

EDWARDS MOUNTAIN WOODWORKS, LLC

fine handtool woodworking: creating and teaching in wood



Bill Anderson
57 Woodside Trail
Chapel Hill, NC
27517-6077
919.932.6050

bill@edwardsmountainwoodworks.com

Turning Bowsaw Handles



My technique for turning bowsaw handles has evolved over the years. Initially I followed a strictly traditional approach, turning between centers, but have changed recently to using a morse-tapered chuck (one of two styles) to increase the axial concentricity of the handle and the included pin.

Turning between Centers.

There are two handle sizes. The near one is long and is used to “power” the saw. The far one is short and is grasped by just 2 or 3 fingers to give support to the saw. Both handles will be drilled for a tapered pin, but the short handle is short enough that one cannot use an unmodified taper reamer to ream the hole. It is for this reason that the taper reamer is cut off using a metal cut off

wheel. Cut the reamer just below the $\frac{1}{4}$ ” diameter (i.e. smaller by a bit). The reamer will be completely functional for all operations in making the bowsaw.

1. **Stock preparation (far left background).** The major diameter of both handles is $1\frac{3}{8}$ ”, therefore I make the blanks about $1\frac{1}{2}$ ” square. The lengths are about 1” longer than the final handle lengths.
2. **Centering the stock (far left background).** Saw diagonal lines across one end (the headstock end), then set your 4 pronged chuck in these lines centered on the stock and tap the chuck in to establish a good seat. At the other end, determine the centerpoint with an awl. Make this mark light.
3. **Drilling the stock (second from left background).** Use a $\frac{1}{4}$ ” bradpoint bit mounted in a Jacobs chuck in the tail stock. Set the stock carefully in the head stock, advance the bit in the tail stock until the centerpoint of the bradpoint registers in the centerpoint of the stock. Set the lathe to a low speed and slowly advance the bradpoint bit with the turnscrew of the tail stock. You need to have enough force at the tail stock to keep the stock registered on the headstock throughout this whole process. The depth of the hole needs to be a bit longer than the pin length that will go into the hole. You will probably have to do this drilling in two steps to reach the full depth.
4. **Taper reaming the hole (3rd from left background).** On your workbench in the shoulder vise, ream this hole so that the pin goes in to within a skinny $\frac{1}{8}$ ” inch of bottoming out.
5. **Rounding Out (4th from left background).** Return the stock to the lathe, but replace the Jacobs chuck with a cone center. My cone center has a major diameter of over 2”. In theory, the cone center will keep the stock coaxial and if the hole is coaxial as well, then all is copacetic. To make sure that the tailstock end is square to the stock axis, use a parting tool to part down to just shy of the cone center surface (as close as possible). Remove the stock and pare off the remaining small amount of wood, then return the stock to the lathe. Use a large roughing out gouge followed by a skew chisel to turn the stock into a fair cylinder, ever so slightly just over $1\frac{3}{8}$ ” to allow for final shaping and sanding.
6. **Laying out the handle profile (5th from left background).** The handles have just 3 diameters: major diameter ($1\frac{3}{8}$ ”), minor diameter ($\frac{5}{8}$ ”, neck of the handle) and the tailstock end diameter (1” or so, just a bit larger than the bearing surface of the pin). Establish these diameters using the template, a thin parting tool and outside calipers set to the individual diameters. Note that none of these diameters are overly critical. Mark the peak of the major diameter with pencil while the lathe is spinning. The curve of the profile will drop away from this line in either direction. Finally, turn an area of the headstock end of the handle down to under $\frac{1}{2}$ ”. The left shoulder of this cut should be right at the final length of the handle, the right shoulder of this cut should be shy of the headstock chuck points!

7. **Turning the profile (Far right background).** I usually turn everything to the right of the neck cut down to 1", then use a smaller roughing out gouge and an outside caliper set to 5/8" to turn the neck to final diameter, sloping to the right to shy of the tailstock end. At the tailstock end, I locate the position of the bead with a skew chisel point-on (about 11.8" from the end of the stock). I then turn the very end into a small bead using a very small spindle gouge. On the left edge of the bead I establish a deep quirk with the skew chisel. I fair the left edge of this quirk down to the bottom of the neck using a spindle gouge. From the major diameter to the minor diameter, the profile follows a double (ogee type) curve. These curves should break evenly in both directions. I use a combination of a small roughing out gouge, and a spindle gouge. From the major diameter to the end of the handle, the profile is essentially a "bulb" (an evenly sloping downward curve).
8. **Finishing the handle.** Leave the headstock end of the turning intact with maybe a final diameter of under 1/4". This will allow you to apply finish on the lathe while it is turning, and to buff the handle also while the handle turns. Once you have finished the surface coating and buffing, return the handle to the lathe, and turn off the headstock end.
9. **Installing the pins.** Clamp the handles in a shoulder vise (use a piece of leather or equivalent to protect the handle), and finish out the reaming by trial and error until the pins is almost seater. Apply 5 minute epoxy to the shaft of the pin, and tap the pin home until it seats on the end of the handle. Wipe off any excess glue.

Occasionally, the pin is clearly not coaxial with the handle. This is often just a slight difference, but it bothers me. Either the bradpoint wandered down the grain off center when drilling, or the cone center did not hold the stock square to its turning axis. I have devised two different chucks which should eliminate this problem.

1. **Four jawed chuck (center and right foreground).** Turn a piece of dense hardwood (I used an ebony cutoff for the large pins and a rosewood cutoff for my small pins) between centers to about 1 1/2" diameter. On the tail stock turn down a tenon to about 1" diameter and about 1" long. Part this turning off the lathe at a length that is just short of the length of the handle end of a pin. Install a four-jawed chuck in the headstock and insert the tenon end of the turning into the chuck. Make sure the tenon shoulders are tight against the chuck. Place a 1/4" bradpoint in a Jacobs chuck and install this in the lathe tail stock. Slowly and carefully drill a hole completely through the turning. Note: do not mark the centerpoint of the turning, let the drill bit find this itself. Once you have the hole drilled, lock the headstock in place and manually taper ream this hole. Note that the total length of this hardwood chuck needs to be shorter than the part of the pin that seats in the bowsaw arm by an amount so that the pin does not bottom out on the face side, but protrudes from the back side a bit so that the pin can be tapped out. Install the chuck in the 4 jawed chuck and turn down the outfeed end of the chuck to a sloping curve so that it is under 1" so as not to interfere with turning the handles later on.
2. **Morse taper chuck (left foreground).** Turn a piece of dense hardwood between centers to have a taper that matches the morse taper of the headstock. At this point, do not worry about the length of the stock, just get a good taper. You will want the taper progress up to a diameter that is slightly greater than the maximum diameter of the headstock hole for your lathe. Above this taper (tail stock end of the turning), turn a straight sided tenon about 1/2" long. Install a ferrule there. I use 1" o.d. brass tubing for this purpose. Remove the turning from the lathe and cut it to a length that is slightly shorter than the pin length that goes into the handle. Reinstall this chuck directly into the headstock, making sure that the more taper is holding. Insert a 1/4" bradpoint into a Jacobs chuck in the tail stock and slowly and carefully drill a hole completely through this chuck. Let the bit find the centerpoint. Lock the headstock and manually taper ream the hold so that the pin sits proud of the ferrule a bit, and pokes out the opposite end as well.

Either one of these chucks can be used to turn the handles. I have used both with the same results.

Headstock Turning

1. **Stock Preparation, Centering the Stock, Drilling the Hole, Taper Reaming the Hole.** All of these operations are exactly as done for between center turnings, with one exception. When you rem the hole, ream until the pin is just a shy 16th from seating flush on the stock. At this point, apply 5 minute epoxy to the pin and tap the pin in until it seats flat.
2. **Preparing for Turning the Profile.** Choose one of the two chucks described above, and seat that firmly in the headstock. Insert the handle and twist in into the tapered hole. With a small conical chuck in the tail stock, bring the tailstock up to the handle blank. Allow the lathe to run at a slow to moderate speed and let the chuck in the tailstock find the venter point. If you have drilled the hole in the headstock chuck carefully, then all units should be coaxial. At this point, the tailstock is just providing support for the turning, and as you get closer to the end, you can pull the tailstock away to finish out the turning and applying the finish.
3. **Rounding Out, Laying Out the Profile and Shaping the Profile, Finishing the Handle.** All of these steps are exactly as described above with one exception. Now the handle is in its complete form, there is no material to turn off after the finishing process.