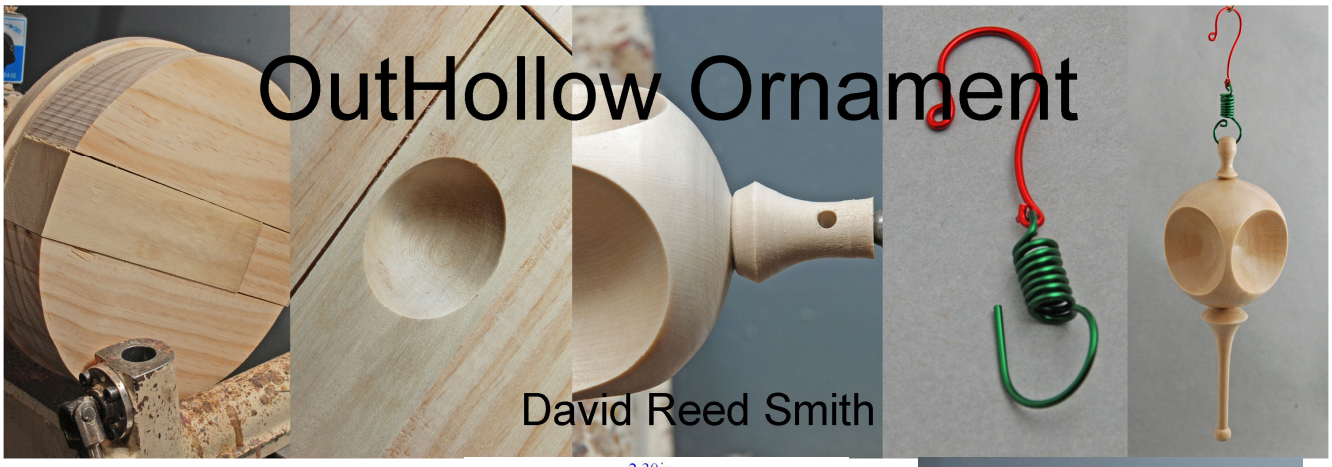


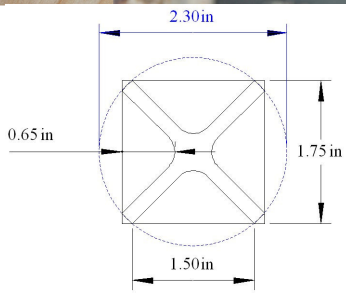
OutHollow Ornament

Introduction

I was quite impressed with the finial Thomas Farrell put on his "Sovereign's Comet" ornament in Woodturning Design #28, with four hollows formed by turning the spindle blank at right angles to its long axis. In fact I liked the idea so much that I made it into the whole ornament.

I didn't want to do the cross axis turnings while dealing with the propeller effect though, so I made a set of jaws for my 4-jaw chuck that surrounded the cross mounted spindle blank turning it from a dangerous propeller to a safe disc. A stop block on one of the jaws served to keep things as balanced as possible and also served to align the blank so that all four hollows line up with each other. As not everyone has a 4-jaw chuck, much less a big one, I designed a jig that can be mounted in any chuck or even a faceplate. Mounting the blank is done with screws into areas that will turned away later.

An added benefit that I didn't discover until the first turning attempt is that I got an ornament whose apparent diameter was larger than the side of the turning square I used because at its largest it is slightly less than the corner to corner diagonal measurement of the turning square. Drawing01, showing the ornament from the top as if it was cut in half at the largest diameter, illustrates this. The turning square is 1.75" on a side. The hollows have a largest diameter of 1.5", and are .65" deep. The apparent diameter, when viewed with two hollows equally visible, shown in dotted blue, is 2.3". Usually the ornament ends up with a slightly smaller diameter by the time no flats surround the rims of the hollows.



Drawing01: The OutHollow ornament globe as if it had been cut in half as viewed from the top.

Briefly, first the jig is constructed. The spindle blank is mounted in the jig and a hollow is turned in one side. The spindle blank is removed from the jig, rotated 90 degrees and remounted to turn another hollow. This is repeated until all four sides of the blank have hollows. The blank is then mounted between centers and the final shape of the ornament is turned. Finally a hanger is made of red and green coated copper wire.

Jig

I used common pine for the jig because it's cheap. Begin to make the jig by preparing a tenon disc that will mount in your chuck. If you are going to mount the jig on a faceplate you will omit this step. Rough out a 3-1/2" disc of ¾" pine on your bandsaw and pin it at its center to the fully closed jaws of your chuck with the tailstock center as in Fig01. True the rim of the disc with a bowl gouge. Then turn a tenon to a diameter that your chuck will hold well. I used 2-1/2". Make the tenon deep enough that the jaws will hold well, but not so deep that it will bottom out on the chuck jaws. Ensure that the shoulder of the tenon is flat so that the faces of the chuck jaws will bear evenly on it.

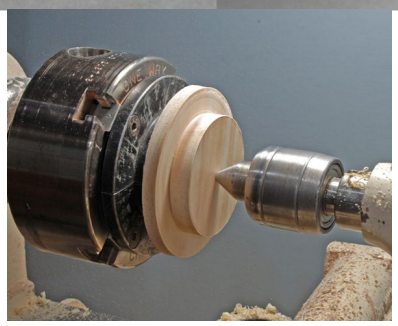


Fig01: The tenon disc after turning. The disc is held onto the chuck by the tailstock.

To make the backplate disc use a compass to draw an 8" circle and a 3-1/2" circle with the same center on ¾" pine. Rough out the disc on your bandsaw, leaving a margin outside the 8" circle. The result is seen in Fig02. Drill and countersink 3 mounting holes in the tenon disc. Using the 3-1/2" circle on the back plate disc as a guide, attach the tenon disc to the back plate disc with 3 1-1/4" #8 or #10 wood screws and glue. The result is shown in Fig03.

Fig02: The backplate after roughing out on the bandsaw. The diameter of the tenon disc is marked in the center.

Fig03: After attaching the tenon disc to the backplate with glue and screws.

Mount the jig in your chuck and turn at least the front half of the rim true and to an 8" diameter. Assuming you mounted the tenon disc properly you'll be able to just cut to the 8" circle drawn earlier. Also mark the actual center with a pencil while the jig is spinning on the lathe. The result is shown in Fig04. Remove the jig from the chuck.

Fig04: After mounting the backplate via the tenon disc in the chuck and turning the front half of the backplate rim to 8" diameter.

To layout the position of the filler pieces, first draw a diametrical line from edge to edge of the disc through the marked center point. Now draw a line parallel to the diametrical line and 7/8" from it. Draw another parallel line 7/8" away on the other side of the diametrical line. These lines indicate the edges of the arc filler pieces. Measure in 2" from the edge at one end of the diametrical line and draw a line perpendicular to the parallel lines. This marks the placement of the filler stop block. The result is shown in Fig05.

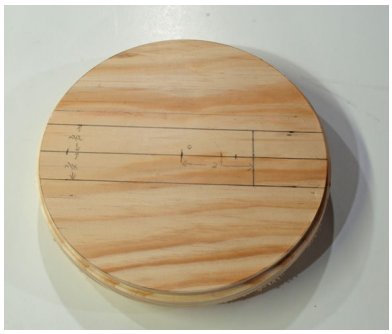


Fig05: After laying out the positions of the filler pieces on the backplate.

For the filler pieces you need wood that is 1-3/4" thick. I laminated ¾" and 1-1/4" pine together and planed it to 1-3/4". If you don't have a planer you could use thicker stock and turn it to the required thickness on the lathe after constructing the jig. The filler pieces could be laid out directly on the wood or done on paper which is then temporarily glued to the wood. The two arc filler pieces can be laid out just like the lines for their placement on the baseplate—a semi-circle with an 8" diameter minus the bottom 7/8". I used a CAD drawing which is available at www.DavidReedSmith.com/articles/OutHollow/Filler&BaseplateLayout.pdf.

Also on the filler stock lay out the stop block. It is 1-3/4" wide and 2" long. As a fine point you can make one of the 1-3/4" sides into an 8" diameter arc. The filler stock after laying out the pieces is shown in Fig06. Note that the straight edges are on the edges of the filler stock board. This saves cutting them as well as getting a more accurate edge than bandsawn. Cut the filler pieces out on your band saw.

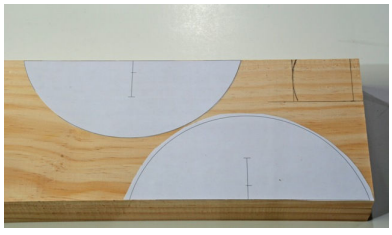


Fig06: After laying out the filler pieces on 1-3/4" stock.

After the filler pieces are cut out, prepare to mount them by drilling body holes for mounting screws in the base plate, as in Fig07. Drill three holes for each arced filler piece, and two holes for the filler stop block. While you're at it, drill two body holes for mounting the turning blank. These hole should be on the mid-line, with one hole 1/2" in from the stop block and the other hole ¾" from the opposite edge. Turn the base plate over and countersink the holes so the screw heads will be recessed.

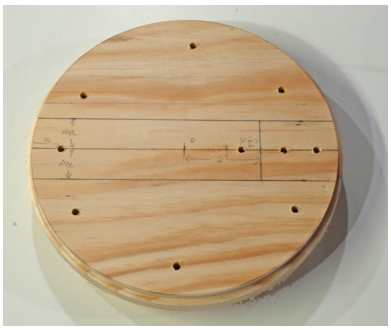


Fig07: Holes for mounting screws for the filler pieces have been drilled in the backplate.

To attach the filler pieces, first clamp a filler piece in place as in Fig08, being careful to get the straight edge right on the layout line on the baseplate. Then attach the filler piece with screws. I used 1-1/2" screws. If you don't use glue you'll be able to readjust them if necessary. Repeat for the two other filler pieces. The completed jig is shown in Fig09.

Fig08: Attaching the filler pieces. Clamps hold the filler piece in position while screws are driven in.

Fig09: The completed jig. The ornament blank is held in between the filler pieces by wood screws in wood that will be turned away later.

Fig10 shows a similar jig using wooden jaws on a 4-jaw chuck. It is faster to use—remounting the blank with the wooden jig takes about 10 seconds as opposed to somewhat over a minute for the jig described in this article. Instructions to build the wooden jaw jig are on my website which you can use instead if you have a large 4-jaw chuck, such as the One-Way Stronghold, and feel confident about wooden jaws. The plans.

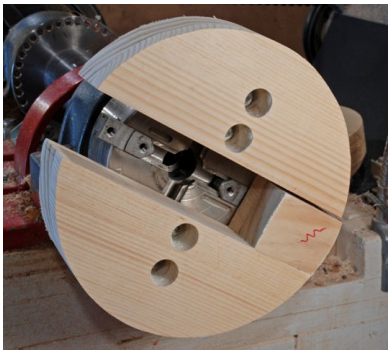


Fig10: An alternate jig using wooden jaws you could use instead if you are comfortable with wooden jaws and have a large 4-jaw chuck.

Turning

Hollows

The blank will be mounted in the jig using two 1-1/4" screws. You want enough thread engaged to hold the blank securely, but not so long that the screw hole won't be turned away. Be sure the blank is butted up to the stop block before driving in the screws. To avoid confusion, mark which screw holes have blank mounting screws so you don't inadvertently loosen a filler piece when remounting the blank later. The jig with blank mounted is shown in Fig11.

Fig11: The jig with an ornament blank mounted. As the blank is completely encased by the filler pieces there is no propeller effect.

Mount the jig on your lathe. Start the lathe at a slow speed and increase the speed gradually to a speed both you and your lathe feel comfortable with. As the stop block may very well have a different density than the blank, this may introduce vibration if you try for high speeds on a lightweight lathe. Use a pencil to mark the center of rotation. Then use the pencil to mark a 1-1/2" diameter circle as in Fig12. I made a marking aid from a small offcut scrap, with a center mark and a small v-groove made with a triangular file ¾" from the center mark.

Fig12: After marking the rotation axis and maximum diameter of the hollow. The simple gauge to mark the diameter is leaning on my tool rest banjo.

Use the point of a skew held sideways or a diamond shaped scraper to make an indentation in the center so a drill will start true. Then drill a depth hole 0.65" deep using a small drill as in Fig13. I used a pin chuck choked up on the drill as a depth stop and hand held the pin chuck. Turning to a maximum diameter and depth is much quicker than making a template and constantly stopping the lathe to check with it.

Fig13: After drilling a depth indicator hole. The pin chuck laying on the lathe bed has a drill protruding the right amount.

Use a small bowl gouge to start forming the hollow, trying to turn a conical recess with a slightly rounded center. Having the diameter marked with pencil and the depth marked with a depth drill should enable you to turn reasonably similar hollows without resorting to the hassle of constantly stopping the lathe and checking with a template. Fig14 shows the hollow at full diameter but slightly short of depth. As the hollow is essentially a very small bowl, it will require similar sanding so you may wish to refine the surface with several passes with a shear scraper. Fig15 shows the turned hollow.

Fig14: The hollow still a little short of full depth.

Fig15: After turning the hollow. Compare the surface left by a shear scraper in this photo with the surface in the previous photo.

Sand the hollow with progressively finer grits. It will go more quickly if you determine the starting grit by the quality of your cut results than by your ego. The sanded hollow is shown if Fig16. If you wish to finish the ornament on the lathe with a friction polish you'll need to apply finish to the hollow at this point.

Fig16: After sanding the hollow. If you wish to apply finish on the lathe you should finish the hollow at this point.

Remove the jig from the lathe and remove the blank by removing the two mounting screws as in Fig17. Rotate the blank 90 degrees, being sure **not** to flip it end for end, butt the blank firmly against the stop block, and reattach the mounting screws. Remount the jig on the lathe and then turn the second hollow. Repeat the remounting/hollowing process until all four hollows have been turned as in Fig18.

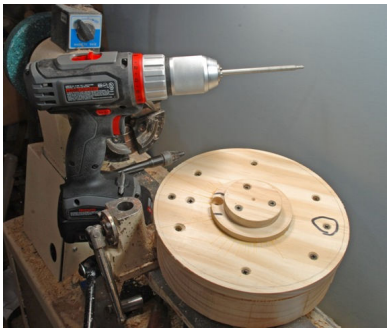


Fig17: Rotating the ornament blank in the jig. I'm using square drive screws which power drive well. The mounting holes are circled with marker to avoid removing the wrong screws.

Fig18: The jig and ornament blank after turning all four hollows.

Spindle

Prepare the blank for the final turning between centers by carefully finding the center of each end with diagonal lines and punching with a center punch as in Fig19. If you mount the blank off center, the hollows will look different even if they were originally turned identically. Mount the blank between centers as in Fig20, with the top of the ornament blank towards the tailstock.

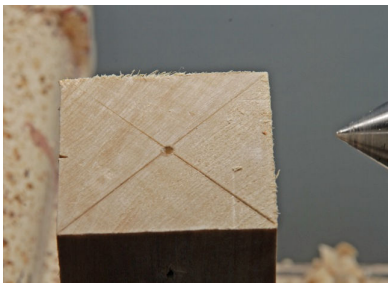


Fig19: After carefully marking and center punching the centers of the ornament blank. Centering must be accurate for the hollows to look the same size.

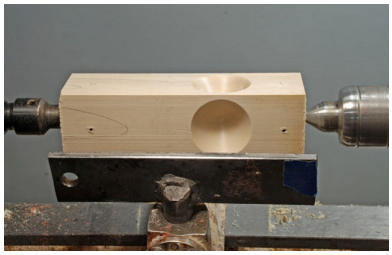


Fig20: The ornament blank mounted between centers.

Turn on the lathe at a comfortable speed and reduce the diameter of the ends, well away from the hollows, with a spindle roughing gouge. You'll be able to see the area of the hollows even while the lathe is turning by the ghost image as in Fig21. The blank with reduced end diameters are shown in Fig22.

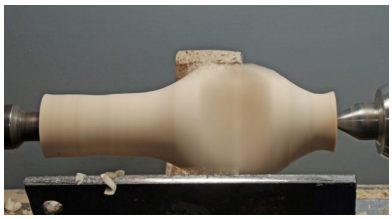


Fig21: The ghost image of the hollows.

Fig22: After roughing down the diameter of the ends.

Now start forming a globe at the tailstock end using the hollow ghost as a guide, with a spindle gouge. When you think you are getting close, stop the lathe for a look. You have to get rid of any flat spots around the hollows, as shown by the arrow in Fig23. Be sure to check all four hollows. Reduce the diameter at the top finial as you progress. Be careful at the greatest diameter of the globe. Because you are cutting mostly air it is easy to remove more wood than you intend. If you are comfortable with a skew you may find it easier to get a smooth cut at the full diameter with a large skew.

Fig23: After almost rounding over the top half of the globe. Check all four hollows for flat spots such as indicated by the arrow.

Now round the globe at the headstock end with the spindle gouge, reducing the bottom finial diameter at the globe somewhat as you go, again checking for flats on all four hollows. The result is shown in Fig24. There is a lot of end grain visible on the top and bottom of the globe. I found it helpful towards getting a uniform appearance to make several light passes with a shear scraper such as a pyramid point tool or ¼" shear spear (see my web site or the Fall 2009 edition of Woodturning Design)

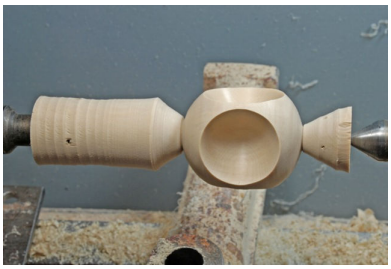


Fig24: The rounding of the globe is complete.

Reduce the top finial to somewhat more than the final diameter with a spindle roughing gouge and then use a 1/8" drill to drill a mounting hole in the finial as in Fig25. Drilling the finial when slightly over the final diameter lets you turn away any drill breakout. If you wish to use a traditional eyelet style hanger omit drilling this hole and drill an axial hole for an eyelet after removing from the lathe. Turn the top finial to its final shape with spindle gouge and/or skew except for leaving a nub for the tailstock as in Fig26.

Fig25: After drilling a mounting hole.

Fig26: The top finial is complete except for a nub for the tailstock.

Reduce the bottom finial diameter with a spindle roughing gouge and finalize the transition between the globe and bottom finial with a spindle gouge and/or skew as in Fig27. Use the spindle roughing gouge to taper the bottom finial so that the end is about the diameter of the terminal ball, about 5/16". Then turn the terminal ball with skew or spindle gouge as in Fig28. Finally reduce the taper of the bottom taper to its final diameter. Fig29 shows the ornament after turning. The nibs will be removed off-lathe—although there is a way if you make the jaw jig and feel compulsive.

Fig27: After reducing the bottom finial to its largest diameter.

Fig28: After turning the ball at the end of the bottom finial.

Fig29: The turning is complete. Nubs will be removed off lathe

Sand the ornament with progressively finer grit abrasives. I found it helpful to wrap the sandpaper around a small firm sponge block when sanding the greatest diameter of the globe, where one is sanding more air than wood, as in Fig30. The sanded ornament is shown in Fig31. Remove the ornament from between centers and cut off the nubs with a bandsaw or scroll saw. Then sand the ends of the finials by hand or with a cushioned drum sander. I used a temporary wire hanger to hold the ornament and applied several coats of spray lacquer.

Fig30: Sanding the globe with abrasive wrapped around a foam block.

Fig31: The sanded ornament.

Hanger

If you wish to make a decorative wire hanger you'll need 18 or 20 gauge colored copper wire, round nose pliers, non-serrated needle nose pliers, and diagonal cutters as in Fig32. Cut 7" of green wire and 2-1/2" of red wire. Use the tip of round nose pliers to form a small loop at both ends of the red wire. Then bend the wire into a hook shape using a conveniently sized cylinder, such as a Sharpie marker, as a mandrel. The result is shown in Fig33.

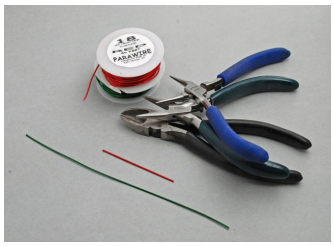


Fig32: Wire and tools for making a hanger: Red and green 18 gauge copper wire, round nose pliers, non-serrated needle nose pliers, and diagonal cutters.

Fig33: The red hook after forming loops at each end with the round nose pliers and bending around a Sharpie mandrel.

Beginning about 1-1/4" from one end, wrap the green wire into a coil around a 5/32" drill as in Fig34. Use the non-serrated needle nose pliers to bend the long end of the wire at a right angle to the coil, then angle in downwards. Slide the coil to the end of the drill and use the non-serrated needle nose pliers to bend the short end of the wire across the drill end, as in Fig35. Trim the short end if necessary and form the short end into a loop centered on the coil with the round nose pliers. Form the long end into a curve around the Sharpie mandrel. Open the bottom loop of the hook sideways, slip it over the loop in the coil and then close the loop sideways. The result is shown in Fig36.

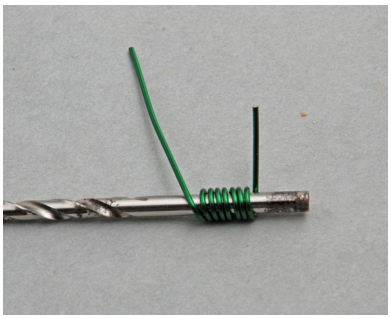


Fig34: After winding a green coil around a drill bit mandrel.

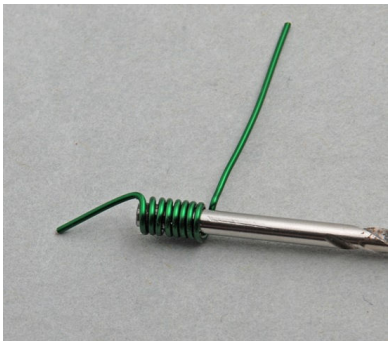


Fig35: The green coil after bending the ends. The longer end is bent at a right angle to the mandrel and then down. The short end is bent across the end of the mandrel.

Fig36: After assembling the hanger.

Slip the long curved end of the coil through the finial mounting hole in the ornament then form a loop with round nose pliers to keep it from falling out as in Fig37. The ornament, shown in Fig38, is now finished.

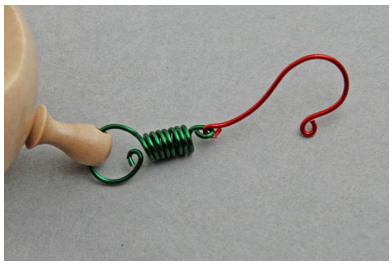


Fig37: After inserting the hanger in the mounting hole and forming a loop so it can't come out.

Fig38: The competed ornament.

Variations

You could develop a family of related ornaments by changing the hollow treatment. Fig39 shows an OutHollow Ornament with 1/16" mini-coves. Fig40 shows an ornament with alternate red and green hollows. (Caution: Sharpie runs if you over-apply lacquer). You could also use concentric rings of color or spirals. Fig41 shows an ornament with spikes. These spikes were turned when making the hollows, but you could also spindle turn spikes or mini-finials out of contrasting wood.

Fig39: An OutHollow ornament with concentric mini-coves in the hollows.

Fig40: An OutHollow ornament with red and green hollows. You could also try colored rings or spirals.

Fig41: An OutHollow ornament with spikes. You could also turn contrasting mini-finials.

Have fun and explore these and other variations. Then send me pictures.

Tools

Bowl gouge

Small shear scraper (1/4" mini-cove tool) optional

Spindle roughing gouge

Spindle gouge

¼" shear spear or pyramid point tool optional

Skew

Foam block

Progressively finer abrasives

Round nose pliers

Non-serrated needle nose pliers

Diagonal cutters

Materials

Ornament

1-3/4" x 1-3/4" x 6" turning square for ornament

Red and Green 18 or 20 gauge colored copper wire

Jig

¾" thick 3-1/2" diameter pine disc

¾" thick 8" diameter pine disc

1-3/4" thick pine for filler pieces

8 each 1-1/2" wood screws for mounting filler pieces

3 each 1-1/4" #8 or #10 wood screws for mounting spindle blanks

Author

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