Woodturning Project Tutorials by Larry Hancock

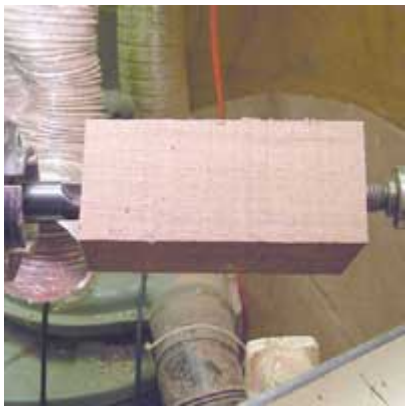
Gavel Turning

Before you can start to turn a gavel the design, size, and wood need selected. The design I used here is a traditional one that looks good and works well as a functional or presentation gavel. When I was first asked to make gavel samples for the Oklahoma State House of Representatives I did not have any idea exactly what size to make or what would be a good design. I ask the local library for help on with this information; the internet is a good resource now. Search for gavel or antique gavels. You can find samples of different shapes and sizes to get you started.

There are some standard sizes for gavels but do not be afraid to bend the rules and make a custom gavel to fit someone's personal taste. A judicial gavel usually has an overall length of 10" to 11" and the head is 4" in length by 2 ½" in diameter. I make two sizes of gavels for the State. The Speaker of the House of Representatives uses the largest gavel. The head is 2 7/8" in diameter and 5 1/2" long and the overall length is 15".

The wood I mostly use is walnut; most any hardwood used in furniture making will work. Ebony and rosewood gavels are popular for presentation sets. Dry walnut is easy to find in 12/4 stock but the exotics dimensioned to 3" or thicker and dry are hard to come by. I try to find a wood dealer that has exotics that have been air-drying for a several years.

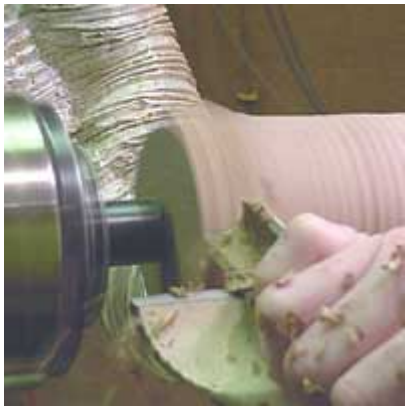
With the above considerations taken care of, we can now get down to the actual turning of a gavel.



Since this is a large square, 3", I will start the turning between centers and turn a tenon to fit in the chuck. The spur center for the Stronghold chuck is convenient for this operation and saves time in not having to remove the chuck to install a drive center.

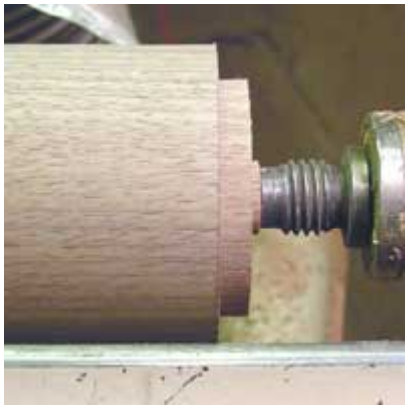
To quickly center, the blank I roughly eye the center and stick the spur point into the wood enough to hold it. Bring the tailstock in to hold the other end and rotate the blank to check centering. If not I move the point to another point and check again until centered. I cut all my blanks slightly oversize so I do not have to center perfect to keep the finished diameter I want. Once centered tighten the tailstock to engage the spurs on the center.

Start roughing the blank from either end, not in the middle, and cut back across the blank until round.



When you reach the opposite end, reverse the gouge and turn toward the end of the blank.

I am using a peeling cut with the skew on its side to form a tenon for the chuck.



The straight tenon formed with a flat or slightly undercut shoulder to fit the jaws of the Stronghold chuck.

The tenon seated firmly against the chuck jaws so the largest diameter area gives good lateral support while turning an unsupported spindle.

Sizing the blank to slightly over the desired diameter. When I say slightly over, I mean about 1/64”. Sanding will reduce the diameter by a small amount later.

Turn the whole blank down to the sized areas. Cut the surface cleanly because the tops of the beads and ends are at this level. The cylinder needs to be a consistent diameter all the way across. I do not want one end of the gavel larger than the other one.

The storyboard for the head. The length and all the major transition points are marked, the high spots and the diameters also.

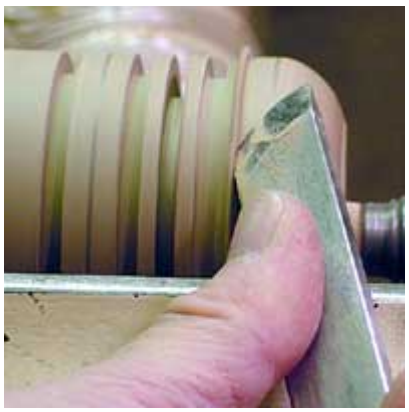
With the lathe on transfer the layout points to the blank. Each point on the storyboard that needs to be marked precisely has a small V notch for the pencil to rest in.

Use the parting tool and calipers to size down to the required diameters. The calipers float of the wood; if pressure is applied, the calipers may spread.

Check to make sure everything is sized right and where it should be. Keep the storyboard or another head handy as a visual reference. It is easier than you might think at this stage to turn away what should have been a bead.

I start turning at the tailstock end and work my way toward the headstock.

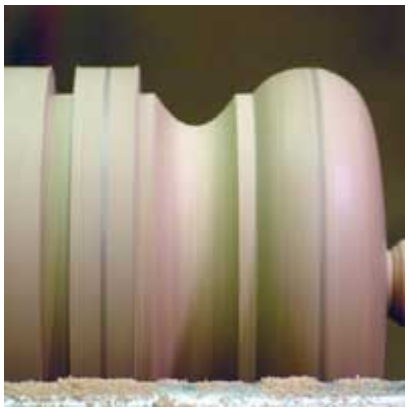
The spindle gouge works as well as a skew for cutting the endgrain surface. Actually, the spindle gouge would be the best selection for turning the head because it can make bead and cove cuts equally well. In a production run of turning the fewer times you have to switch tools the faster you can complete the turning. Use the tool you are most comfortable with but do not neglect to learn how to use all the basic turning tools. The more skills you have the more creative options are open to you in turning.



You can see a pencil line that is the high point on the end and another to the left, the center of the bead. Do not turn the pencil lines away and you will not be reducing the diameter.

Starting to cut the cove with the gouge on its side and bevel pointed where the cut will end at the bottom center. Cutting a cove requires moving the gouge handle in a long arc and rotating the handle at the same time.

Cut the other side of the cove the same way. Work the cove from each side until you have one continuous curve.



The finished cove with flat fillets on each side. Make the fillets flat or slightly higher at the cove edges to avoid sanding them so they angle down in to the cove.

Shape the beads and leave the pencil marks intact. Many turners keep trying to cut the perfect bead by going back to the center and starting the cut again. Each time this happens the diameter of the bead shrinks. Avoid this by starting a good round shape with the first cut and repeating it in steps until the side is finished.

Remove the excess wood from between the beads. I use the skew on its side to flatten this area working from side to side. This is just a light cut that removes any ridges. It leaves a surface that sands well and does not tear the grain.

The finish turned center of the head. Surface finish straight from the tool and pencil lines intact.

With all the elements turned, I can now slide the tailstock back and finish the outboard face. I use the skew long point for this. Endgrain surfaces are hard to sand torn grain areas out of so make sure there are none. A sharp tool is essential for this.

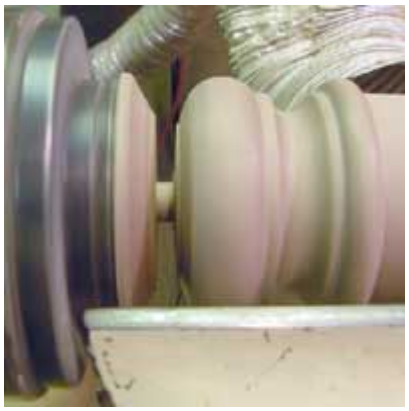
The center of the wood moves at fewer feet per revolution speed so the cut has to slow as it nears the center also.

Check to make sure the face has a convex profile.

Sand the finish turned areas. I usually start with 180 grit and work up to 400 or 600 grit depending on the wood. I often apply a finish now to protect the wood from handling in further operations.

The face of the gavel is clean cut. Do not leave spur or tailstock center marks in the gavel faces. The gavel samples shown to me at the State Capitol had them still in the faces and a screw through the top of the head to hold the handle in place.

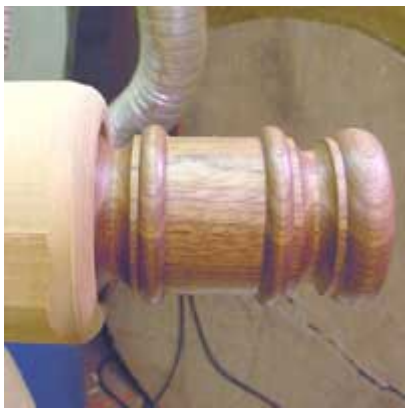
I usually turn at least a dozen gavels at one time. To save time I turn three heads at once. Without a steady rest for support, this is a number that works well for me.



I turn a 7/16” diameter tenon that will fit inside the taper of the cup on the Oneway live center. This will center the head for me when reversed. This little tenon works well for all other reversing operations like bowls and hollow forms. Clay Foster showed this to our turning group during a demonstration and it has been a handy piece of information on many reversed pieces.

To hold the finished end of the head I use my Oneway collet chuck jaws without the aluminum inserts. I have ground the sharp edges off the inside of each jaw so they do not mar the surface. Here I am putting a piece of foam in the back of the chuck to protect the finished face.

I use a piece of foam from a computer mouse pad to cushion the finished end.



Another way to hold the finished face. Turn a recess in a waste block mounted on a faceplate. If you are turning several heads, measure them all and start with the smallest one then enlarge the jam chuck to fit each larger end.

The 7/16” tenon and the tapered inside of the live center. I do not use a center point in my live center except to hold a pen mandrel end. All other turning I do with the cup as a contact area only.

Apply a finish of your choice. I use a three-part finish made of equal parts of denatured alcohol, boiled linseed oil and clear shellac. Lacquer and other surface build finishes look bad on the faces after a few years of use.

I saw a video by Dennis White of England turning a gavel and it showed how he drilled the head perfectly centered in a jam chuck like this one. It looks bad to have the handle angled to the head or offset to one side when you look at the gavel from the end. With this method, all you have to do is drill and the handle aligns perfectly with the head.

Make the jam chuck from softer wood than the gavel or the head will be marred in this process.

I drill perpendicular to the grow rings of the wood. Drilling through the rings instead of with them will help avoid splitting the head with a tight fitting handle.

Rotate each end of the head past a fixed point and adjust the head until both are the same. Tap with your hand or soft face mallet to adjust.

Measure the diameter where the head will be drilled and subtract about ½” so the drill does not go all the way through the head. If this was a carving mallet or other type shop mallet I would not mind the handle going all the way through but for a gavel I think it is not good practice.

The threaded hand has a short section of straight shaft about 3/8” long that I counter bore for at the start of the hole.

Now transfer the depth measurement to the drill bit. I use a piece of tape to mark the drill.

Turn the lathe on and drill to the depth mark. I usually drill at a speed around 300 rpm.

The opening for the handle is a convex shape with two high and two low areas. I chamfer the opening with a gouge to allow the round shape at the top of the handle to seat all the way down to the low spots.

You will find out if you have turned a gavel head exactly the same measurement on each half if you add an element like this small bead in the center. You will also find out if you lathe centers align when you start to drill.

The Beall wood threading kit. Three sizes of taps and inserts for the router fixture (1/2”, ¾” and 1”), a double ended cutting bit and a pilot bushing to align the fixture on the router.

The taps have a long pilot section on the end that I have cut off to be able to thread deeper in a blind hole. The largest tap still has the long pilot end.

Tapping the threads in the head.

The finished threaded hole with the counter bore and chamfer.

I use my Nova chuck with the number 1 jaws to grip the square for the handle. Center the tailstock end of the blank and tighten the jaws.

The Stronghold and the small Nova are the only two scroll chucks I have. It would be convenient to have a chuck for every different size jaw needed, unscrew one chuck and screw another on.

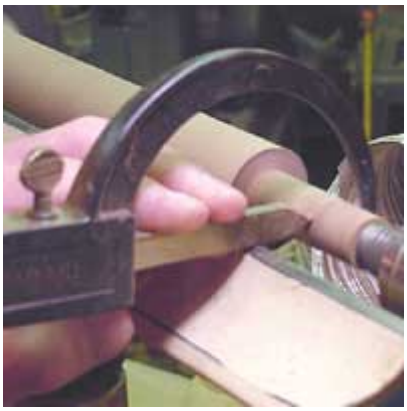
If any tool supplies are reading, I would be glad to test new tools and write a section on their use. Just contact me and I will give my shipping address.

Start roughing to round at the tailstock end and work back toward the headstock.

I have the end for threading on the tailstock side. I mark off the thread length plus about a ½" extra to turn down for the ¾" threads. With the lathe, running you can see the blur of the small pencil mark made and finish the mark around the spindle.

Set the calipers and make a few sizing cuts as reference to turn down to.

Remove the excess wood to slightly over the desired diameter. I set my calipers to about 1/32'" over the ¾" diameter.



I use a sizing tool to complete the sizing. The sizing tool works well for any operation that requires an exact sized tenon, especially when you are working on a project that has many spindles like a crib or stairway.

Chamfer the end of the spindle to make starting the thread cutting easier.

Reverse the handle blank and grip the thread tenon in the chuck. Turn the square section to round that was in the chuck jaws.

The storyboard for the handle has all the information and layout points for turning this handle as many times as need.

Mark off the handle for turning.

All the sizing cuts made. I am double-checking with the storyboard that everything looks right.

To the left I have made my sizing cuts to align with the point where the cuts need to start as a reference. One side is half a bead and the other half is half a cove.

Start shaping the handle from the tailstock and work back to the headstock end.

When working into a sharp V area from both sides make sure not to move the line back and forth as you cut form left and right each time.

Make the concave cut at the top of the handle. You now have the transition set.

Round the top shape to the thread straight section.

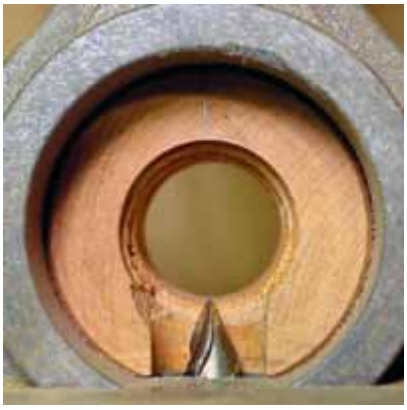
Roll the bead on the handle.

Using the skew to bring the handle up to the bead for a sharp transition. Do not take too deep a cut with the point or the grain could tear out. The cut in front of my point is a thin rolled continuous ring of wood. I want the point to come up to the bead side and stop, not undercut the bead.

The line of the handle should look like it continues straight through the bead and not higher on one side and lower on the other.

With everything turned the end of the handle can now be finished with the tailstock backed off. Lightly grip the rotating handle in your fingers and shape the end.

Sand the handle and apply a finish.



The fixture for threading the handle, ready to go with the bit height checked on a scrap dowel. I made the die from a piece of boxwood. If the bit is not set deep enough to make the full thread the handle will not turn and the height will need adjusted.

Once the thread has started in the die you need only turn the handle until it bottoms out against the boxwood die.

The fresh cut threads on the walnut. Walnut is not the hardest of woods but with a little clean up they will look fine. The thread area still needs cut to length and the end matched to fit he threads inside the head.

I grip the end of the handle in the chuck with foam for padding. I can now do all the shaping and cut to length. Turn away the threads to match the end of the tap.

Sand the threads with fine sand paper to remove the fuzzed up grain. With the lathe running, sand each side and the tops of the threads.

The finished handle threads.

I glue the handle in with Titebond yellow glue. Oily woods like cocobolo I epoxy.

I align the grain of the handle with the face grain on each side of the head; the way of axe and other tool handles for strength.

Enco and other woodworking tool companies supply thread boxes and taps. I had bought the Beall Wood Threader years before I turned a gavel just because I wanted to thread some wood.

The finished gavel.

Face view of the head and handle alignment.

Do not use glue on the thread area before routing the threads. The broken threads to the left are the result. I thought that hardening the top edges of the threads with thin glue before routing would make them less likely to chip and break. I was wrong. The glue soaked threads broke off and jammed inside the die.

If I wanted to make a blinded wedged tenon as the head attachment method I would now make the hole tapered from narrow at the opening to wide inside with the long point of the skew or a scraper ground for the purpose.

Drill a hole through the handle of the tenon as a stop hole for the saw cut.

I split the handle on the band saw with the stop hole vertical and the tenon riding on the table.

A view of the wedged tenon inside the flared hole in the head. Ignore the split handle; it happened because I was trying to drive the wedge in without a head around it for support. You can see the difference between the drilled ¾" hole and the flare cut with the skew long point. This method locks the handle into the head securely. The correct measurements need to be made so the wedge will flare the tenon all the way out or the handle will be loose. Marring the head and handle while seating the wedge may occur.