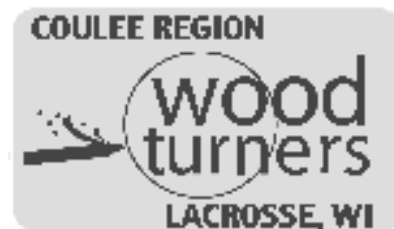


Making Fancy Ornaments

Using the Inside-Out Technique (Reverse Turning)

By Ken Grunke
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This is a fun way to put the inside-out turning technique to use. The idea has probably been around for decades at least, but I first learned of it from an English woodturning magazine about '96 or '97.

People look at any inside-out turning, and are mystified. "How do you hollow out the inside?" they ask. When I tell them they are laminated from four quarter-sections of wood, I still have a bit of explaining to do!

The basic process is as follows:

- 1). Four square sections of equal length wood are temporarily fastened together with what will be the insides facing out.
- 2). The assembly is chucked in the lathe, and the inside profile is turned.
- 3). The sections are removed from the lathe, separated, and permanently glued back together with the turned profiles facing inwards.
- 4). The glued assembly is rechucked, and the outside is turned to a pleasing shape to go with the inside profile.

Preparing the stock

You can cut the segments from board stock, or from solid chunks of air-dried or semi-green wood, such as from various species in your firewood pile.

Using lumber

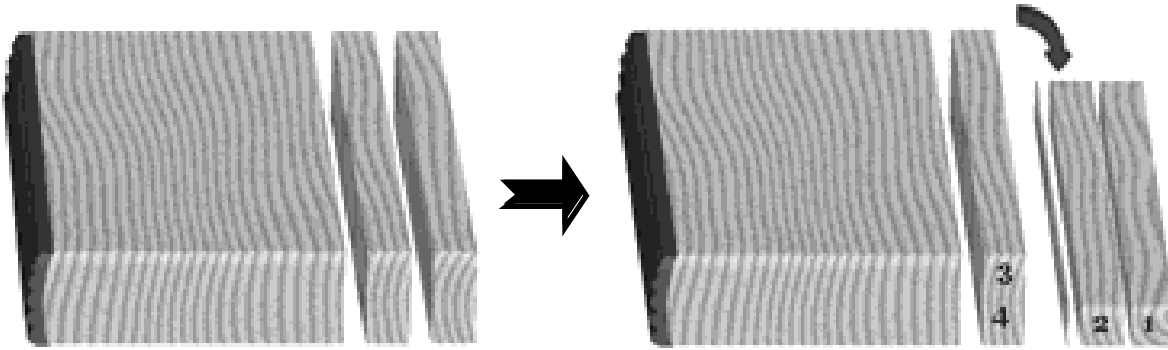
Using board stock (lumber) makes the process easy--3/4 inch stock will give a nice size of about 1 1/2 in. for the finished ornament. Start with flat, un-cupped boards and rip them on the tablesaw--setting the fence just a hair less than the thickness of the lumber, so you can cut the second face to make the piece square. It is important for the sections to be as square as you can make them on all sides-- the four pieces must fit together accurately, so make sure your blade is set at 90 degrees. A fine-tooth ripping blade is best, or I use a fine-tooth cutoff blade from my miter saw which gives a very smooth glue joint.

Using raw wood chunks (found wood)

Starting with raw wood chunks is a little more involved, but worth the effort. Your selection of wood species is probably much more varied than what can be purchased at the lumber yard, and you can find some very interesting grain patterns in found wood. And by cutting the pieces from a solid chunk, you can do the final glue-up to give continuous grain, looking as if the ornament were made from a solid piece--especially with accurate glue joints.

I first cut rough oversize flitches on the bandsaw, at least a half-inch over the planned final dimension of the four assembled segments to allow for jointing and squaring up, and the tablesaw kerf. Make them as wide as the chunkwood allows, without including the pith or the bark. Some sapwoods are to be avoided, but others, like walnut or cherry, give pleasing effects.

Next I joint the wide face first, and then one edge square with the wide face. Now you can take it to the tablesaw--set the fence to the size of a quarter-square and cut half-pieces, then rip those in half for quarter pieces. I number the ends to keep track of grain alignment, and rubber-band them together when doing quantity batches.



If you have a bandsaw but not a jointer, you just need to make more accurate cuts on the bandsaw, and allow for a little more waste in the tablesaw ripping operation. Next, cut the quarter-pieces to length and get them ready for the next step.

Turning the inside profiles

Mounting on the lathe

The usual way to hold the quarter-pieces together for this is to glue them together temporarily with brown paper between the joints, so they can be easily separated for the second, and final, turning. I didn't want to wait for the glue to dry, so I superglued just one end, for about a quarter-inch to a half-inch, and held the other end in a 4-jaw scroll chuck. Superglue holds just fine for this, and usually comes apart easily by prying with a knife. Don't use too much pressure on the glued end with the tailstock point, or you'll wedge it apart.

I've also used a short ring of PVC pipe--1 1/2 or 2 inch drain pipe--forced onto the four sections to hold the tailstock end together. The proper size of a single quarter-piece is a hair over 9/16th inch for 1 1/2 inch pipe, to give a snug fit for all 4 pieces. The simple formula is: I.D. of pipe x .707, divided by 2 to get the size of a single quarter-piece for that kind of fit. Add about 1/16th of an inch to the I.D. of the pipe to allow for nipping of the corners just at the ends--which is a good idea to be able to slip the ring on easily, then snug it up tight for another 1/4 inch more. Now you don't have to worry about the assembly flying apart on the lathe. I must admit that I like the superglue method much more, as you aren't limited by the size necessary to fit into a certain I.D. of pipe.

One more thing I like to do before gluing and slapping the assembly on the lathe is chamfer two opposite corners the whole length of each piece by rubbing on a sheet of sandpaper on a

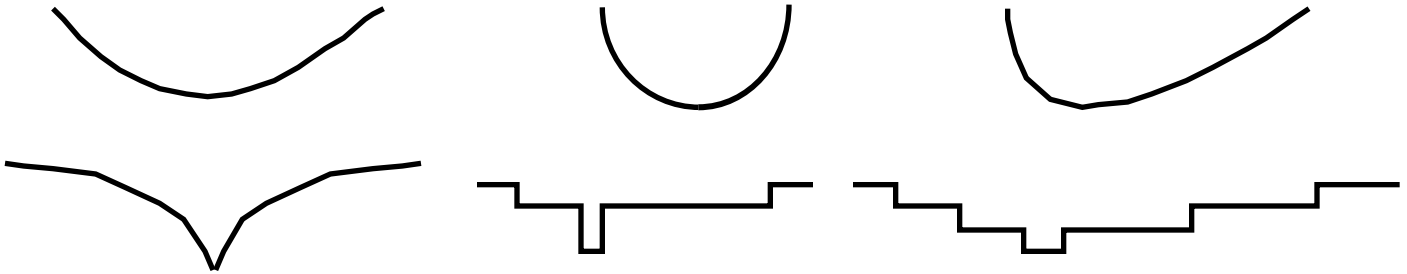
flat surface. That's the two corners that will be at center during each of the turning operations. This in effect gives a small pilot hole through the length of the finished ornament, for facilitating drilling a hole for an eyehook, or whatever is used for hanging. This also gives a place to stick the tailstock center into for both turning steps.

If you are not fortunate enough to own a scroll chuck yet, then you can superglue the headstock end the same way, and use a drive center. Alan Lacer recommends a tailstock cup center for driving, it's much safer than a spur center--which can blow the piece apart if you have a catch. Allow enough waste at that end to cut off so the segments can be separated easily.

For a turning diameter of 1 to 2 inches, I would use a lathe speed of 1000 rpm minimum, somewhere towards 2000 rpm would be better.

Profiles: Technique, tools, and depth

So now we're ready to do some turning! Turning the inside profile should go quickly, you are simply scooping out a nice shape for the interior of the ornament, that's it. I use for the most part a shallow spindle gouge, or a small roughing gouge. A fluted round gouge is good too, but may not give as good of a finish. Here are some ideas for profiles:



You may ask: How deep should the profile be turned? Good question. If you go too deep, the segments will be too thin in the final turning. Too shallow, and the openings between segments will be too narrow. A good rule of thumb to start out with is a depth of about one-half of a single segment when viewed from the side.



After you become familiar with the process, you can become bolder and turn the profile a little deeper for a thinner segment wall in the final turning.

Once that is done, remove the turning from the lathe and pry the segments apart with a knife. This is easy if you didn't use much glue at the tailstock end.

Here's what a single segment should look like, with a simple curve profile:



Finish sand the profile surfaces with fine grit, and put on a coat or two of your favorite varnish. I use quick-drying lacquer in a spray can, then a muslin buffing wheel treated with polishing compound to give the surfaces a nice gloss.

Stage 2: Finish Turning **Gluing**

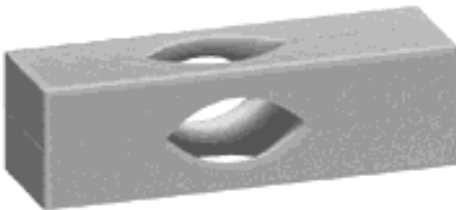
Now it's time to glue the pieces back together permanently--first I glue two quarters into a half-section:



Have some spring clamps available, and a flat surface to align the pieces on for gluing. Once again, I use superglue for this as well--for dense hardwoods, you need only coat one side of the joint--but soft porous woods should have glue applied to both surfaces, spread thinly and evenly. Be sure to get the glue right to the edge of the inside profile, especially if the walls will be turned thin. And keep your fingers away from the glue! Disposable plastic gloves would be wise.

At this point, you'll find out how square you cut the segments by laying a straight-edge across the face of each glued half section and holding it up to a light. You can correct small degrees of out-of-squareness by flattening the faces of each half on a sheet of sandpaper.

After gluing all four segments together, it should look something like this:



Turning

If you chamfered the inside corners of each block before gluing, there will be a little hole at each end for the tailstock center, and the headstock drive center if you'll be using one. If you are using a scroll chuck, the tailstock is still a very good idea for security. After preliminary turning using a spindle gouge or a shallow 1" roughing gouge, the work should look something like this:



I usually get the tailstock end almost completely finished before starting on the headstock end. For those of you who balk at using a skew chisel, I highly recommend biting the bullet and giving it a try--it's ideal for this kind of work, or just about any spindle work. Of course, you need to put in a lot of practice time on scrap wood before starting on something like this. Using a sharp skew, especially a "scary-sharp" one as Alan Lacer calls it, gives a much better finish with minimal tearout and less sanding needed than with any other tool. On the majority of cuts with the skew, I use the short point, pushing a ring of shavings along as it cuts around a curve. I use the long point for shoulder cuts (going straight in or at a slight angle), for nipping the corners when roughing a ball shape, for detail cuts where a ball shape meets a neck, and v-cuts.

There are three movements to the skew chisel when turning any kind of curve shape, whether convex or concave:

- 1.) spinning, or twirling the chisel along it's axis to keep the edge above the short point from digging in and causing a catch.
- 2.) swinging the handle to keep the bevel behind the cutting edge aligned with the cut.
- 3.) raising the handle, thereby lowering the tip, when cutting downhill from the top of a curve towards center.

When I first decided to tackle the skew technique, I spent many hours turning pieces of branchwood into shavings, trying to figure out on my own how to avoid a catch. It was very frustrating until I learned to use the very end of the short point, pushing a ring of shavings around a dome shape at the end of a piece, and ending up with a little finely woven conical basket of shavings. Soon I had little cone-shaped florets all around my lathe, and was in turner's heaven.

Enough skew talk, for those who prefer other tools--a shallow spindle gouge, about 1 inch wide, is probably the next best thing, and less likely to catch. Use a parting tool, a fluteless gouge, or a pyramid point to finish off the details--whatever you use, make sure it's very sharp--this technique is prone to tear-out on the trailing edges of the segments, and it's good to keep sanding to a minimum.

As the piece is spinning, you can easily see most of the inside profile and judge how much and where to turn the outside to match. Still, I stop the lathe often to get a better look at the progress.

With the tailstock end completely finish turned save for a little nubbin for tailstock support, begin turning towards the headstock. If you are using a scroll chuck or other means of solid headstock support, you could finish off the tail end, and slide the tailstock out of the way. This might be a good time to drill a hole for a hanging hook, if the top end is facing the tailstock. Otherwise, it can be done later.



You should get most of the body finish turned before turning down the end towards the headstock, while there is still enough wood to avoid whip and chatter. I don't recommend spin-sanding here, the piece tends to grab and tear the

