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BEREA COLLEGE SYMPOSIUMS

WOOD TURNING & JOINERY

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SHARPEN MY OWN TOOLS? SURE!

---And with a minimum of equipment.

"A Sharp Tool Is A Safe Tool," has been said many times and I say it again.

Not only that but there is joy in using a sharp tool. There is a lot of satisfaction in making smooth clean cuts in a piece of wood, but---this is nearly impossible if the cutting edge is not sharp. So, let's see how we can get and hold a sharp edge. I'll show you one way--the way I do it:

Let's take a half inch wood chisel for the first example. Methods used here will be used later for other tools.

There are many books on sharpening and you can get a selection of them from Woodcrafters Supply in Woburn, Ms., Craftsmans Wood Service in Chicago, Curtis Woodcraft Supply, Memphis, Tn., Albert Constantine in New York, and others closer home--Louisville, Minneapolis, Atlanta etc.

These books will tell you to grind the chisel's edge to 20° to 25° and you can buy a gauge to go by or use a protractor, but in the mean time, get a piece of cardboard from a cereal box, and a ruler or square and draw a 3" horizontal line. Make two dots on this line 2" apart and from the right hand one, measure vertically $7/8"$ and make another dot. Now draw a line through the first and third dots and your gauge is finished. You can cut along your lines if you want to or just lay your chisel down on it and look. This is a 25° angle. See Fig. 1.

25° BEVEL GRINDING GAUGE
STANLEY #149

EWT-----

Sometimes you will need a thinner, sharper edge for pairing and cutting soft woods.

Other times you will need a thicker, stronger edge for cutting hard wood or for heavy cuts. (A cold chisel for cutting metal is no better steel than a wood chisel but it has a 75° or 80° cutting edge and so it is very strong.)

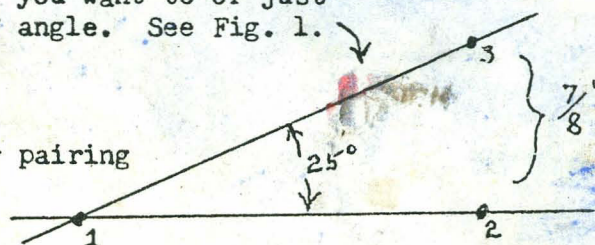


Fig. 1

Sharpening Equipment You Will Need.

GRINDER and SAFETY GLASSES.

---Or maybe I should say "Safety glasses first, and then a grinder.

A couple of years ago a friend of mine got something in his eye while grinding-- wasn't wearing his glasses-- and it was a real bad injury. So don't take chances. I know they are inconvenient and uncomfortable but to leave them off just isn't worth taking the chance. So let's get on with the sharpening.

2)

If you have a grinder of some kind already, use it. If you don't, you can get a small Black & Decker, or Sears, or Pennys, or Wards one for \$30 to \$35 that will work well for years. Watch for a sale or look at Harbor Freight or some tool auction. You can even put an extension shaft on an old washing machine motor and mount a grinding wheel on it till you can get a grinder. I used one for years and still have it with a wire wheel mounted in place of the grinding wheel. Bolt it to a board to have a base to work from. (The problem is that it doesn't have a guard over the grinding wheel so it is dangerous. The guard protects the wheel from getting damaged and if the wheel should shatter, the guard protects you.

HAND SHARPENING STONE or bench stone and oil can, or diamond stone.

The usual bench stone has coarse grit for fast grinding, on one side and fine grit on the other. If you can, get an 8" one or longer. If it doesn't come in a wood

box for protection, you can easily make one. The box keeps it clean too--if you remember to replace the lid! But spend a little more and get a good one like a Carborundum. A cheap one may not sharpen very well. I had one like that and it just wouldn't bring the tools to a keen edge. Finally I got rid of it.

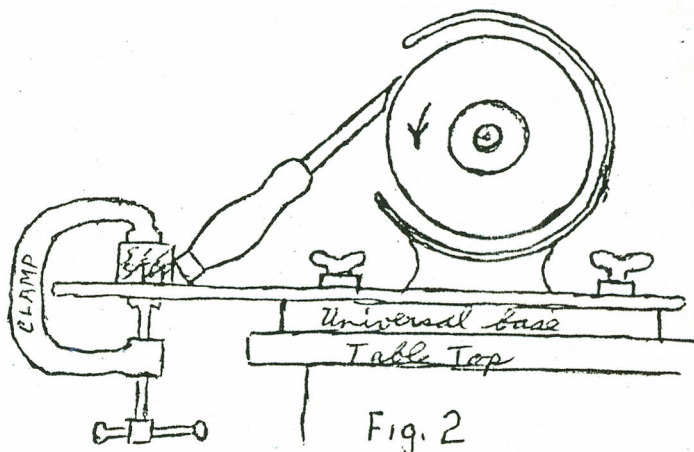
An oil can with a flexible spout is safer and a pump oil can is convenient. You can even use water if you use lots of it but it doesn't carry away the grindings as well as oil does. You can buy special sharpening oil but I just mix 10W-40 motor oil with about 1/3 kerosene. Sometimes I use pure kerosene when the stone begins to get clogged, then wipe it off with a paper towel.

Your grinding wheel, if it has been used, may need to be "dressed," to make it run true and to clean it. This may be done with a "Star Wheel," a rotary wheel dresser, a diamond wheel dresser, a dressing stick or even an old engine valve held in a piece of pipe so it can spin. (See example on table.) I like the star wheel best for most purposes but the diamond is best for shaping the wheel. You will also need a pot of water for cooling your chisel and other tools. An old plastic butter dish is fine but try to get one that doesn't tip over too easily.

Now to GRINDING:

Hold the chisel over the gauge you made, Fig. 1, to see whether the original bevel is right, and if it is then hold it up to your grinding wheel (not turning) to see what kind of a jig will hold it in that position while grinding. Fig. 2.

You will likely need to make a "Universal Base" which can be moved back and forth under or by the grinder and clamped down solidly. Then you can mount other jigs on it, later. Right now you will need to mount a board 3 or 4 inches wide, so it extends out in front of the grinding wheel. This will allow you to clamp a stop block to hold the chisel in the correct position.



Start the motor and place the handle of the chisel against the stop block and just let it down till it touches the grinding wheel. Now look at the chisel to see if the ground spot is in the right place. If it is too near the cutting edge of the chisel, move the stop

EASY - OFF To Clean Saw Blades
Buy Bottle with a Brush (Paw & Chisel) 1010 Spray Bottle

block closer to the grinding wheel. If the spot is too far back from the cutting edge, move the stop block a bit farther away from the grinding wheel. (Very small movements of the stop block make much difference in the angle of the cutting edge.)

When all seems well, move the chisel across the grinding wheel using light pressure and cool the chisel very frequently in the water. When you get the feel of grinding look to see if the chisel has nicks or a crooked grinding edge. If so, rub it with the handle vertical to the bench stone and grind it smooth and true. (If you feel confident enough you can do this on the side of the grinding wheel but it works very fast and you don't want to shorten the chisel any more than you have to.)

You will find a grinding burr on the flat side of the chisel. Remove it by putting the flat side of the chisel flat on the bench stone and rubbing it. This leaves a distinct edge which will later become the cutting edge. If you look at the end of the chisel you will see the square edge you ground onto it. You will grind the chisel till this edge has just disappeared down to a dotted line. Remember to dip the chisel in water very frequently to keep it cool to the touch of your finger. A thin edge heats up a lot faster than a thicker one so watch it carefully. A few strokes with the wheel dresser just before the last grinding, sharpens the stone and helps keep the tool from overheating. If the steel turns blue, you've lost the temper and it won't hold the cutting edge very well till it has been ground away. However, when this happens, all you can do is go ahead and try harder, next time. Keep it cool!

The chisel is now "hollow ground." Fig. 3 shows the chisel hollow ground but exaggerated. It would be this way if ground with a very small stone.

The chisel now needs to be whetted on the bench stone. Place a few drops of oil on the fine side of the bench stone and the hollow grind of the chisel down into the oil. (Unless you use a diamond stone which doesn't use any oil at all and even water I find to be a nuisance. I just wipe the stone on my pants and go ahead--don't tell my wife why they get so dirty!)

Rock the chisel back and forth feeling for the flat, then raise it up on the "toe" just a bit and stroke the chisel back and forth on the stone holding this position and light pressure. Now turn the back of the chisel flat on the stone and rub it a bit. If you look closely you may see a "wire edge". Remove this by drawing the sharp edge lengthwise over a block of hard wood, then again whet the chisel by drawing it toward you, bevel down, a few times.

Test for sharpness by touching the edge of the chisel to your thumb nail, lightly. If it grabs, it is sharp. If it slides, it needs more whetting. Look at it closely with a magnifying glass if you have one, under a good light. Repeat whetting as needed.

If your grinding wheel is small, it may make too much of a hollow grind. You can grind off the heel a bit by resetting the stop block on your grinder. Fig. 3-A. An 8" wheel or larger, makes very little hollow grind--almost flat.

Commercial devices to hold your tools for grinding cost a lot and don't do any better job in many cases, than devices you can rig up on your own. They may work faster and easier on production jobs but they may be very complicated to use. Watch to see how other people sharpen their tools and learn from them. But learn how to sharpen your

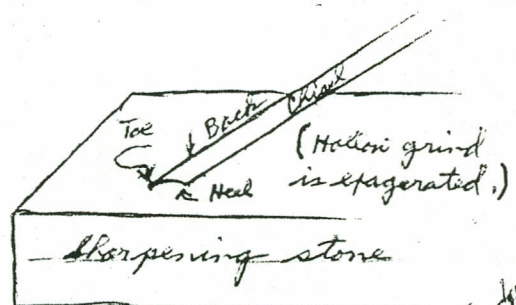


Fig. 3

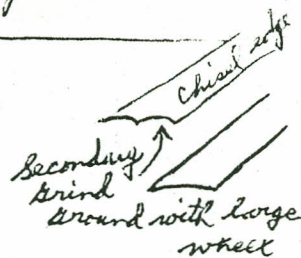


Fig. 3-A

own tools so you can have them how you want them, when you want them, and you can save money and time. You can have them ready to use again in just a few minutes and you can suit the shapping to the job ahead. Make your jigs and fixtures as you need them and keep thinking of ways to improve them.

Following the above methods for sharpening a carpenters' chisel, you can sharpen plane irons and square nose lathe tools, too. You can sharpen gouges by rolling the tool while grinding. Round nose lathe chisels can be sharpened by carefully letting the chisel run down over the edge of the grinding wheel. This will tend to round the wheel a bit which may be a small advantage, later on. I like a hollow ground chisel much better than a flat ground one because it is easier to whet and can be sharpened many more times before it needs to be reground.

Other tools need different jigs and fixtures to hold them, e.g. a "skew" lathe chisel or a "side cutter". A round nose chisel can be ground easier and better on another kind of jig.

The base for the grinder should be large enough to allow you to screw down or clamp various attachments for grinding, or you can make a Universal Base to which your attachments can be fastened.

Your Universal Base should be moveable back to front unless your grinder has a tilting base. In any case the distance between the grinding wheel and work needs to be variable very gradually, like with a screw, then after the adjustment is made, clamped solidly for grinding. You are welcome to look at mine but work up the solution to the problem with your own grinding wheel. It must be solid but allow the necessary movement to get the job done. Make notes and drawings on the back of these sheets because you are not likely to remember details after you get home. Make up your jigs but always be looking for ways to improve them and make them simpler. And remember, there are no impossible solutions, only simple ones and sometimes a difficult one.

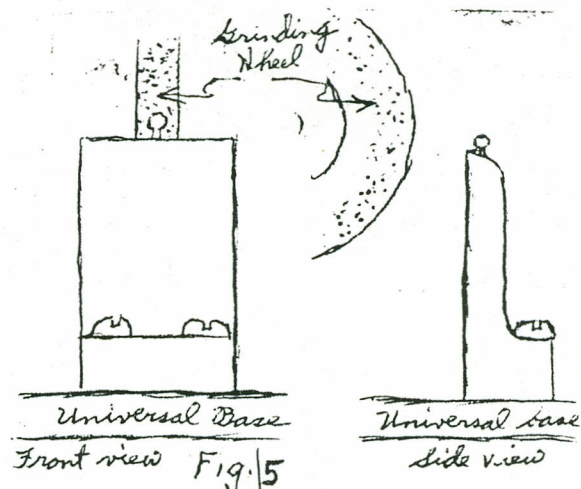
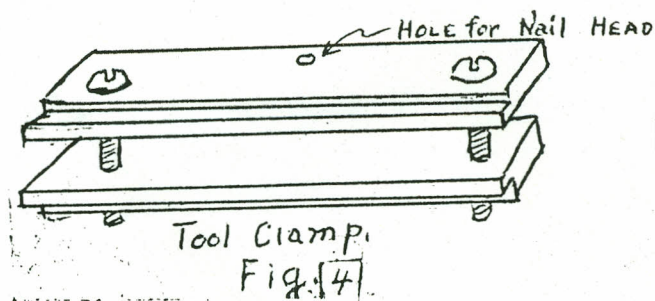
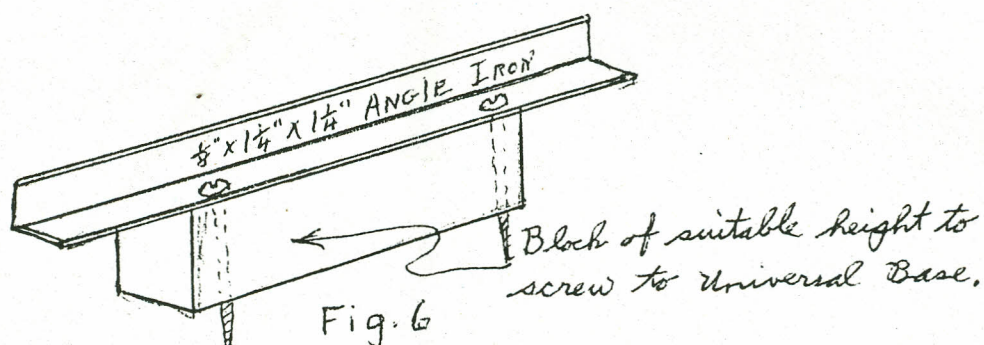


Figure 4 shows a tool clamp which can pivot on a rounded head casing nail in a block screwed to the universal base. This is fine for grinding round nose chisels and maybe gouges. The advantage is that you get a sharper edge farther around to the side and that makes turning a lot easier. And you can get rid of that pesky corner on the gouge that sometimes spoils your work.

You can suit yourself how far the pivot point should be from the grinding wheel but a couple of inches seems about right for me. I like a slightly rounded face grinding wheel too, and not too thick, like $\frac{1}{4}$ " to $\frac{1}{2}$ "

Another attachment you may find useful, is a long straight, smooth edge for a rest in front of the grinder, mounted on the universal base. Fig. 6. Your tool clamp Fig. 4, can slide along it when sharpening a chisel, plane iron, skew chisel etc. You may find it better than the first mentioned way of sharpening a chisel. With another jig to hold them, planer and jointer knives may be ground this way. Fig. 7.



JOINTING is trueing up a cutting edge before it is sharpened. You may have jointed your chisel in the first example by grinding off the edge on the bench stone or touching it to the side of the grinding wheel, and you may joint a circular saw blade by raising it up against the bench stone on the table of the saw while running the machine. But to joint planer blades, you need another jig. It's merely a flat board with a guide strip along one edge and mounted on the universal base in such a way that the knife holding board, Fig. 7, can slide past the grinding wheel with the knife touching the wheel at right angles, just enough to take out nicks and hollow places, so that it is straight and even when it comes off the jointing board. Go very gently at first. It's easy to grind off too much and knives are expensive. Then replace the jointing board with the long angle iron rest and adjust the distance from grinding wheel to planer knife so that the angle being ground is about 45° . Take off the burr and grind as you did before till the jointed edge just about disappears and you are ready to whet the knife. All planer and jointer knives of one group or set, should be the same width, for balance.

Not everyone whets his jointer or planer knives but if you do, it can be done nicely with a true, unworn bench stone. The diamond stone stays true. (Note that if the stone isn't true, you won't get a straight whetting of the knife.) If your stone is hollowed slightly, look at the edge of the stone. Chances are it is still straight. You can use this edge for whetting jointer and planer knives.

You can hold planer knives with your fingers as you did your chisel or you can make a special bench hook to hold the knife and run the stone over the knife. Fig 9. Lay the stone lengthwise on the knife (or vice versa) and feel for the flat. Then run a bead of oil the length of the knife along the ground edge, (unless you use a diamond stone) then replace the stone and again feel for the flat, raise the stone onto the toe of the knife and whet with a circular motion, moving the stone along the knife. Remove the knife and wipe off the oil with a paper towel and remove the wire edge as you did before. Whet again by drawing the stone away from the sharp edge and test for sharpness on your thumbnail. Repeat steps as needed.

Now think of these jigs as general guidelines for the ones you will be building for your own tools. Make them of a size and style to meet your own needs--for example, if you have a side cutting chisel, you may need to make a special jig to hold it in the right position. Other tools will need other kinds of holders. You can even make a special jig and hollow grind ice skates. See examples on the display table.

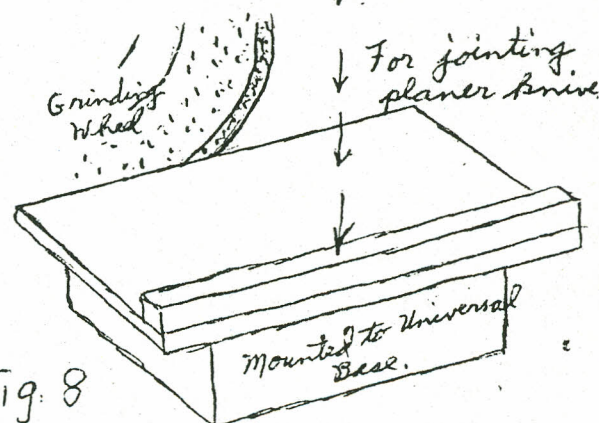
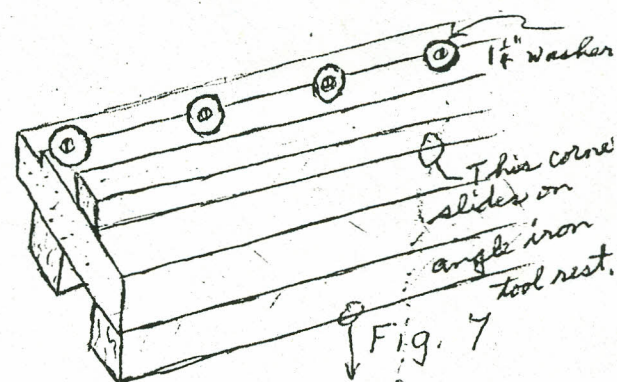


Fig. 8

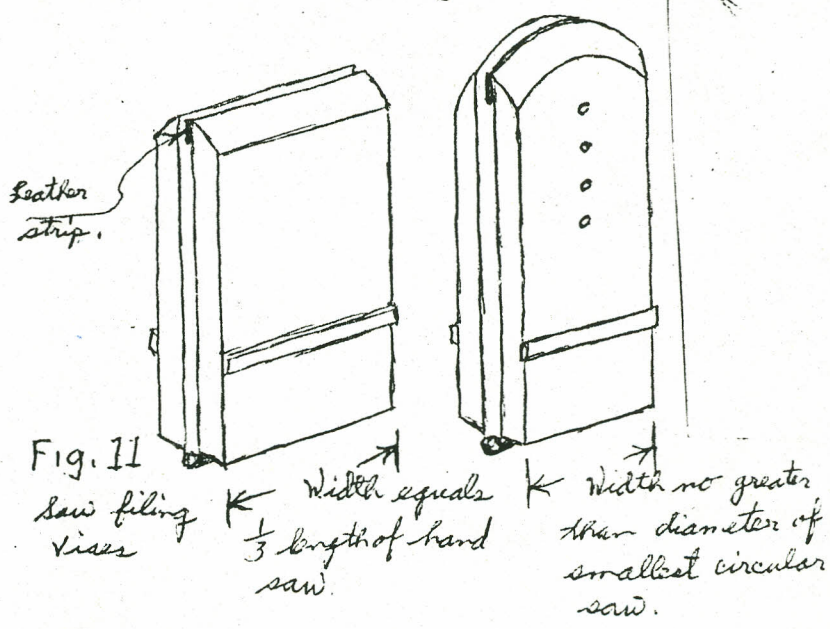
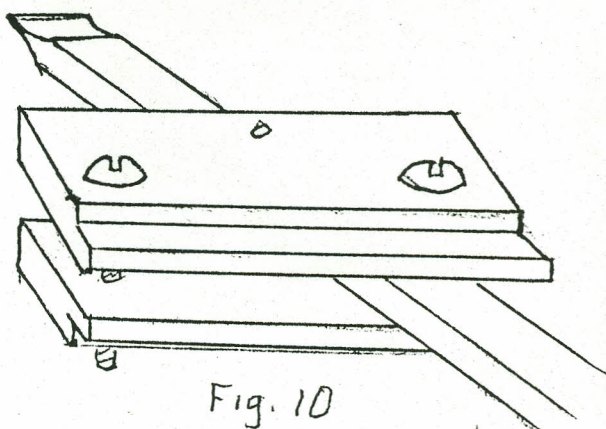
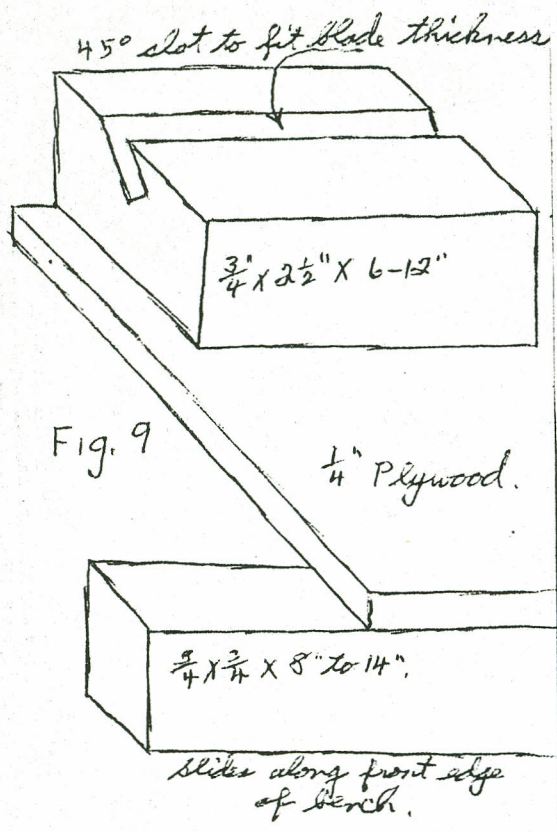
Skew and Diamond point lathe tools are held in the tool clamp Fig 10, at an angle and slid along the angle iron rest, Fig. 6. Grind one side, then turn it over to grind the other side. Keep the sharp edge in the center of the thickness of the tool. A diamond point chisel is held the same way but must be shifted to the other angle after one side is ground instead of turning it over.

HAND SAWS AND CIRCULAR SAWS.

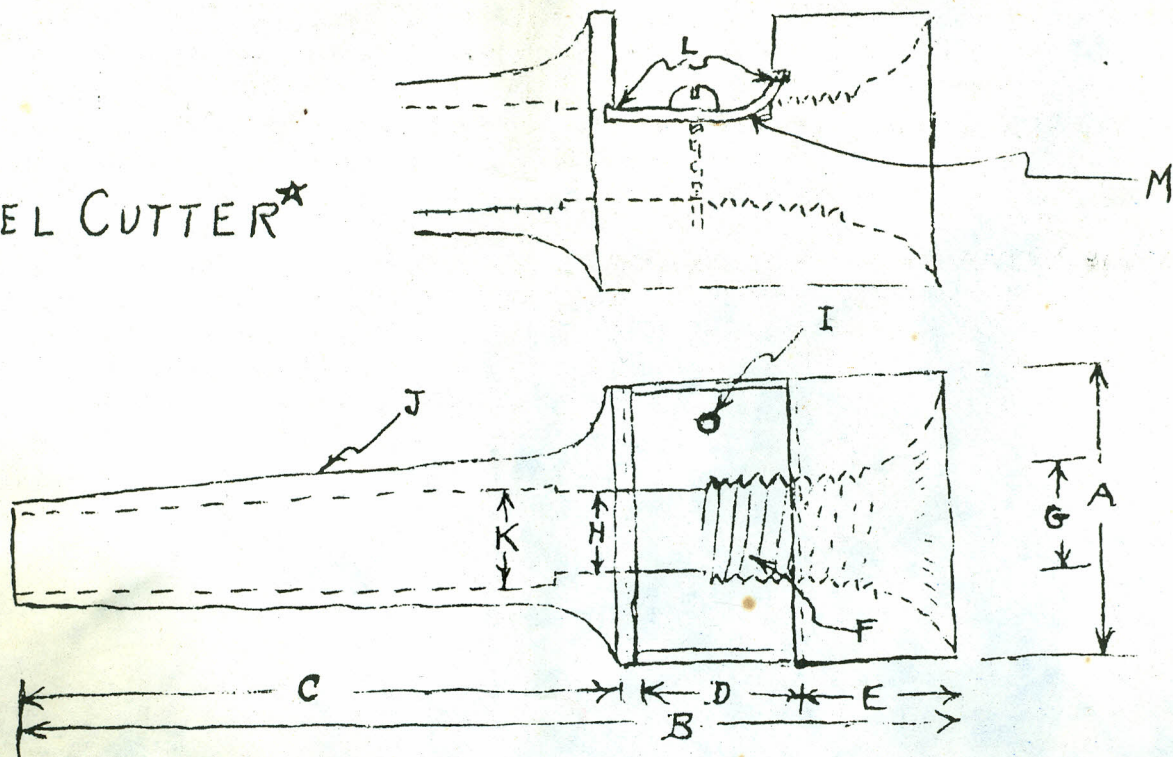
Follow the directions in a sharpening book for tooth shape and methods. A clamp for holding hand saws may be made to use in a machinists vise or a bench vise, or it can be made to clamp to the workbench while standing on the floor. It has a hinged jaw and it will hold better if a thin strip of leather from an old shoe, lines one or both of the jaws. Fig. 11. Make it straight on top for a hand saw or curved for a circular saw blade. See examples and make a sketch of the one you want to build. Or you can buy one for about \$40. but you can make one for free that works well.

Carbide Saws and lathe tools really should be sharpened on a diamond wheel so it would be better if you sent them to a sharpening shop. But if you want to do your own, use a "green wheel" if you have one or a regular wheel with frequent dressing and low pressure and plenty of cooling. (A green wheel is made very soft and wears away fast, thus presenting a continuous flow of sharp cutting grains of abrasive.) But do this: Either reverse your grinder (it will throw dust in your face!) or hold the chisel upside down. The idea is to sharpen with the wheel turning AWAY from the cutting edge rather than toward it as is ^{THE} normal way of grinding. And grind very slowly and not too much. You can sharpen masonry drills this way very satisfactorily.

Keep thinking while you are grinding and try to improve. Learn from other people. I haven't been to a symposium yet when I didn't learn from others' suggestions.



DOWEL CUTTER★



	$\frac{1}{2}$ " CUTTER	$\frac{3}{8}$ " CUTTER	$\frac{5}{16}$ " CUTTER	$\frac{1}{4}$ " CUTTER
A	$1\frac{3}{8}$ "	$1\frac{3}{16}$ "	$1\frac{1}{8}$ "	1"
B	$4\frac{3}{4}$ "	$4\frac{3}{4}$ "	4"	$3\frac{3}{8}$ "
C	3"	$3\frac{1}{4}$ "	$3\frac{1}{4}$ "	$2\frac{1}{2}$ "
D	$1\frac{1}{16}$ "	$\frac{5}{8}$ "	$\frac{1}{2}$ "	$\frac{7}{16}$ "
E	$\frac{3}{4}$ "	$\frac{5}{8}$ "	$\frac{1}{2}$ "	$\frac{7}{16}$ "
F	$\frac{3}{4} \times 16$ or $\frac{1}{2}$ " PIPE	$\frac{1}{4}$ " PIPE	$\frac{7}{16}$ - 14	$\frac{3}{8}$ - 16
G	$\frac{5}{8}$ " or $\frac{1}{16}$ "	$\frac{7}{16}$ "	$\frac{27}{64}$ "	$\frac{5}{16}$ "
H	$\frac{1}{2}$ "	$\frac{3}{8}$ "	$\frac{5}{16}$ "	$\frac{1}{4}$ "
I	6-32	6-32	6-32	6-32
J	#2 MORRIS TAPER	#2 MORRIS TAPER	#2 MORRIS TAPER	#2 MORRIS TAPER
K	$\frac{9}{16}$ "	$\frac{7}{16}$ "	$\frac{11}{32}$ "	$\frac{5}{16}$ "
L	UNDERCUT WITH HACKSAW AND FILE			
M	CUTTER MADE FROM WORN OUT RED DEVIL SCRAPER BLADE. FIXED TO TIGHT FIT.			

★ PATTERNED AFTER STANLEY DOWEL CUTTER

7-13-'83
E.W. KINDEL