be these small streaks that give the figure to hard maple. These lines, when exposed lengthwise, are quite visible to the naked eye, being from 1-16 to ⅛ of an inch wide, and are said to be enlargements of the rays, as they radiate similar to them, all starting from points more or less deeply imbedded in the wood; some, which are the older ones, extending from the heart to the surface of a large log. When the wood is being reduced to thin sheets of veneer, the block must be cut transversely to these, and the pits or specks are small sections of them, which are



Cross Section of Walnut Butt, showing Bird's Eye Veins.

clipped, as it were, off each of these small veins, and each section is equal to the thickness of the veneer being cut. In this manner are formed the pits, or beautiful figure in bird's-eye maple.

In bird's-eye walnut the figure is formed in the same way, though in walnut it is not so uniform. In hard maple the exterior of the wood producing the figure is not so prominently studded with sharp points as in walnut, but the principle of its formation is the same.

SANDING AND FINISHING FURNITURE.

We who manufacture furniture must be careful that the goods put out are attractive in appearance and workmanship in order that not only the average buyer, but even a critic may be satisfied. There must first be beauty of design, the most essential part of which is proper proportion in the dimensions of the different parts of a piece of furniture. Then there is the stability of its construction. Much furniture is seen lately that, if subjected to any strain, will fall to pieces;

too much of the strength of construction is sacrified to lightness and style, with the result that the goods hardly hold together to be shipped to destination. It is a pleasure to see the tide of fashion in this respect is taking a drift toward the old-fashioned massive construction.

The principal feature, and the one of which I wish to speak, is the finish on the goods. The dealer to whom the manufacturer sells will look this over more closely than any other part of the work. In order to obtain a good finish, we must first have a good surface. The finisher is often blamed for the looks of a piece of furniture when in reality it is the machine man who is to blame. Getting a proper surface to finish on begins as soon as the stock leaves the stock-cutter. If it is not faced up straight and true, the trouble begins, for the planer work will be poor. If a piece of wood is crooked, warped or twisted when it is planed, it will remain so after it is planed.

Then look out for the sander work, which is the whole thing as far as good finishing is concerned. The best finisher in the country cannot produce a good-looking surface if the sanding is poor; and the quality of the sanding depends on the quality of the planing. If the material comes from the planer gouged, rough and crooked, it is next to impossible to get a perfectly sanded surface, for the gouges and marks of the planer will be copied by the sander, even though they be never so small. There are instances where a planer will leave a mark for every revolution of the cylinder, owing to the fact that the knives are not set out exactly alike, and, the feed being somewhat fast, there will be a very small hollow where the knife struck that had the most projection. When the stock is fed through a sander the pressure rolls on top will feel every one of these little hollows and they will cause corresponding hollows on the other side of the stock, made by the sand drums. Passing the stock through the machine several times only serves to make them worse, and although they may be hardly noticeable to a casual observer, if the stock is held up to the light in a proper position a surface will be seen very similar to a washboard, and after it is finished it is much worse.

If one wishes to see what kind of sanding is done, take a piece of finished goods, place it near a window where the light will strike it fairly, step back about twenty feet and look across it with the eye level with the surface. Then it is that every imperfection, scratch or mark of any description will be seen with a distinctness that is nothing short of surprising. In order to avoid these marks great care must be taken with the sanding. If a piece of stock has gouges or marks on its surface, left by the planer, it should be first put through the machine a little cornering, so that the marks will not come lengthwise the rolls. It is frequently necessary to put stock through once on the poorest side, diagonally, to secure an even surface for the pressure rolls to roll upon when sanding the best side. Of course, it will not do to run the stock through cornerwise the last time, as it leaves scratches crosswise the grain, which show through the finish, but it may be run that way the first time to even down any imperfections, after which it should be run through straight for the last time.

In manufacturing high-priced goods the surfaces are generally hand-sanded after the machine, to take out any imperfections that may appear, and in some factories there is what is called a buffing or polishing machine, which is used after the sander. This is composed of a long arm with a horizontal stroke, on which is a large pad covered with fine sandpaper. This is run over the stock, accomplishing the same result as hand-sanding, but much faster and easier; but as this hand work cannot be done on the cheaper classes of goods, they must be left as they come from the sander. A great many concerns make the mistake of employing cheap help on the sandpapering machine, overlooking the fact that it is the most important part of the work and requires a man of good judgment.

It is an easy matter for the finisher to spoil the look of the goods by some little oversight or carelessness. In the first place, the "filler," if it is the kind that is sanded off when it is dry, may be a trifle too thick and may be applied too heavily. The outside of the filler will become dry, while that underneath will still be somewhat soft. In sanding off this filler some particles become caked in small spots on the sandpaper and these cause scratches on the surface, which are not noticeable till after the varnish has been applied, when they show up to great disadvantage. So, really, too much care cannot be taken with the finish of a piece of furniture. This is the most important feature in its construction and upon it depends the sale of the goods, and, incidentally, the demand for more, which goes to make the manufacturer eithe rsuccessful or insolvent.—T. W.

THE GRADING AND USE OF GLUES.*

By J. Alexander.

In this paper I desire, first, to describe a connected series of selected tests which may be run consecutively and used as a basis of grading; second, to define standards for use in these tests; and, thirdly, to give some practical hints on the proper selection and use of glues and gelatines. For convenience, the product will be referred to as "glue," gelatines being regarded as very clean or high grade glues, and the suggestion of Rideal, followed by Wilson and others, will also be observed, spelling the name of the commercial article gelatine, and that of the chemically purified substance gelatin.

The treatment of the stock depends upon the technique of the particular factory, and the use for which the finished glue is intended. In some factories bones are boiled without even washing; in others, most of the grease is steamed out or removed by volatile solvents. The clearest and best bone glues are obtained by leaching the bones with dilute acid which dissolves out the lime salts and leaves the gelatinous matters. Such crushed leached bone is sold as a glue stock under the name of osseine. Hide pieces, sinews, osseine and leached horn pith are limed until properly "plump"; the subsequent treatment before boiling varies, being usually regarded as a trade secret.

One extraction of the stock does not exhaust all the glue in it, so it is necessary to make a number of consecutive extractions or "runs," as they are called. The condition of the stock, the temperature and time of boiling, and the apparatus employed are the main factors controlling the proportion of glue in each run. Sometimes as many as ten or fifteen runs are taken from the same kettle of stock, and these runs may be finished alone, or blended with each other or with runs from other kettles containing perhaps different kinds of stock. It will be readily seen that the kinds of glue are practically unlimited in number, as indeed the great variation in appearance would seem to indicate. But in glue, above all things, appearances are very deceptive. Even after a manufacturer has finished his glue, he is obliged

* Read before the Chemists' Club, New York.

to test it in order to establish the grade of his finished product.

To the chemist or analyst, glue presents itself in the form of sheets, flakes, nodules, small grains of powder, varying in color from black to white and all shades of brown and yellow. It may be clear, cloudy or opaque. How shall a value be assigned to each glue? Purely chemical tests, as at present known, are for the most part of little value. The determination of water is without much practical significance, for all desired is that the glue be commercially "dry." The presence of any considerable amount of phosphate in the ash is supposed to indicate that the glue was made from bone stock.

What is most striking is the lack of glue standards or units of measurement.

Thin blown glasses about 8—8.5 cm. high and 5.5 cm. in diameter are convenient for tests. Twenty-five grms. of each glue to be tested is broken into small pieces and soaked in 100 c.c. of water until softened (over night if possible); and at the same time a number of standard glues, described later on, are treated in like manner. All the glasses are at the same time placed in a water-bath, heated to 80° C., and stirred until a perfect solution is obtained. More or less than 25 grms. per 100 c.c. can be used as long as the standards and unknown glues are all treated alike. The reaction is determined with litmus paper. In cases where the degree of acidity or alkalinity is desired, a separate titration is made.

Viscosity or Running Test.—Keeping the temperature uniform, the viscosity is determined by running the hot solution from a pipette, noting the time of efflux by a stop-watch. The relative viscosities are thus fixed in seconds. We use a pipette of 45 c.c. capacity, which will permit the efflux of hot water from the glue bath in exactly 15 seconds. After each determination, the pipette is washed with hot water, and care must be taken that no partially evaporated glue or slime clogs the outlet. While running the pipette may be kept in a specially constructed thermostat.

The most convenient thermostat is a simple water-bath. The projecting effluent tube is protected by a mica cylinder through which the end point is observed. When the thermostat is used a small piece of rubber tubing controlled by a pinch cock is slipped over the upper end of the pipette, or a glass stopcock may be fused on.

The odor of the hot solution is then noted, and the glue rated as sweet or "off." Decomposition is readily detected, although it is often masked by phenol or ethereal oils. Besides, the smell gives some indication of the stock from which the glue was made.

Grease.—The glue solution is painted on a piece of white paper with a little aniline or dry color, and spots or "eyes" appear roughly proportionate to the amount of grease present.

Foam is determined by agitating the solution with a rod or mechanical agitator. An egg beater serves very well. Like grease, foam is estimated on a comparative basis.

Comparative Set.—The glues are then taken from the bath, allowed to cool, and the comparative set or speed with which the jellies harden is noticed.

Jelly Strength or "Test."—When the jellies have reached the room temperature, the jelly strength or "test" is determined. For speed and perhaps also accuracy I prefer the "finger test," and grade the jellies comparatively by pressure with the finger tips, the unknown glues naturally grouping themselves as stronger or weaker in jelly than the several standards. Notwithstanding the personal equation, expert operators obtain much more uniform results in this way than are given by the various mechanical devices. A special instrument for the determination of jelly strength will be referred to later.

Melting Point.—The melting point of the jelly is also of considerable value, for, generally speaking, it is proportionate to the jelly strength. Strictly speaking, a glue jelly has no absolute melting point, for it softens up gradually and shows no sharp line of demarcation between solid and liquid. I have tried to determine the melting point by filling a small test tube and observing the temperature at which shot of the size known as B.B. would sink, but the results were very uncertain and then only comparative. Perhaps, the best way is to put the test glasses back into the water bath, and gradually raise the temperature, noting comparatively how the jellies melt.

Binding or Adhesive Strength.—For this there is no one test that can have a general application; the glue must be tried under actual working conditions. It stands to reason that if a glue is to be used to hold clay to paper, it is of small interest what its binding strength is on mahogany, maple or porcelain blocks. Very often, in fact, a glue that will size paper perfectly will not make a joint.

Keeping Properties.—The glasses are then allowed to stand uncovered at room temperature for several days to observe the relative keeping qualities of the jellies. If the keeping property under special condition is desired, these conditions are simulated.

Standards.—The choice of standards is a very important matter, for once they are taken all unknown glues are measured by them. Few published results of glue tests can be used for comparison, because seldom, if ever, have any two investigators worked on the same glue or glues, which have been described sometimes by their cost, sometimes by the stock from which they were manufactured, and upon which only partial determinations were made. That definite standards will simplify and harmonize the grading of glue is self-evident.

Uses.—Glue is used for a multitude of purposes. Each line of work has its special requirements, and years of experience are necessary to pick out the right glue for the work. Trouble may be caused by a glue that is too strong as well as by one that is too weak. Although in using glue the most important thing is the selection of the right glue for the work, much depends upon its proper preparation and application. If anything that is glued up comes apart, the immediate verdict is "bad glue," which is often unjustifiable, for poor judgment or unskillful workmanship may be responsible.

Many users cling with blind prejudice to some brand they have confidence in, and pay, consequently, prices far above the market. This state of mind is easily understood, for they have often been deceived by unscrupulous or ignorant dealers who sell glue on its appearance only; and, furthermore, a small amount of glue may enter into the make-up of a large value of finished product, causing heavy loss if deficient. It makes no difference per se whether a glue is cut in thin or thick sheets, or ground or pulverized. Nevertheless some users will pay extra prices for glues cut in special shapes.

In preparing glue for use the following points should be observed:—

1. Use definite weights of glue and water. Glue is sold by the pound and should be used by the pound. 2. Soak the glue in cold water until it has thoroughly softened. Ground glue softens more quickly than sheet or flake glue, and is therefore preferable, other things being equal. 3. Melt in a water or steam bath, and keep at as low a temperature as

is consistent with the work. Prolonged heating injures glue, so that it is advisable to heat up successive small lots of the soaked up material, rather than have a large lot remain heated for a long time. 4. Make good evaporation from the glue-pot by the addition of water if necessary. 5. Use clean utensils. 6. Fit the strength of the solution to the work—don't use the glue too thick or too thin. 7. If surfaces are to be joined, have them dry and warm, if possible, and apply pressure until the glue has sufficiently "set."

Glues for particular purposes should be chosen as follows:—

Wood Joints.—Most preferable are hide glues from 70 up. Lower test hide glues may give trouble. While some bone glues answer admirably, in general they should be avoided. The pieces to be joined should be thoroughly fitted, dry, and of seasoned wood.

Veneers.—Most advantageous is a bone and hide, or bone and sinew mixture, testing between grades 50 and 70. Higher test glues are apt to set too quickly. Pure hide or sinew glue is better, but more expensive, while, for cheap large surface work, bone glue may be used. If worked on a veneering machine, freedom from foam is essential.

Sizing.—As most sizing is done with special machinery, each case must be considered individually. Generally a free flowing glue, free from foam, is required. If used to surface paper, grease is undesirable, as is any marked acidity or alkalinity which might turn the shade of the colors with which the size is mixed.

Paper Boxes.—For "setting up," quick setting hide glues, grades 70 to 90, are best. For "covering," lower test is necessary to prevent the glue setting too quickly; bone glues, testing grades 40 to 60, are most desirable. Of course, to the relatively higher test glues more water can be added; consequently they go further, and it is only a matter of proportion between strength and cost to determine the value.

Leather Goods and Belting.—Here the main points are flexibility, tenacity, and resistance to moisture. Nothing under grade 100 should be used, and higher test goods are to be recommended, because they are less sensible to moisture, and interpose less mass between the surfaces joined. Fish glue, once largely used, is in disfavor, being too hygroscopic. Most leather belt manufacturers make their own special "cement," using high grade glue or gelatine as a base, and mixing it with glycerine and other ingredients.

FINISHING ELM FURNITURE.

Elm has a large pore and can be filled more easily than ash or oak. One trouble however, is the fuzz or whiskers of the wood which usually catch the filler and causes a muddy, uneven color. The following method is said to overcome this trouble mentioned and enable the finisher to turn out a very good appearance in this wood. Instead of filling with paste filler, use the following materials and methods. First, a liquid filler; have some good primer that does not settle, break up some paste filler, medium antique, in turpentine to make an amount equal to the quantity of primer measured out. It is important to use turpentine instead of benzine because it will not evaporate so quickly. Benzine would cause brush marks or laps. Now add together the liquid filler and the primer and half as much turpentine as either. Stir the mass thoroughly together. Any change in the color may be made by adding burnt umber or burnt sienna in oil or both. Apply this liquid filler with a flat-chiseled soft bristle brush, one about two and one-half inches wide. Carefully apply the filler, spreading it uniformly and evenly, wiping out the edges. Lay it off as in a staining job, then leave it to flat. In about fifteen minutes the work will become flat, and will have a soft, velvety feel. Allow the work to stand twelve hours, then rub off lightly with No. 0 sandpaper, making the surface quite smooth; now apply a coat of the primer. After this has stood twelve hours it may be rubbed down with fine paper very smoothly, after which you may apply a coat of rubbing or a gloss coat as the case may be. A good deal of elm is full of sap spots and these will appear lighter than the rest of the job. These spots must be stained. After the work has been filled and sandpapered take a bit of cotton cloth and a cup of distemper stain, using either burnt umber or Vandyke brown, and go over these sappy places with it. This will make the entire job uniform of color. This method will be found to have advantages which make it well worth your while to give it a trial.

REPORT OF SUPERINTENDENT OF FORESTRY.

The report of R. H. Campbell, Dominion Superintendent of Forestry, states that during the past year the grants of timber tracts numbered forty-nine, with an area of 410 square miles. The amount received on account of bonuses was $226,360, or an average of $511 per square mile. Recent sales of timber are yielding considerably larger average prices than have been received at any previous time. The report goes on to say: "The present method of disposing of timber is not a satisfactory one. The Department has, as a rule, little or no knowledge of the timber of which it disposes, and, as the quantity now in private hands is fully adequate to meet present needs, no detrimental result would follow the holding of timber lands until Government inspectors can examine and estimate the timber, so that an adequate upset price may be fixed before a berth is put up to competition. The necessity for fuller knowledge of the timbered districts is emphasized continually by the experience of the Department, and it would be a proper policy for the Department to obtain directly more adequate information in this respect. The enquiry made by a committee of the Senate during the past session showed that the natural resources of the northern districts of the West are greater than the public has any idea of, but the evidence would be much increased in value if direct means were taken by the Government to obtain information in regard to these districts, and, as a result, the administration of the timber therein could be more intelligently carried out."

—Every now and then, says a manufacturer, the question is asked where the next generation of cabinetmakers is coming from. It does not seem to me that this is a question which should trouble us very much, although there have been times within the past year or two when I have been compelled to ask for cabinetmakers of the present generation. Such constant improvement is being made in machinery that the necessity for the number of thoroughly trained and highly skilled cabinetmakers is less apparent than it was even no longer than ten years ago. There was a time when we thought we were at the mercy of the carvers, but the carving machines were brought out. There seem to be just about as many carvers employed as ever, but I guess we are using a great deal more carving. Improvements are being made in machinery all the time, and there are men who seem to have the faculty of making anything for an emergency. I am disposed to put my confidence in this our adaptability, and not to borbow much trouble about the future.

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.

The McDonald-Barnet mills on Lulu Island, B.C., are nearly completed.

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The Trenton Cooperage Company will establish a cooperage mill at Trenton, Ont.

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J. Broadway will build, it is said, a carriage factory in Barrie, Ont., at a cost of $4,000.

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C. Dreifle's sawmill at Sebastopol, Ont., has been burned down. Loss, $2,000.

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W. W. Abra has started work as foreman at Hancock Bros.' planing mill, Toronto.

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The Fraser Davidson Lumber Company, Ltd., Moose Jaw, Sask., has been incorporated.

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W. P. Fowle, of New Westminster, and R. Nevins will build a large sawmill at Bon Accord, B.C.

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The Alberta Lumber Company, Ltd., Vancouver, have put in a 16 x 30 Macgregor, Gourlay timber sizer.

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C. Warwick is erecting a shingle mill at South Vancouver, B.C. He will also put in a planing mill.

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Several large sawmills are to be erected around Grand Forks and Franklin, B.C., as soon as weather permits.

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The Fischer Lumber Company, Sarnia, Ont., has passed a by-law to increase its number of directors.

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The St. Lawrence Lumber Company, Three Rivers, P.Q., will build a mill at Dalhousie, N.B., at a cost of $150,000.

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The Fairview Manufacturing Company has taken over the business of J. R. Murphy, sash and door manufacturers, Vancouver.

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The large factory of the Modern Bedstead Company, Cornwall, Ont., collapsed a few days ago at a loss of $10,000.

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The Montmorency Lumber Company, Quebec City, is applying for incorporation. Samuel M. Richardson, of Quebec, is agent.

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Cushing's box mill No. 3, St. John, after two months' idleness, has resumed operations. Their big mill at Union Point is also starting up.

The Stratford Manufacturing Company has started operations at Stratford, Ont., manufacturing ladders, kitchen furniture, churns, etc.

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A strap broke on the connecting rod of the engine of the Rat Portage Lumber Company's mill at False Creek, B.C., causing considerable damage.

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Mark Richardson is suing the Knechtel Furniture Company, Southampton, Ont., for damages for injuries received while in the employ of that company.

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Petition is being made for a winding-up order for the Cornwall, Ont., Furniture Company. Mr. Milliken is appointed interim liquidator.

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F. D. Sadler's sawmill at Rowena, N.B., was totally destroyed by fire. The damage is estimated at $5,000, with $1,000 insurance. The mill will be rebuilt.

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The boiler of a portable sawmill, owned by William Johnston, at Sarnia, exploded, and a lad named James Harkins was hurled nearly 200 hundred feet and instantly killed.

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Application is being made to the Ontario Legislature to confirm the by-law to grant a bonus to the Seaman, Kent & Company, Limited, though some opposition has developed.

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The Patrick Lumber Company, Ltd., Nelson, B.C., are making good progress with their new mill, at Crescent Valley, B.C., which will have a capacity of 125,000 feet per 10 hours day.

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The Lost Lake Timber Company, Limited, Vancouver, B.C., has been incorporated with a capital of $30,000. They will manufacture, deal in, and export lumber and wooden articles.

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The cut of lumber on the Restigouche River, New Brunswick, this season is estimated at nearly 60,000,000 feet—larger than was expected, owing to the favorable weather conditions.

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The "Ontario Gazette" gives notice that the Stratford Mill and Lumber Company, of Stratford, carrying on business as operators of a planing mill and lumber yard, have made an assignment.

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Williamson's planing mills, Toronto, which were recently burned down, have made great headway in the work of rebuilding, and a large part of the machinery has already been replaced.

The Eastern British Columbia Lumber Company, Vancouver, has been incorporated with a capital of $500,000. It will carry on a sawmill business and make all kinds of articles in which wood is a material.

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The Moresby Island Lumber Company, composed of Illinois and North Dakota capitalists, will shortly begin construction work on a proposed $350,000 sawmill to be erected on Cumshaw Inlet, B.C. The mill will be in operation next fall.

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The Bowman-Gray Lumber Company, Limited, Dundas, Ont., has been granted a charter. It will purchase the assets and good-will of Joseph Bowman & Co., make lumber, laths, and shingles, manufacture sashes and doors, furniture, etc. Capital, $40,000.

* * * *

Owing to the fact that large sawmill enterprises are under way for New Westminster, B.C., a large deputation goes to Ottawa this month to urge upon the Government the necessity for deepening the channel of the Fraser River to adapt it to the navigation of ocean-going ships.

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The Little Current Lumber Company, incorporated under Michigan laws, has been granted a license by the Ontario Government to do business in this Province, manufacturing lumber, laths, and shingles, etc. Capital authorized is $50,000.

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The E. R. Burns Saw Company, Limited, Toronto, has been incorporated with a capital of $50,000. It will manufacture and deal in saws, tools, general hardware and wood specialties. A. W. Holmested and A. R. Bickerstaff, both of 20 King Street East, Toronto, are interested.

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The partnership between M. Floody and H. S. Hennessy, who have been running a sash and door factory and planing mill at Haileybury, Ont., has been dissolved by mutual consent. Debts owing to the mill are to be paid to H. S. Hennessy, Haileybury, and all claims against it are to be presented to Matthew Floody, of Haileybury.

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Lester W. David, of Blaine, Wash., has sold the Fraser River sawmills, New Westminster, B.C., together with large timber limits, to a syndicate composed of Col. A. D. Davidson, King Edward Hotel, Toronto; A. D. McRae, Winnipeg, and E. E. and Louis Swift, the pork packers, of Chicago. The purchase price is said to have been over $2,000,000. The mill will be rebuilt and many extensions made.

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The Dodds-Cook Lumber Company, Toronto, has secured an option on a tract of timber and agricultural lands in the Tehuantepec Isthmus, Mexico. The area is estimated at 130.000 acres, and it comprises large quantities of both hard and soft timber. Tropical woods, many of them, are noted for their strength and durability. There is good transportation, both by rail and water, and the experiment will be watched with interest.

* * * *

Hon. W. A. Charlton, president of the Ontario Lumbermen's Association, stated at the annual meeting of that body, held in Toronto on the 2nd ult., that, in his opinion, last year's prices for nearly every class of lumber will be fully maintained. The cost of production, Mr. Charlton pointed out, had not been reduced, though the wages of labor went down about 15 per cent. last November, in the middle of the log-cutting season. Hay and oats were much dearer than usual. Further, the stock of unsold lumber at the mills and in all city and country yards was now much smaller than for several seasons. He added that a smaller quantity of lumber would be produced in 1908 than in 1907, both in Canada and the United States. In Quebec and New Brunswick the production of spruce lumber would be 50 to 70 per cent. less than in 1907.

Machinery and Mill Equipment

SAFETY AND ECONOMY IN THE MILL.

Manufacturers often spend much time and money in experiments for perfecting their product, even in small details which count for much in fine points of operative safety, efficiency and economy, but it is a source of frequent and serious discouragement to note how the advantages arising from careful study and methods are often lost in actual service, due to carelessness and laxity on the part of those responsible for the installation and maintenance of equipment.

The dangerous character of the old-time shaft collar, with its projecting setscrew, long since led to the design of "safety collars," whose construction eliminated the former liability to injury of workmen whose clothing might come into contact with the rotating shaft. Requirements that collars in general be made to minimum outside dimensions of width and diameter, necessarily call for economy of space around the protected screw head, and consequently prevent use of needlessly large wrenches. It is no uncommon sight in factories and other power-using plants to see "safety" collars with long projecting setscrews, which have been substituted for the shorter ones originally supplied, thus utterly destroying the safety feature simply to accommodate the convenience of some lazy attendant, who prefers taking the risk of serious injury to exercising the care required in selecting the proper wrench for use in placing and readjusting these collars. Is it not hard to sympathize with any one but the employer and the bereft family when some day this man pays the penalty of his folly?

Similarly, but much less frequently, we find plate couplings, the protection of whose rim flanges has been nullified by the insertion of perhaps only a single bolt too long to be safe. That this occurrence is less common than the collar evil is due only to the naturally less likelihood of occasion for renewal of these bolts and the impossiblity of gaining much in handiness of wrench access unless washers be placed under the nuts and heads.

While the neglect of safety is likely to be of the greatest importance, its money cost leaping into large figures when an accident occurs, the even more numerous items of carelessness of operative economies are matters of continuous loss, whose aggregate as time goes on would compel attention were it even faintly realized. Many a bearing is daily consuming its owner's money in needless friction, occasioned by failure to keep in good condition the maker's carefully planned means for efficient and constant lubrication. How can we excuse the neglect—especially when persistent—to close the oil-holes of bearings properly provided with non-removable caps? Even in some dusty mills, equipped with dust-proofed bearings, with spring caps for closing the oil openings, we have seen these coverings deliberately held open, thus allowing free access for dust, not only lowering the bearings to the level of the most common sort, but also rendering positively wasteful the owner's expenditure of the additional amounts paid for the superior dust-proof bearings.

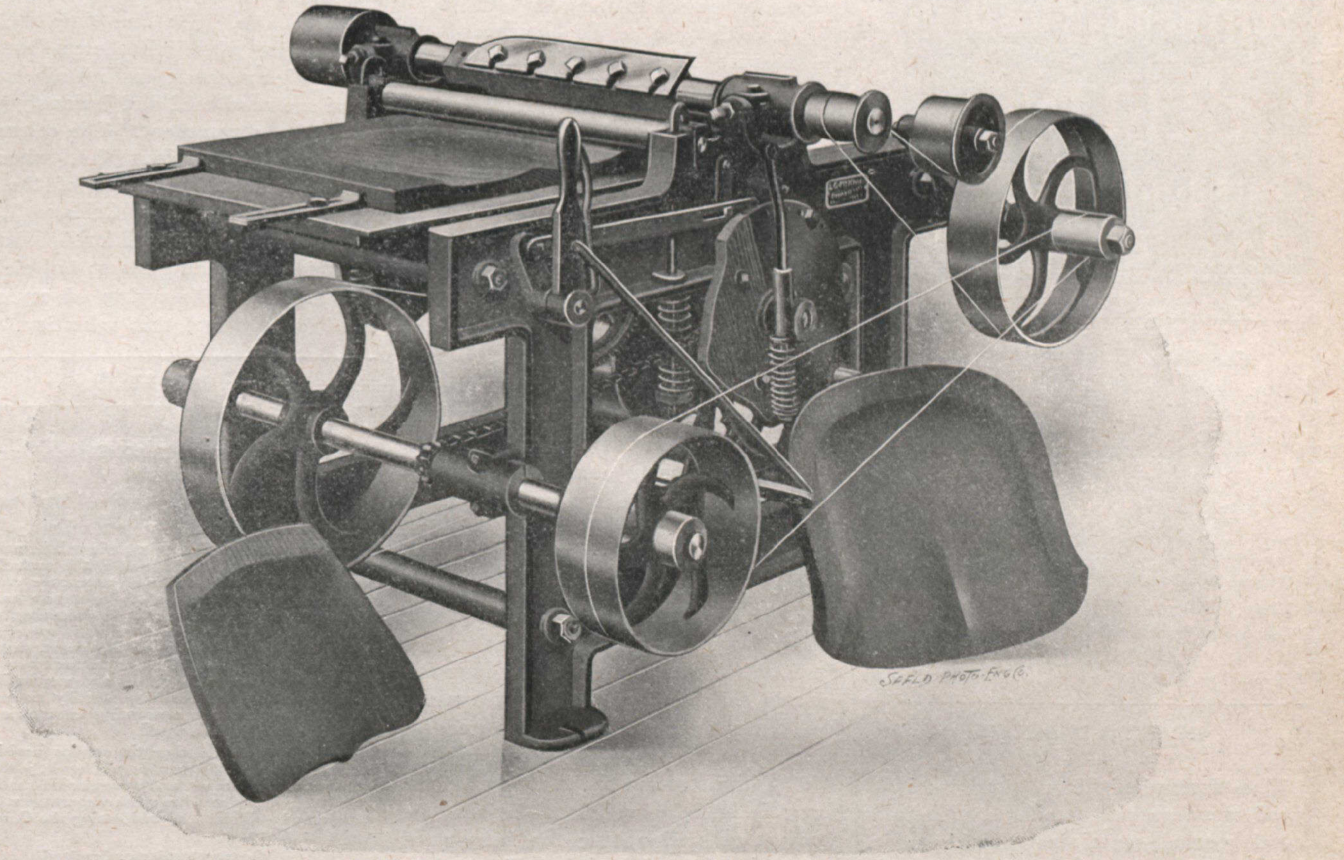
Failure to take advantage of means provided for careful adjustments of shaft alignment, clutch mechanism, etc., is of all too frequent occurrence. In some plants it is so common that " occurrence " is not the word to use; we should more properly refer to it as "regular practice." There is no excuse for such utter neglect, and its only redeeming feature is the fact that the losses entailed fall most heavily upon the owner of the plant—the man who, presumably, is ultimately responsible for their origin and continuance.

Other items of mechanical equipment might afford subjects for lengthening the argument, but the principle is sufficiently illustrated by the examples already cited. The point to be noted is that the power-user should see to it that the attendants of his machinery, through the proper superintendents and foremen, are required to avoid prejudice of safety and economy through simple neglect to properly use the means provided by the maker and paid for in good coin of the realm.

McKNIGHT NO. 1 POWER FEED, SADDLE SEAT MACHINE

L. G. McKnight & Son, Gardner, Mass., are placing on the market an improved machine for saddling and scooping all styles of wood seats, cabinet seats, etc., and similar kinds of work. It will adze 2,000 to 2,500 saddles and seats per day of 10 hours.

This machine is automatic, feeds seat through, the head



McKnight No. 1 Power Feed, Saddle Seat Machine.

with knives is raised and lowered automatically with cams on each side of machine. There is no chance whatever for breaking of seat, as pressure rolls hold stock in place while knives are cutting seat.

The head raises and lowers, and each end raises and lowers independently for cutting any depth or shape of seat desired, and the machine is easily and quickly adjusted for any style of seat, and any ordinary workman can operate machine. Self oiling boxes, etc. Machine guaranteed to be of best material and workmanship, with all the latest improvements.

This firm has had thirty years experience manufacturing chair machinery, and guarantees this is the best machine ever placed on the market for doing this class of work, and they also guarantee it to do from three to four times as much work as any other machine made.

They make over one hundred different standard machines for manufacturing chairs.

Condensed Advertising

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

For Sale—Lumber and Veneers

15,000 ft. Hungarian Ash Veneers.
2,500 ft. Rosewood Veneers.
47,000 ft. Bird's Eye Veneers.
750,000 ft, Mahogany Veneers.
65,000 ft. Mahogany Crutch Veneers.
15,000 ft. Cedar Crotch Veneers.
40,000 ft, Long Figd. Walnut Veneers.
30,000 ft. Figd. Walnut Butt Veneers.
63,000 ft. Curly Birch Veneers.
475,000 ft. Qtd. Sawn Oak Veneers.
43,000 ft. Qtd. Sliced Oak Veneers.
35,000 ft. Circassian Walnut Veneers.
5,000 ft. White Mahog. Lumber ⅝ in. & up
150,000 ft. L.R. Cuban Mahog. 1 in. to 4 in.
375,000 ft. Afr. & Mex. Mahog. 1 in. to 4 in.

RICE VENEER & LUMBER CO.
Grand Rapids, Mich.

MAPLE LEAF
STITCHED COTTON DUCK
BELTING
DOMINION BELTING CO. LTD.
HAMILTON CANADA

For Sale-Second-hand List

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

MERRITT MFG. CO.
Lockport, N Y.

HOW TO IMPROVE.

The first requisite to progress in a good wood-working machine man is a good journal pertaining to the trade. The operator should not only study the articles in relation to his particular work, but should glean the much valuable information to be found in the advertisements. He should also obtain catalogues from all the leading manufacturers of molders and become familiar with their various features. By this means he will often find where he can improve his own machine with little or no expense to the company, and make his work more enjoyable as well as increase the output, for there is nothing that will raise the spirits and lighten labor like the ability to put out a large amount of well-finished artistic stock. To be able to proceed with confidence, precision and dispatch in some difficult job, complicated in pattern and curly and cross-grained in wood, relieves the operator of the strain and weariness which is the inevitable portion of ignorance and experiment.

The operation of the molder, or "sticker," as most mill men call it, is deservedly classed among the trades, and nothing short of years of actual experience will perfect a man in it. Nevertheless, a capable man may soon become proficient if he avails himself of all the assistance to be obtained from the sources herein mentioned, besides the instructions given by the foreman in the regular course of the work.

WOODS WHICH SELL BY THE POUND.

Some woods are so precious that they sell by the pound instead of by board measurement. French burl brings from 15 cents a pound up, and a single log has sold in New York for $25. It is curious to note that the value of this wood depends upon the wart or knot which forms upon the tree when young, and that the protuberance is supposed to be caused by the sting of an insect. The twisted burl produces in time strange combinations of lines which take a high polish. A more expensive wood than the French burl is a rare wood that comes from the coa... of Africa and is commonly known as amboy. This frequently sells at from twenty to twenty-five cents a pound. It is a reddish brown wood irregularly veined, and is held in high esteem for inlaying. Even ebony is sold by weight. This is the heaviest as well as the toughest wood known in the trade; it will outclass brass, is tougher than many grades of steel. A stick of wood weighs nearly as much as lead. It is in great demand for warship bearings, and usually the shafts of the immense machinery wear out before the lignum vitae bearings. The rarest of all precious woods is said to be the calamander tree which grows on the island of Ceylon where it is held in reverent awe. At one time the trees were quite plentiful there; but only about ninety specimens remain and all these are numbered and jealously guarded by the government. The calamander trees are so precious that when fine pieces of furniture made of the wood were exhibited at the Chicago World's Fair they were insured for two hundred and fifty thousand dollars; but elaborate and skilled workmanship of course entered largely into this valuation.

ADVERTISERS' INDEX

ESTABLISHED 1849

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Best and Cheapest on the Market

Adjustable and automatic stops.

Entirely NEW principle—not copied after any other gauge.

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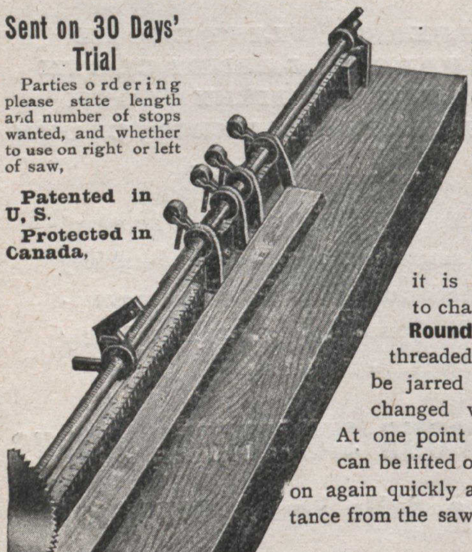

Hardwood Rail, making continuous straight edge, doubly marked in feet and inches from saw with rule maker's dies. Handy to use for cutting odd lengths for which it is not worth while to change the stops.

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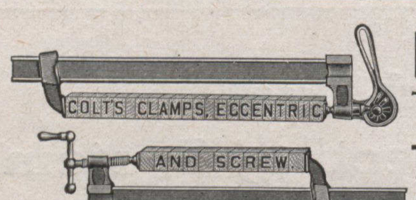

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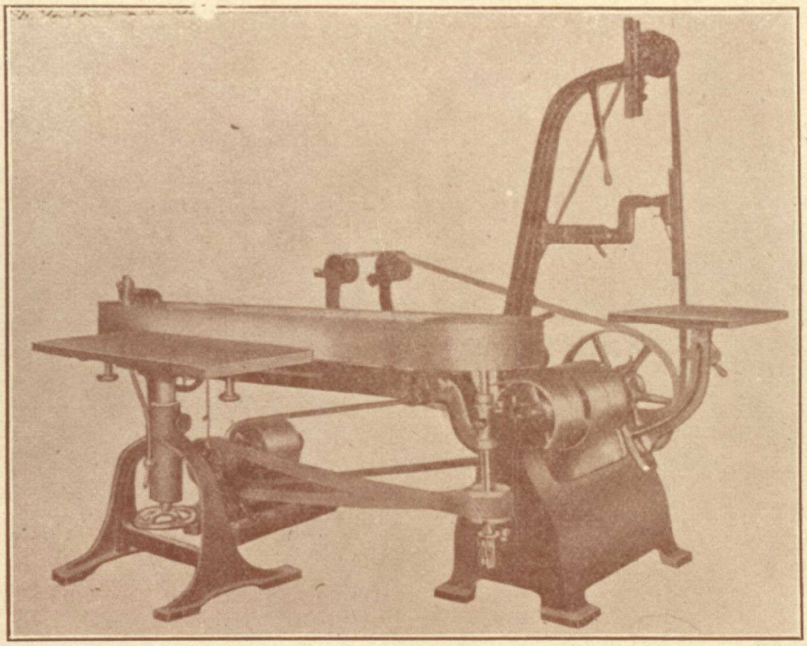
Notwithstanding the money stringency we are still selling machinery as rapidly as ever, and we direct your attention to the following statements regarding our



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We are not attempting to tell you of the good points of our Sanders in this advertisement.

If we may have an opportunity of writing you a letter we can put them before you more fully, and we know you will be convinced that we have the Sander you want, just as we have convinced many others. Will you write us so that we may tell you all about them?

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