

Grinding Bench Chisels—Hold the chisel on the tool rest, loosen the wing nut and tilt the tool rest so the bevel sets against the wheel. If the chisel has a flat bevel, set the angle so that the wheel is centered on the flat bevel. Tighten the wing nut securely (Figure 24-32). Remove the chisel from the tool rest and make sure the speed dial is set to "Slow". Then turn on the Mark V and set the speed dial to "R" (3400 RPM).

If the chisel is narrower than the width of the wheel, slide the chisel up into the wheel, hold it there momentarily and back it away (Figure 24-33).

If the chisel is wider than the wheel, follow the instructions above, except you must slide the chisel from side to side after it comes in contact with the wheel (Figure 24-34).

Grind away only enough metal to remove any damage. This will complete grinding the primary bevel. To create the secondary bevel, hone the chisel.



Figure 24-33. If the chisel is narrower than the width of the wheel, hold the chisel there momentarily, then back it away.

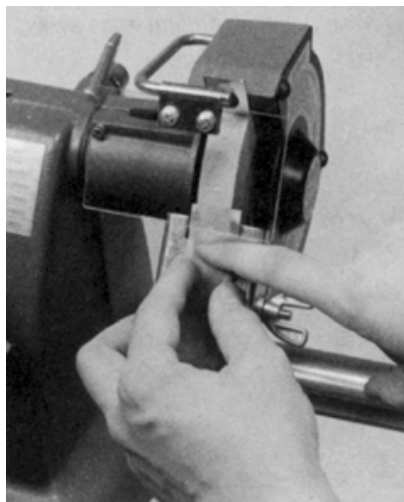


Figure 24-34. If the chisel is wider than the width of the wheel, move the chisel side to side, then back it away.

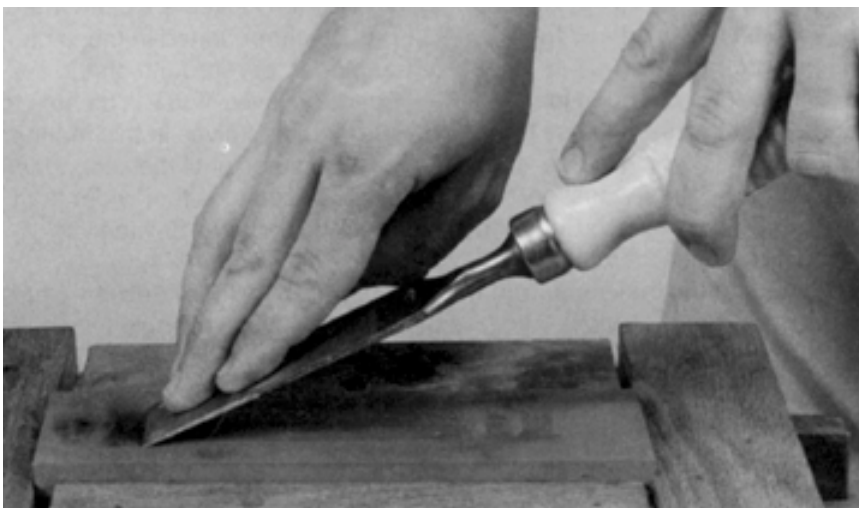


Figure 24-35. Hone bench chisels on oil stones, by pointing the cutting edge in the same direction you are sliding the chisel.

Honing Bench Chisels

The bench chisel has a bevel ground on one side of its cutting edge. This bevel as well as the flat bottom face must be honed. This will remove the grinding burr and sharpen the cutting edge.

Start with a coarse hone and moderate-to-heavy pressure to create the secondary bevel. By repeating this procedure on progressively finer hones you will be able to hone the cutting edge razor sharp.

Using Oil Stones and Diamond Hones

—Hold the bevel of the chisel on the hone. Slide the chisel over the hone with the cutting edge pointing in the same direction you are sliding the chisel (Figure 24-35). Think of it as trying to shave off a thin sliver of the hone. Turn the chisel over and repeat the procedure on the flat side.

Using Water Stones and Rubber Bonded Abrasives

—To hone bench chisels With a cutting edge Wider than 1/2", follow the oil stones and diamond hones instructions.

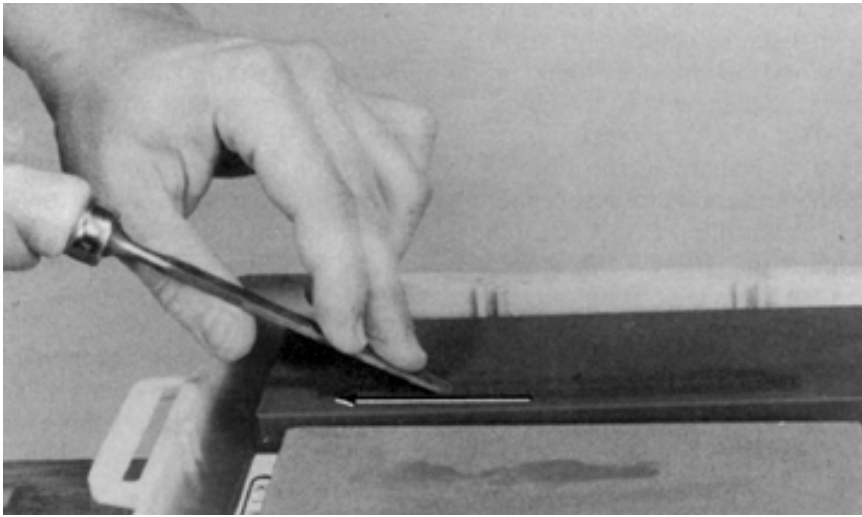


Figure 24-36. For narrow chisels, on water stones, point the cutting edge away from the direction you are sliding the chisel.

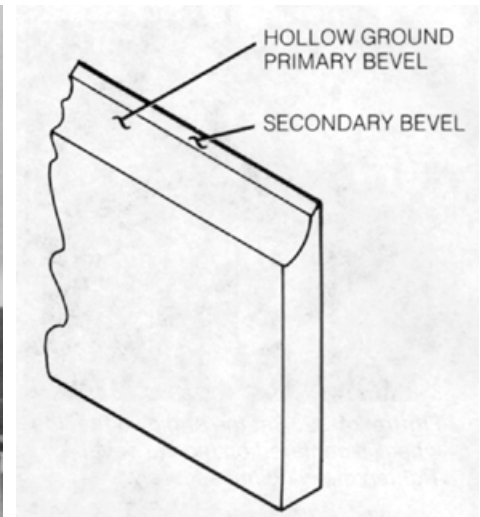


Figure 24-37. First, grind the primary bevel. Then grind the strengthening secondary bevel.

For bench chisels with narrower cutting edges, slide the chisel over the hone with the cutting edge pointing **away** from the direction you are sliding the chisel (Figure 24-36). Think of it as trying to smooth over the surface of the hone. Turn the chisel over and repeat the procedure on the flat side.

GRINDING PLANER AND JOINTER KNIVES

Jointer and planer knives need occasional maintenance. This upkeep consists of a simple cleaning and honing of the knives on the machine (see the Jointer or the Planer Owners Manual). However, this type of edge repair will only go so far before the knives need to be removed and thoroughly ground.

The best way to grind jointer and planer knives is to use the Shopsmith Grinding Wheel and Knife Sharpening Accessory that mounts on the Mark V. Set up the grinding wheel according to the Owners Manual that came with the Grinding Wheel.

Select the proper **hard** wheel for the severity of the cutting edge damage (coarse for nicks and a badly worn cutting edge and fine for routine grinding). **Warning: Never use the soft rubber-bonded abrasive or all-purpose wheels to grind jointer or planer knives. The sharp cutting edge of the knives will dig into the soft wheel and cause the knife to be thrown from your hands, causing serious hand cuts and damaging the wheel and the knife.**

Remove the knives from the cutterhead according to the Jointer or the Planer Owners Manual. Planer and jointer knives are ground in a two-step operation. First, the primary bevel is ground. Then a secondary bevel is ground on the front edge of the primary bevel (Figure 24-37). This strengthens the cutting edge and helps dissipate the heat during cutting.

After the knives are used, they can be either honed in the jointer or planer, or reground on the secondary bevel. You will be able to reground the knives in this manner several times until the secondary bevel becomes either wider than the primary bevel or wider than 1/8".

Grinding Wheel Setup—Set the primary bevel angle by placing the knife on the knife rest in front of the

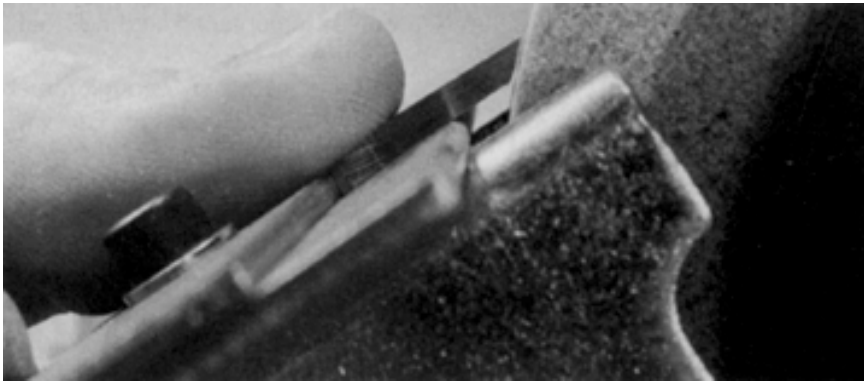


Figure 24-38. Center the knife bevel on the wheel.

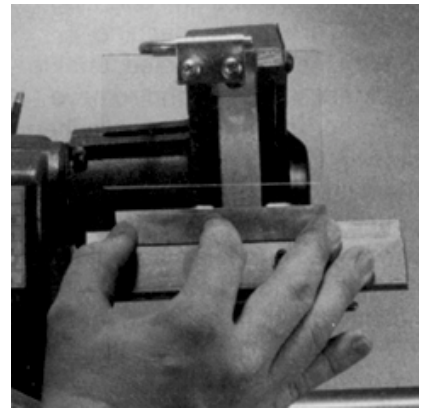


Figure 24-39. Hold the jointer knife with one hand while sliding it back and forth across the wheel.

knife guide. Loosen the wing nut and tilt the tool rest until the knife bevel is centered on the wheel (Figure 24-38). **Warning: Position the tool rest no further than 1/8" away from the wheel.** Then tighten the wing nut.

Position the knife guide behind the knife so that it aligns the knife parallel to and just touching the wheel. Securely tighten the two screws that hold the knife guide in place. Remove the knife.

Grinding the Knives—Be sure that the speed dial is set to "**Slow**" Turn on the Mark V and set the speed dial to "R" (3500 RPM). Hold the knife firmly on one end of the knife rest and feel for it seating solidly against the knife guide.

The 4" **jointer** knives are held with one hand and slid back and forth across the knife rest (Figure 24-39). The 12" **planer** knives are ground in three overlapping sections (Figures 24-40A, B, and C).

Slide the knife slowly across the knife rest and knife guide, and past the wheel. *Caution: Keep the knife moving. If you hesitate, the wheel will heat up the knife and turn the edge blue. This will ruin the factory heat treating.*

Grind the knives at this setting until the sparking stops. When the sparking stops, the knife should be evenly ground.

If some of the nicks are still showing on the edge of the first knife, or only part of the bevel is ground, you may need to reset the guide and continue grinding the primary bevel. But if the remaining edge damage is minor or all but a slight part of the bevel is yet to be ground, the secondary bevel grinding operation will grind away and true up the edge.

Grind the primary bevel on the other two knives at this setting. Then turn the speed dial to "**Slow**" and turn off the machine.

Set the secondary bevel angle by loosening the Wing nut and resetting the tool rest approximately 10° to 15° toward the wheel. Tighten the wing nut.

Place the knife on the knife rest and reposition the knife guide so that the knife just touches the wheel

(Figure 24-41). Repeat the knife grinding procedures explained above, It should only take one or two passes to grind the secondary bevel.

It is **not** necessary to hone the jointer and planer knives after they are ground. The burr that is left on the cutting edge is small, and will be knocked off at the first contact with the stock.

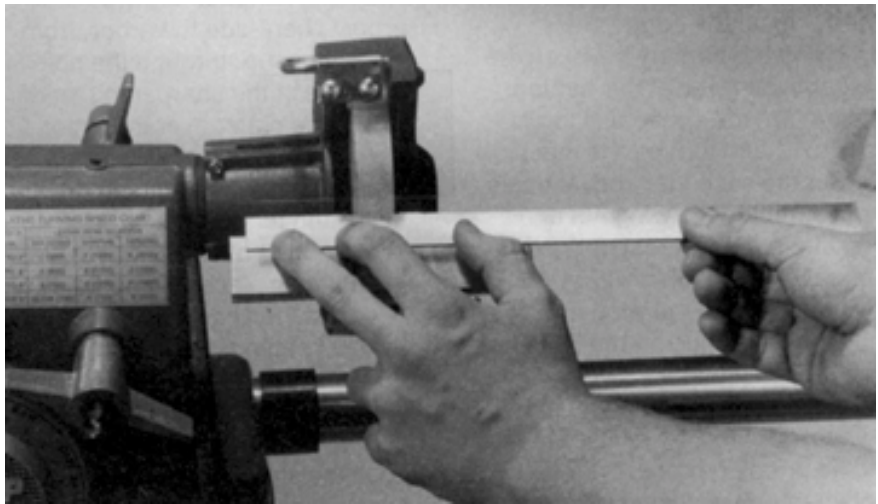
GRINDING SHAPER CUTTERS

Two and three wing shaper cutters may be the most misunderstood cutters in the workshop when it comes to sharpening. It may appear that all the complicated curved wings, on each cutter, must be identically ground and then honed on their curved surfaces. Well this is only partially true and **not** nearly as difficult as it may sound. These cutters need only be accurately sharpened on the leading flat face.

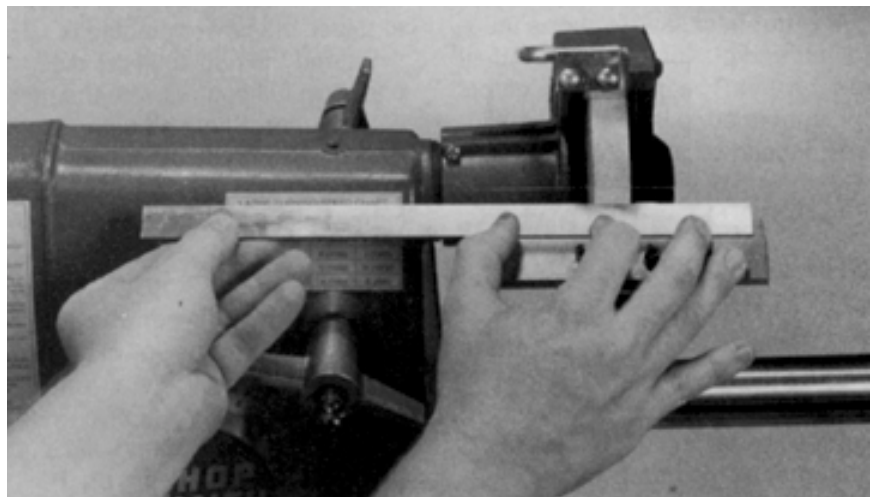
For shaper cutters this is made easy by using the Shopsmith Sharpening Guide. By precisely grinding the face of each wing of each cutter, the cutting edge is sharpened.

Mount the sharpening guide on the Mark V worktable and position it according to the Owners Manual. Mount the sanding disc and position it 3" away from the worktable.

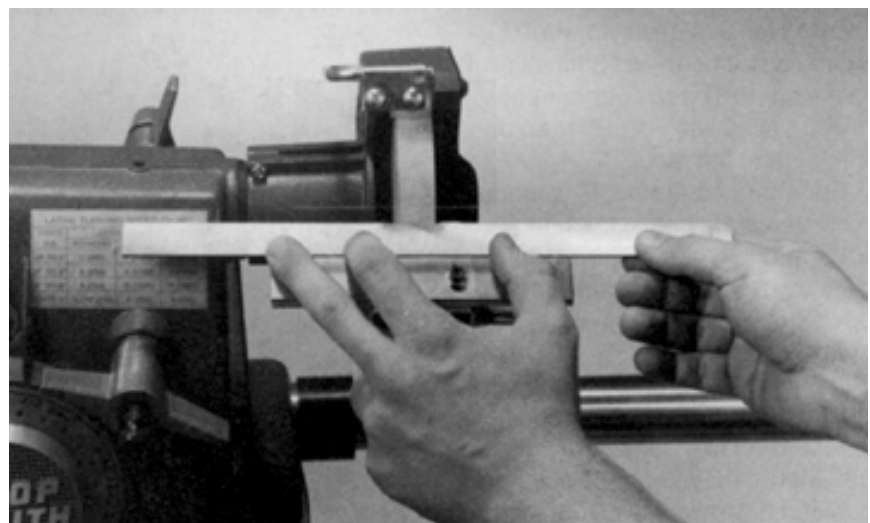
To mount the shaper cutter to the sharpening guide, first, slip the small rub collar on the 1/2" shaper arbor. Then slide the arbor, from the bottom up, through the hole in the base of the sharpening guide.



A



B



C

Figure 24-40. Planer knives are ground in three overlapping sections: (A) grinding the left end, (B) grinding the right end, and (C) grinding the center.

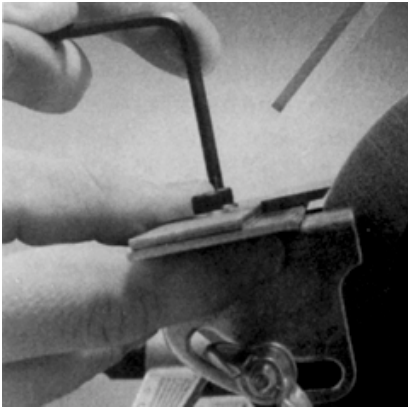


Figure 24-41. Reposition the knife guide so that the knife just touches the grinding wheel.

Slip the cutter over the arbor. Hold the cutter wing firmly against the face of the sharpening guide. Install the tongue washer and nut. Tighten the nut fingertight to hold the cutter in place (Figure 24-42).

Adjust the sharpening guide to the "0" setting. Position the guide on the worktable until the disc will completely cover the face of the cutter when the quill is extended. Lock the sharpening guide securely in place (Figure 24-43).

Position the disc no further than 2" away from the face of the cutter and lock the power plant lock.

Extend the quill until the disc comes in full contact with the face of the cutter. Slight adjustments of the sharpening guide may be needed at this time to position the cutter face precisely in front of the disc.



Figure 24-42. Hold the cutter wing against the sharpening guide and tighten the nut finger tight.

Set the depth stop to "0" and lock it in place. When the quill is extended the abrasive will remove a slight amount of metal from the wing.

Be sure that the speed dial is set to "Slow", then turn on the machine. Allow the abrasive to contact the cutter for only a moment then allow the quill to retract. Continue this until the sparking stops. Turn off the machine.

With the quill retracted, unplug the Mark V, loosen and remove the arbor nut and tongue washer holding the cutter in place. Slide the cutter off the arbor. Rotate the cutter so that the flat of the next wing is facing the disc. Replace the nut and tongue washer. While holding the cutter against the side of the sharpening guide, tighten the arbor nut securely.

Repeat the previous grinding steps without moving either the depth stop, carriage or the power plant. Rotate the cutter as described above to grind the third wing of the cutter. Then hone the face of each wing.

HONING SHAPER CUTTERS AND ROUTER BITS

It is a simple matter to remove the grinding burr from a shaper cutter left by the abrasive. To avoid changing the cutter's profile, do not hone its curved or beveled edges. **Warning: Because of their size, router bits are not easily ground so it is recommended that these bits only be sharpened by honing the leading flat face.**

To hone steel cutters and bits, start with a coarse hone (of any type) and progress to fine. To hone solid carbide or carbide tipped cutters and bits, you must use a diamond hone. As you progress, reduce the pressure applied to the hone.



Figure 24-43. Position the cutter fully in front of the disc and lock the guide in place.