

Sawing by Hand

Bowsaw is best; keep it sharp

by Tage Frid

A handsaw can replace a machine-powered saw for every cutting operation. The correct use and maintenance of handsaws should be practiced until they are second nature. To saw properly, coordination of the joints in the hand, elbow and shoulder must be achieved. The biggest mistake most people make when using a handsaw is to hang onto it as if their lives depended on it, bearing down much too hard. This makes it hard to start the saw, and once the cut is started, it is difficult to follow the line. A handsaw should lie loosely in your hands. No pressure should be applied, particularly when starting the cut. Once experience is gained, a slight amount of pressure can be applied after the cut is started. Use your thumb as a guide when starting the saw.

There are many different handsaws on the market, and each one is designed for a special purpose. Handsaws are sold by length and by the number of points—a six-point saw has six teeth per inch.

The bowsaw, scroll bowsaw, offset dovetail saw and rip panel saw are the saws I have found most useful in my many years as a cabinetmaker. I don't like and would never buy a backsaw; they are clumsy and heavy. Maybe they are all right

in miter boxes, but a bowsaw will do the job faster.

For general sawing, I would recommend buying a 26-in., six-point and an 18-in., eight-point bowsaw. (Lengths might vary, because most bowsaws are made in Europe and so are measured metrically.) I would also buy a 26-in. scroll bowsaw, preferably with interchangeable blades, and a 10-in., or longer, 15-point offset dovetail saw. A 24-in. rip panel saw (the standard American carpenter's saw), six to seven points, is useful for cutting big pieces such as plywood, where the bridge of the bowsaw would be in the way.

Japanese saws are good for special work. I have some but hardly ever use them, except in cramped space where I can't get in with a regular saw. The Japanese rip saw cuts on the pull stroke. This makes the line fuzzy and hard to see when cutting joints. On the crosscut, the teeth are long and might bend when hitting a knot. Also, the saw is hard to resharpen.

For scroll work, I would of course use a band saw if I could. Or I might use a saber saw. But a scroll bowsaw will cut as fast or faster than a saber saw, and no electricity is needed. The blade on the scroll bowsaw is considerably longer than that of any other scroll saw or coping saw.



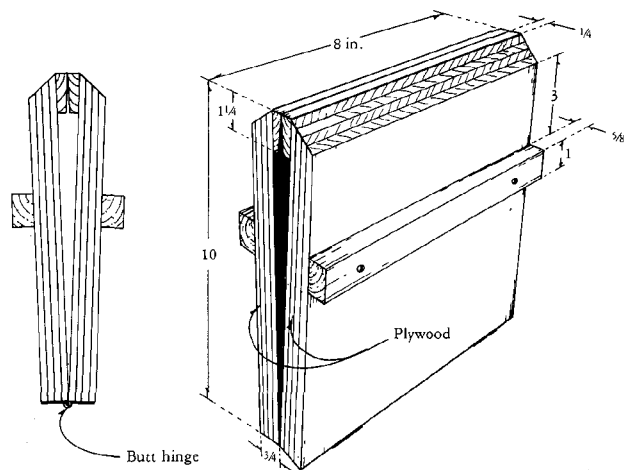
Starting the cut: Frid holds saw loosely, left thumb guiding blade, with eye, blade and cutting line all aligned vertically. Blade is angled so frame will clear wood as cut proceeds.



Dovetail saws: straight (top), offset and Japanese.

Sharpening Vise

You can make a sharpening jig out of two pieces of 3/4-in. plywood. The dimensions can be changed to suit your individual needs. Glue two pieces of maple or another hardwood on the ends of the plywood, as shown at right. These will be the jaws of the jig. When the glue has set, put the two halves together and attach butt hinges at the bottom. Screw or glue on the two side pieces, which keep the jig from falling through the vise. Then cut the jaws parallel, and saw the outside bevel. If you use a table saw, slide a piece of wood in between the two pieces of plywood, below left, to prevent the jaws from binding on the saw blade at the end of the cut. Or handplane the jaws parallel and plane off the bevel, below right. Planing a little off the bottom of the two jaw pieces ensures a tight grip at the top.



Whatever saw you use has to be kept sharp and set right. There are many vises you can buy that hold the blade during sharpening. But I make my own—it is simple to do and considerably less expensive.

For some strange reason, most new handsaws are filed for crosscutting. The first time I sharpen a crosscut saw I change it to a rip saw (by changing the teeth from a point to a chisel edge). This makes ripping faster and easier, of course, and I find the saw works better even for crosscutting.

Before sharpening, check to see if all the teeth are the same height. If not, level them off with a mill file. Then file each tooth to a sharp point, and the saw is ready to be set. After setting, file two strokes on each tooth the length of the saw.

All handsaws have an alternating tooth setting; that is, the upper part of each tooth is bent out to one side or the other, to create a kerf that is wider than the saw blade. If the saw is not set enough it will bind. If set too much, the cut will be wide and rough, and the saw will cut more slowly. If the teeth are set more to one side, the saw will favor that side. To correct this, both sides must be reset. A properly set saw that is started correctly, with little pressure, will easily follow the cutting line. There are many good saw sets on the market. I prefer the Sandvik because it is light, easy to adjust and simple to use. It allows you to see what you are doing. Each tooth should be set approximately 1/64 in.

If the teeth are too small for a saw set, use a small screwdriver instead. Press it down between every second tooth and twist it the same amount each time.

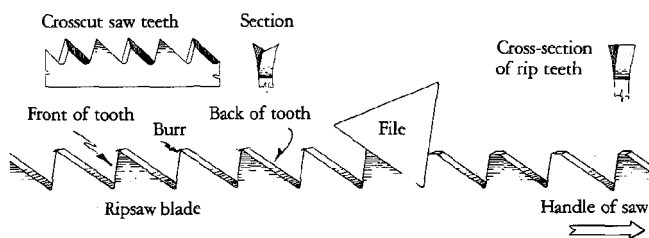
Now the teeth are ready to be filed, with a new triangular file. Use only one edge for each saw filing; by using the same

number of strokes and the same length of the file on each stroke, all the teeth will be sharpened uniformly. The file gradually gets dull, but so gradually that all the teeth will remain the same length. Turning the file to a new edge in the middle of a sharpening is a mistake, because the new side will cut deeper than the worn side. I never use an old, worn-out file. Use a new file—you get three sharpenings from each one. This way the teeth stay the same length and you won't have to level them off for many years.

When filing, press down straight on the file, just enough so the file works and doesn't skip over the metal. File both the



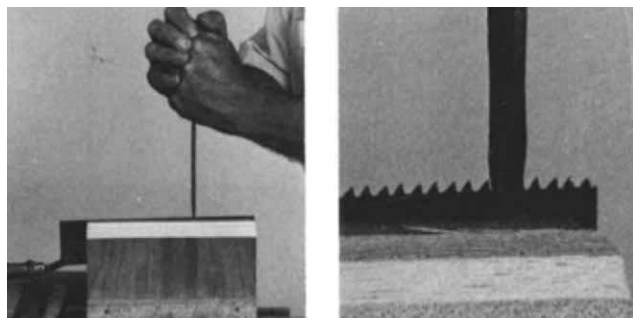
To level the teeth, a mill file is run the length of the blade.



As teeth take shape, tiny burr points in direction of cut.



Pliers-like saw set alternately bends teeth away from plane of blade, about 1/64 in. to each side. Set must be even.



Screwdriver twisted in every second gullet will set small saws.



With fingers as stops, whole length of file is used on each stroke.



Tensioning string is wrapped four times lengthwise, woven to finish.

front and back of the teeth at the same time, working from the front toward the handle of the saw. Thus the final stroke on each tooth will be on the back, and the burr that appears when the tooth just comes to a point will be aimed in the cutting direction. Be sure to keep the file strokes at 90° to the blade. Never file or stone the face of the blade, because this would change the set of the teeth. Don't file the teeth of a rip saw alternately, as is usually recommended in textbooks.

The saw can be refiled four or five times before it needs re-setting. Of course this depends on how dull you let the saw get before you refile it. I always file my saws as soon as the tips of the teeth get shiny white. This means the saw has started to get dull. If it isn't too dull, two file strokes on each tooth should be enough to sharpen the saw.

If the wood tears up in the back when crosscutting or ripping, one or more of the teeth are too long. In this case I file across the top to even the teeth, and then refile all the teeth before setting. If the teeth still tear, as is likely to happen in softwood and especially in plywood, scribe a line where the cut will be and make a vee-cut with a chisel on the underside of the piece. This will prevent tearing.

The bowsaw is my all-purpose saw. It takes longer to learn to use than other handsaws, but once you get the hang of it, you will use it for most cutting. All my advanced students use a bowsaw, and I don't brainwash my students. Its advantage is that because the blade is narrower, there is less friction in the kerf. The blade does not whip because it is kept in tension. Because the steel is thinner than in a panel saw, the bowsaw advances more quickly, and it is easier to cut a line.

When you buy a bowsaw that uses string as a tensioning system, you usually get the saw in pieces. Even if it comes assembled, you must know how to string it in case the string breaks. Clamp the saw in the bench so that there is tension in the blade when the string is applied. Wrap the string four times lengthwise, then finish the stringing by weaving the end in and out of the strings about 10 times. Then place the piece of wood that controls blade tension between the strings. Release the tension when the saw is not in use.

When I rip with a bowsaw I clamp the board down on the bench. I can cut faster this way because I am sawing up and down and can put force into the down stroke. I use both hands so I don't tire as easily. Also, by positioning the board with the portion to be ripped extended over the bench, I have to clamp the board only once. If I stand it up in the vise, I have to keep clamping and unclamping to move it into position. If I were cutting a long board, say 8 ft., I would need a ladder if I stood the board up in the vise. The board would vibrate so that it would be just about impossible to cut.

When I rip a board with a bowsaw, I hold it so the blade is perpendicular to the board. All the force is from the right hand, with the left hand acting as a guide. I saw away from myself so that I can see the line, and so that I can move along with the cut with my arms in a comfortable position. On a 3/4-in. thick piece of basswood clamped horizontally, 10 strokes with a 26-in. bowsaw cut 9 in. With the wood vertically in the vise, the same number of strokes cut about 5 in.

For crosscutting, I use the rip-sharpened bowsaw. I lay the board flat on the bench, with the piece I am cutting off to my right, and hold the wood down with my left hand. Then when the cut is almost through I plant my left elbow on the board to hold it, and reach between the blade and the bridge of the saw to catch the off-cut.

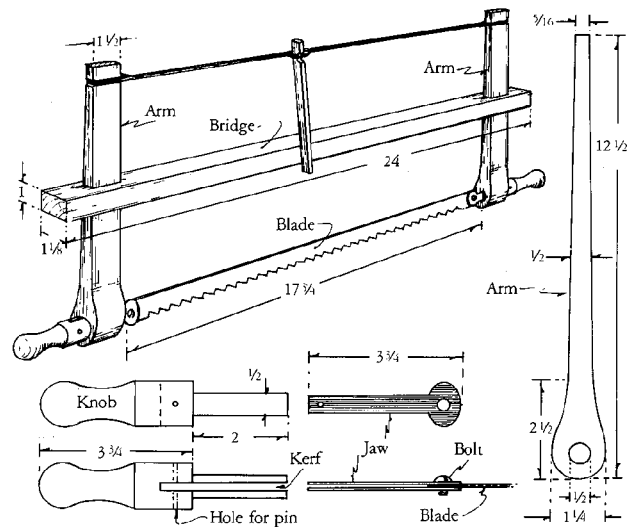
Making a Bowsaw

If you want to make a bowsaw, the first thing to do is to buy the blade, so you can design a saw with the right relationship between the arms, bridge and blade. A bowsaw should be as light as possible. I would use teak or mahogany for the arms, clear pine for the bridge, and maple for the knobs.

To make the arms, drill 1/2-in. holes in the arms first, then mark the wood and cut the taper using a band saw, scroll saw or scroll bowsaw. The arms should be identical. Sand the pieces and break the edges, especially where you will hold the saw. Leave the arms square where they pass through the bridge. The bridge is rectangular in section and has a through mortise near each end for the arms.

Make a 1/8-in. saw cut in the knobs for the two pieces of steel that will hold the blade. Then turn the knobs.

The steel jaw pieces are the most difficult parts of the saw to make. Two pieces go in each knob and sandwich the blade between them. One, 19 gauge, has a hole so the screw can slip in easily; the other, 17 gauge, should have a threaded hole to fit a 5/16-in. roundhead bolt, 1/4 in. long. Remember to put the knobs through the arms before fastening the steel to the knobs with a pin.



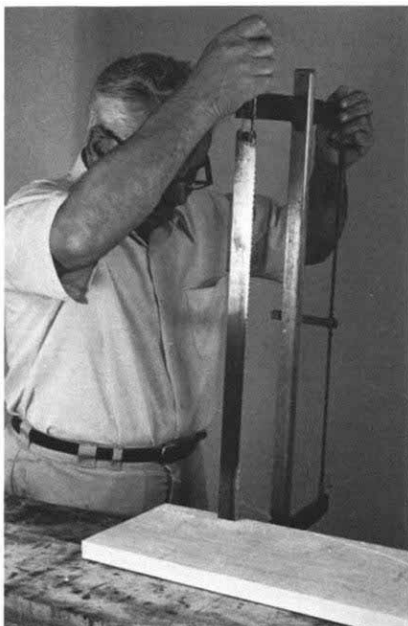
For a 17-3/4-in. blade I would make the arms 12-1/2 in. long; for a 25-3/4-in. blade I would make the arms 14-1/3 in. long. Personally I would not go through all the trouble of making a bowsaw. The wood parts are easy, but the metal parts take time, and I can buy a good bowsaw ready-made for less than \$20.

When I have to resaw by hand, I start the same way as sawing a tenon (*Fine Woodworking*, Summer '76), and if it is started correctly it will naturally follow the line. I mark a line on both ends and along one edge of the board and saw down on one corner so I cut the whole end and part of the top. Then I turn the board around in the vise and saw from the other corner. This way I don't have to worry about following two lines at once—the saw drops into the first kerf and this guides it along. For cutting up plywood, I place the panel flat on sawhorses and climb right up on top of it.

For very small work I use an offset dovetail saw. With the

offset, I can see the line more easily and I can use the saw for cutting flush anything that protrudes above a flat surface. I also change it from crosscut to rip the first time it needs filing. I don't like the reversible offset. It is very bulky, and because I change it to a rip saw I can only use it one way anyway.

[Editor's note: Bowsaws are sold by Frog Tool Co., 548 N. Wells St., Chicago, Ill. 60610; Garrett Wade, 302 Fifth Ave., New York, N. Y. 10001; Silvo Hardware, 107 Walnut St., Philadelphia, Pa. 19106; Three Crowns, 3850 Monroe Ave., Pittsford, N. Y. 14534; and Woodcraft Supply, 313 Montvale Ave., Woburn, Mass. 01801. Olson Saw Co., Route 6, Bethel, Conn. 06801, makes blades for most types of frame saws.]



When ripping (left), left hand guides cut and right hand powers whole length of blade downward. Scroll bowsaw (center) also cuts on

down stroke, away from sawyer. As saw nears end of crosscut (right), sawyer reaches between blade and bridge to catch wood.