End Grain Box with an Inlaid Lid

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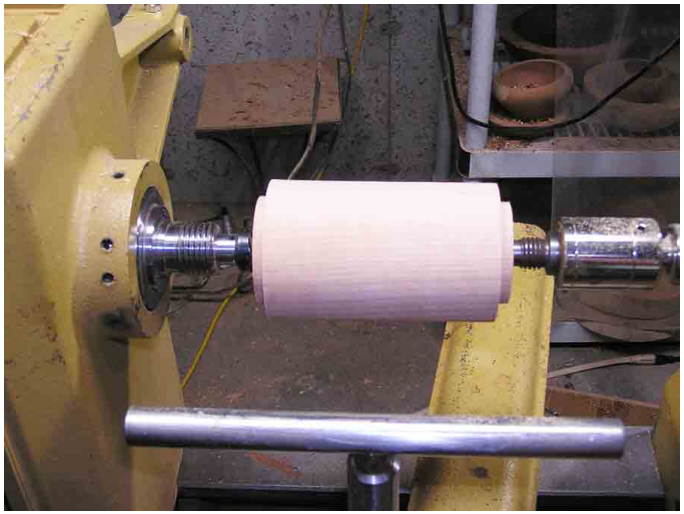
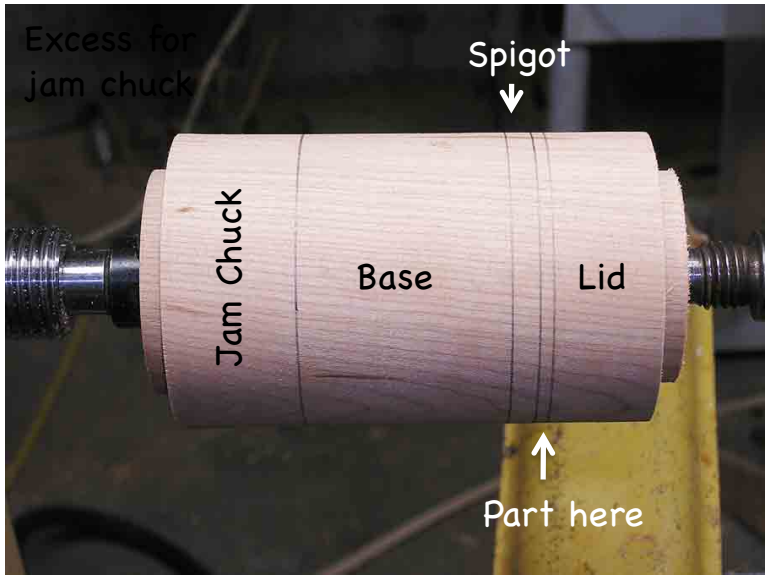
OVWG Symposium 2019

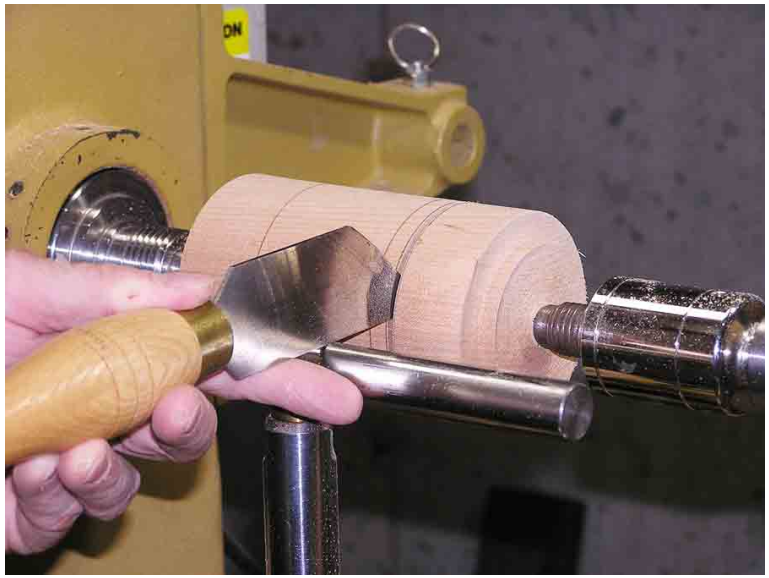
For this box we will use straight-grained dry hardwood, approximately 3" x 3" x 5-6". The excess wood will be used to make a jam chuck for finishing the bottom. Green wood can also be used, but like a bowl from green wood, the box must be rough-turned oversize and allowed to thoroughly dry before completion. Remember to protect your eyes and lungs.



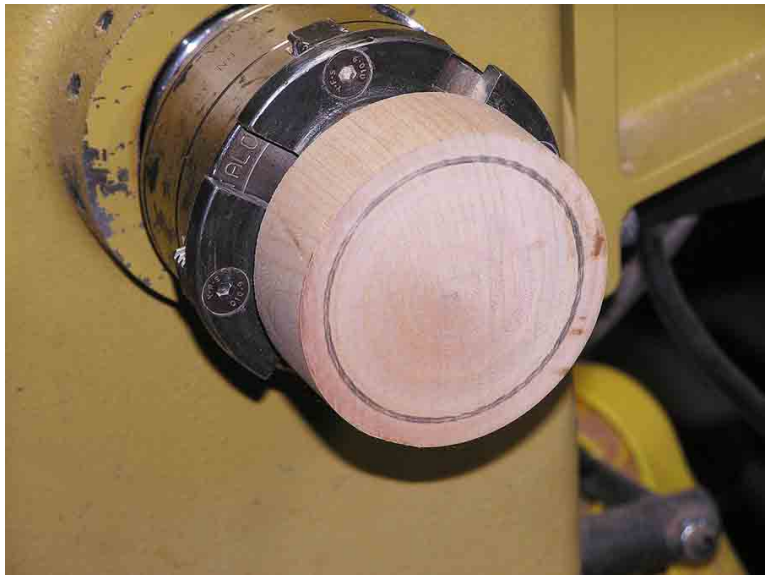
Mount the box blank between centers, then use a spindle roughing gouge to turn a smooth cylinder. Use a parting tool to make tenons at each end that are 2-2 ½" wide by ¼" deep. The tenons shown here are for straight jaws. Adjust accordingly if your chuck has dovetail jaws.



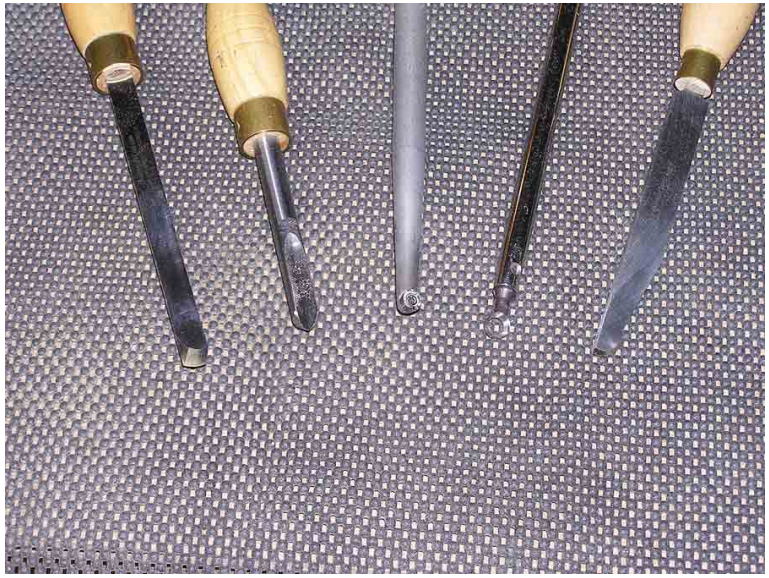
Determine which end of the blank will be the top, then decide on proportions and mark the layout lines. Remember to allow for the flange that the lid will fit over, as well as the wood that will be lost in parting off the lid from the blank. The proportion of the lid to the base can vary depending on the design. A lid that is 30-40% of the overall height of the box usually gives a pleasing result. Including wood for a jam chuck in the blank is not a requirement, but is a convenience in this case.



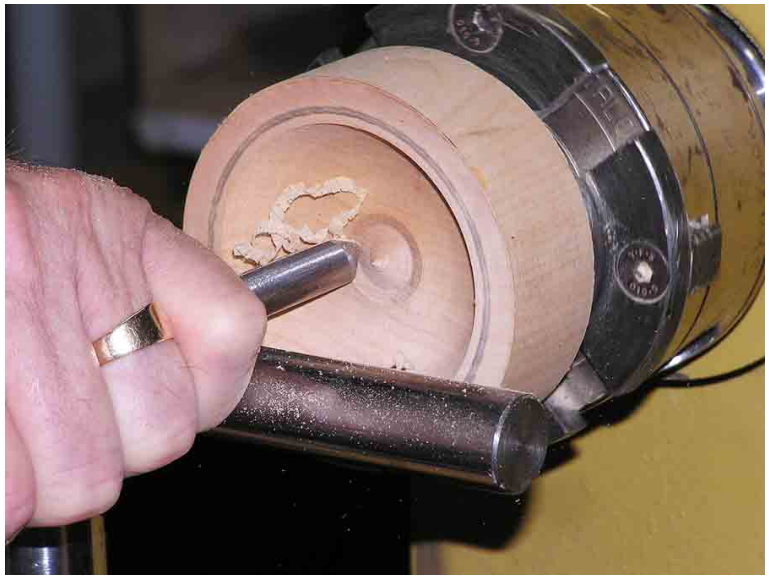
Part off the lid. A thin parting tool is best for this, as it minimizes potential grain mismatch. Part down to about one-half inch, turn off the lathe, then saw through the remaining wood.



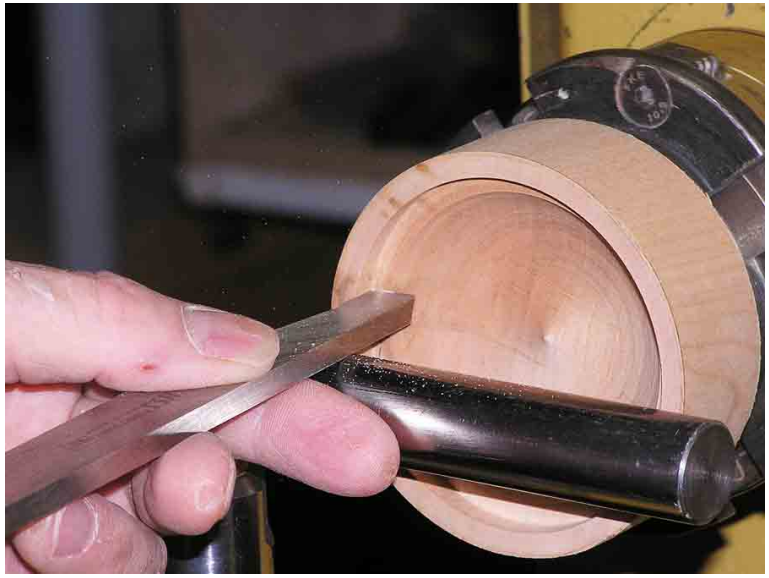
Mount the lid in a chuck and use a spindle gouge to face off the wood. Remove as little wood as possible. Mark the approximate thickness of the wall at the flange. Leave some extra wood for shaping the exterior and sanding.



Tools for hollowing and refining the inside of the box. L to R: heavy box scraper, spindle gouge, Hunter tool, termite tool, curved negative rake scraper. Aim to get the best surface you can to minimize sanding.



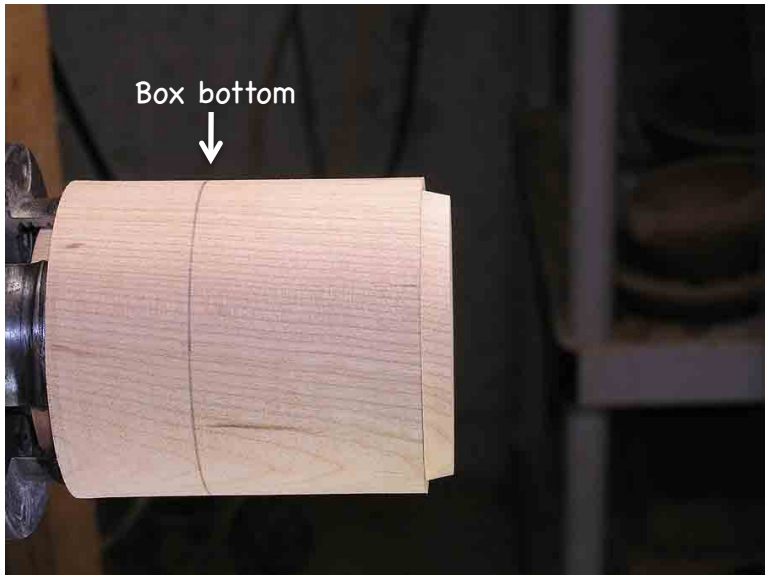
Working from the center outwards, begin hollowing the lid. Shown here is a sharp spindle gouge with the flute pointed between 9 and 10 o'clock. This works well, as does a Hunter carbide tool or a Termite Tool. Using a tool that cuts the wood fibers cleanly is a real help in reducing sanding. Negative rake scrapers are great for refining the surface with finishing cuts. When hollowing, leave a minimum ¼" of thickness (*not including the tenon*) in the top of the lid to accommodate the inlay. Leave the sidewalls about 5/16" thick.



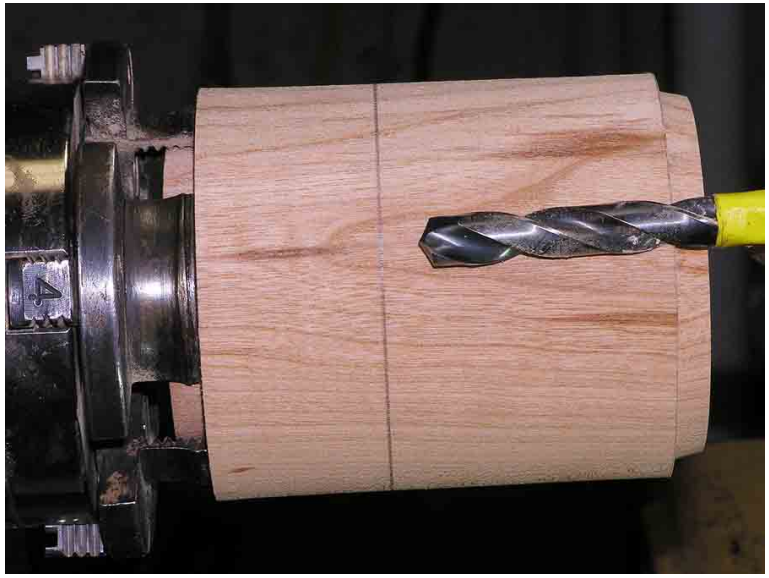
Using a sharpened square scraper set slightly above center, cut the lid flange. Do this in small steps, pushing the tool in as straight as possible (ie parallel to the bed ways). Don't take it to its final thickness yet— you'll need some extra wood when shaping the outside profile, and the initial fit on the bottom flange needs to be very snug.

Using inside calipers, check the flange for parallel walls. Insert the calipers to the shoulder and open them until the tips just barely touch the flange walls. You should feel no change in pressure as you withdraw them slowly. If tighter in one area, use the square scraper to adjust the fit. This is a very important step to get right, as it will affect how well the lid fits the bottom.

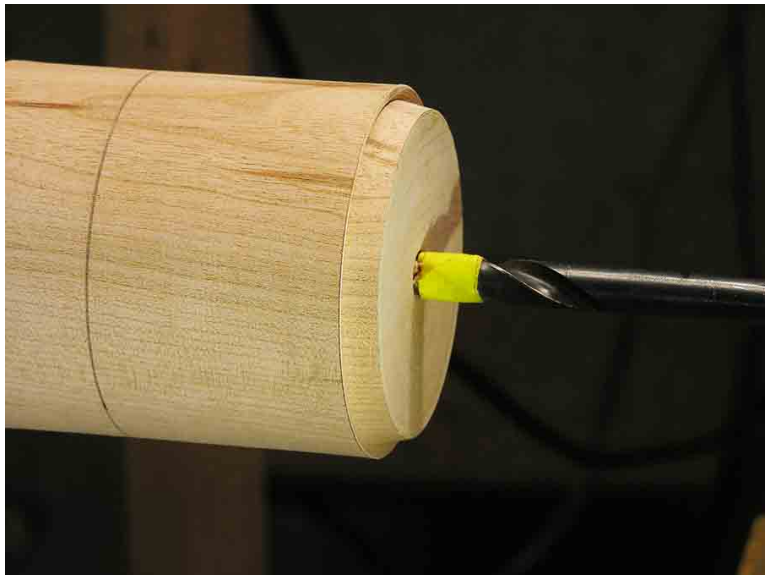
Once the flange walls are parallel, remove any excess wood and finish cleaning up the inside of the lid. Angle the bottom of the lid slightly inwards. Sand to at least 320 grid. Give the inner surface of the flange no more than a quick swipe with 320 grit. If desired, add a detail to the inner surface of the lid. Apply the finish of your choice and polish when dry. The inside of the lid is now complete. Make a note of how thick the top is at its thinnest point.



Mount the bottom blank in the chuck and turn a tapered spigot. You can use a parting tool, but a skew gives better control. The narrow end of the spigot should just begin to fit into the lid flange. Do not yet trim the spigot so that the lid fits!



Place a drill bit so that it comes to about ¼" of the bottom of the box and mark it with a piece of tape. This is an optional step, but is helpful for letting you know when to stop hollowing out the base.

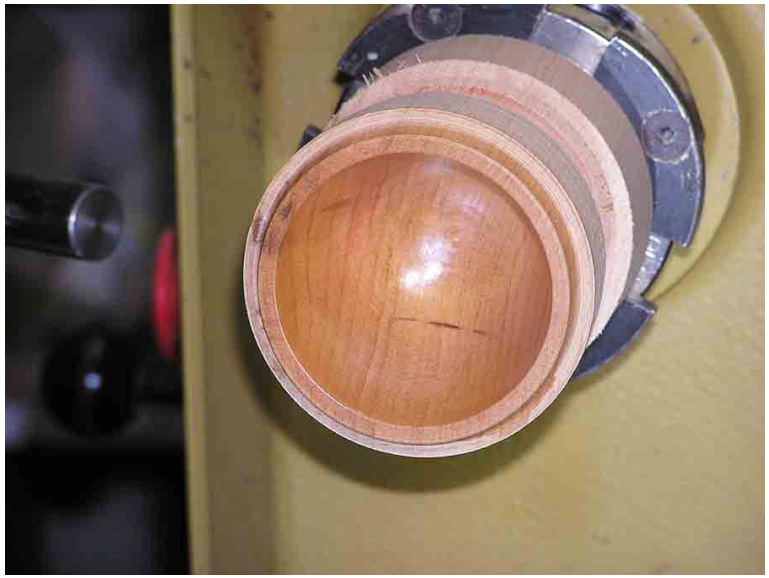


Drill the hole. You can use larger bits, but beware of generating excess heat in the blank.

Part about a third of the way into the blank just below the box bottom. This will ensure accuracy when shaping the outside of the box.

Shape the outside of the bottom of the box. In this case we are rounding the sides down into the base. Don't do any finishing cuts yet, as these will be done when the lid is on.

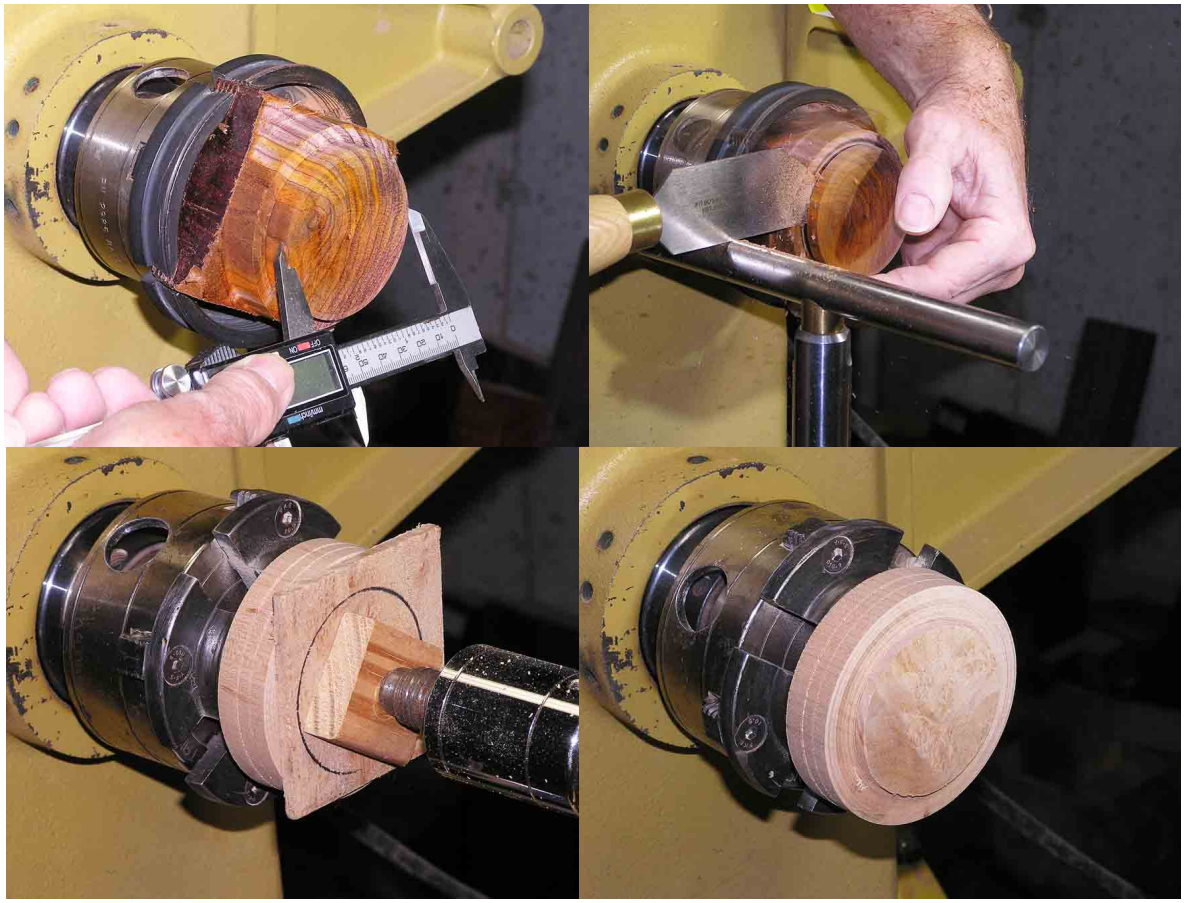
Using the same tools as were used for the lid, hollow the inside of the bottom of the box. Check to make sure that the inside wall parallels the outside wall- fingers are great calipers for this. The inside surface can be refined with a Hunter tool or a negative rake scraper. Strive to get a surface clean enough to minimize sanding.



Sand, finish, and polish the inside walls as you did for the lid. The inside of the box is now complete.

Using a skew, carefully square up the spigot and reduce its diameter so that the lid fits tightly. You want it tight enough so the lid doesn't move, but not so tight that the lid splits. Fitting of the lid was delayed until this point because hollowing the bottom of the box can relieve internal wood stresses that might cause the spigot to go out of round.

Making Inlays

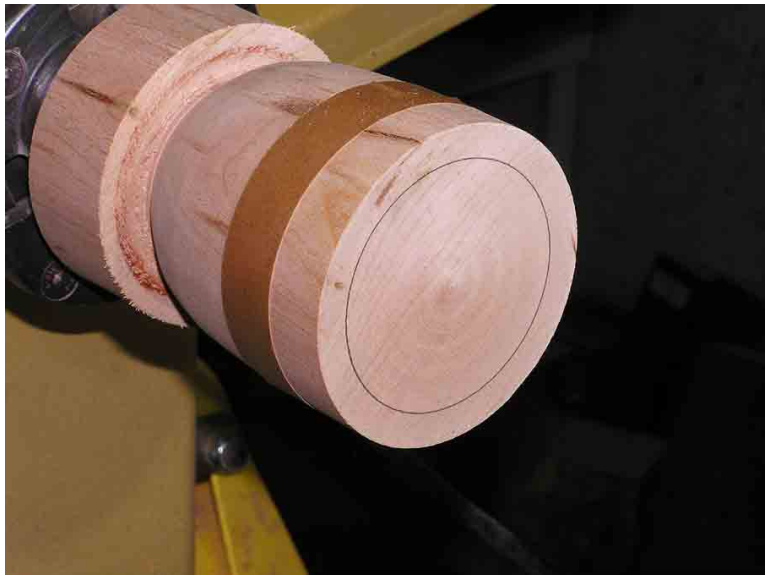


Inlays can be made by parting off a disk from a true cylinder,

or by turning a disk from flat stock attached to a waste block with hot glue or double sided tape.

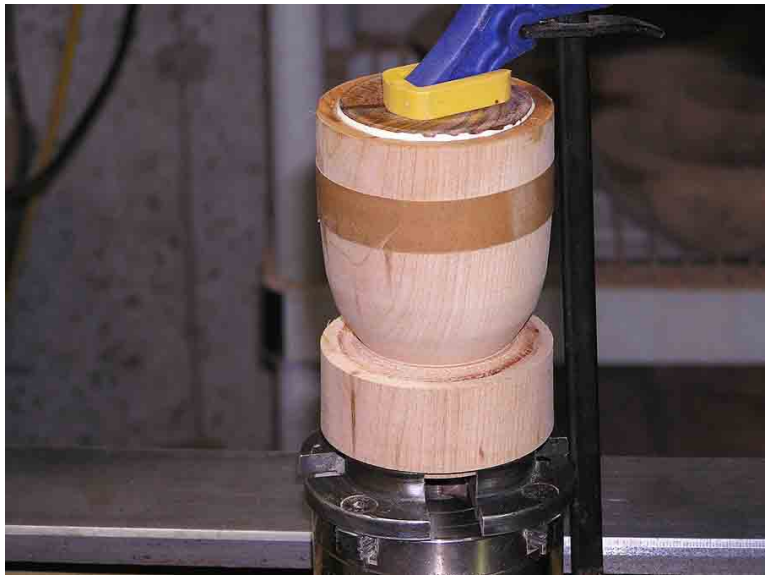
In both cases, make sure that the sides are true and perpendicular to the face of the inlay.

Make the Inlay First!



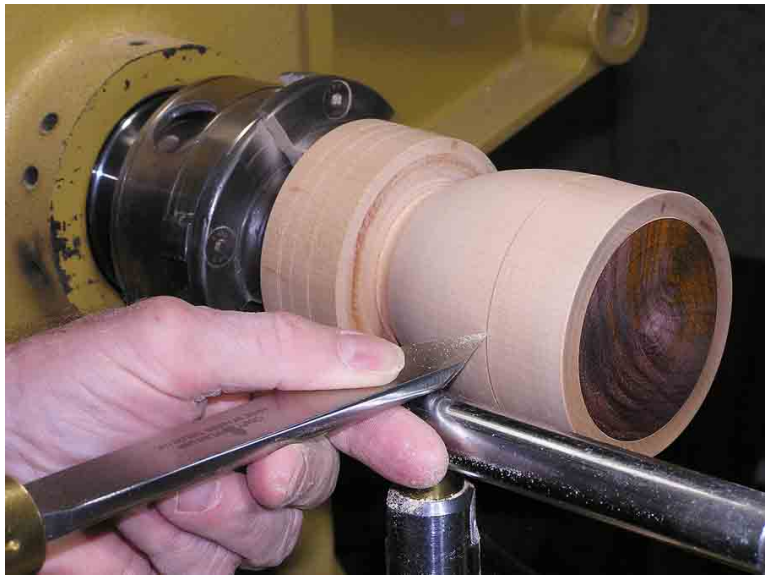
The lid has been jammed onto the spigot. Even with a tight-fitting lid, it's always a good idea to secure things at the join with tape "just in case." The area to be inlaid has been marked with a pencil.

Remembering how thick the top is, create a rebate for the inlay. The depth should allow the inlay to be a little proud of the top. Remove most of the wood with a hollowing tool. Use a sharpened square end scraper (like the one used to cut the lid flange) to sneak up on the diameter, testing the fit of the inlay frequently. Flatten the bottom of the rebate with a negative rake square scraper. It's OK if the bottom is a little concave, but convex creates problems.



Once you have a good fit, glue in the inlay. Leave the whole assembly in the chuck and clamp with moderate pressure. A little squeeze out indicates the inlay is well-seated. Although CA glue will work fine, a PVA adhesive is a better choice, as it will cause the wood to swell slightly and close any gaps.

When everything is dry, remove any excess inlay and true up the top.

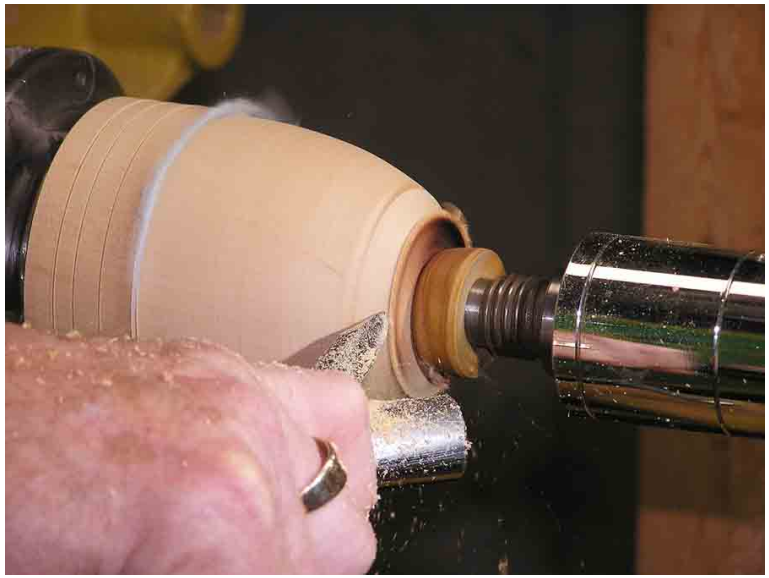


Using your favorite tools, finish the outside profile of the box. Strive for flowing curves with no flat spots. When all looks good, sand to at least 320 grit. Use a sharp pointed tool (a spear point here) to create a detail at the join.

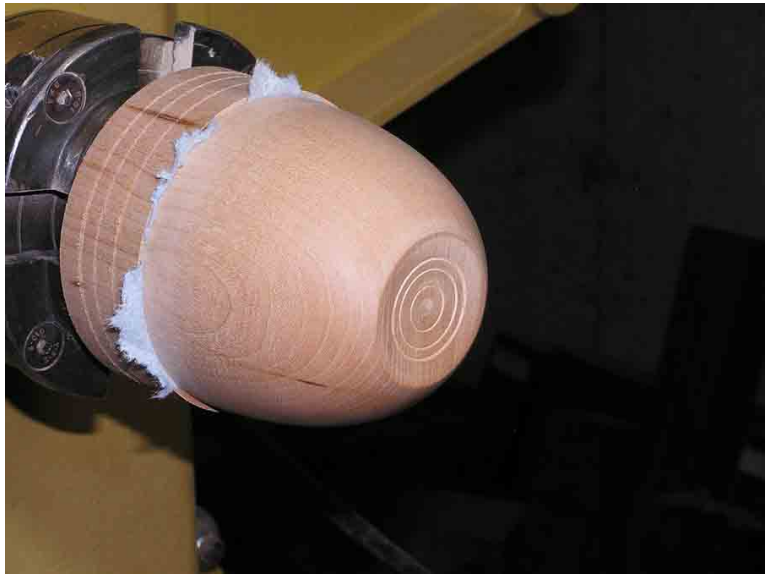
Remove the lid and do the final fitting. Use a freshly-sharpened skew to remove tiny amounts of wood as you sneak up on the fit. Think dust, not shavings. Check the fit frequently. A good fit is when the bottom remains attached when the box is lifted by the lid, but the lid still comes off with a minimum of effort.

Part off the bottom of the box from the waste wood.

Using the same techniques you used for making the lid flange, make a jam chuck for the bottom of the box.



Make the final few cuts at the very bottom of the box. Tailstock support is always a good idea. Here a rubber bumper separates the bottom of the box from the point of the live center.



Remove the live center and finish the base surface of the box. This should be concave, so that the box rests on the outer rim. Sand everything to 320 grit and add a detail to the bottom.
Note that here a piece of shop towel was used to produce the tightest fit in the jam chuck.
Remove the box bottom from the jam chuck and reunite it with the lid.

The completed box, ready for outside finishing!

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