Bowl layout for burn lines

Steve Wilson

Using figured wood to make a bowl is always nice, but sometimes finding figured wood is not always easy. Where I live, north of Detroit, Michigan, there were an awful lot of silver maple trees planted in the fifties and sixties that have come to full maturity and beyond. So, there are a lot of neighborhood trees and trees being cleared off lots to be built on that are now being thrown away. These are the trees I have the opportunity to use and most of them are maple.

These old growth neighborhood trees usually have smooth grain except at branch areas, so a lot of the wood is plain grained and solid. This is prime wood for bowls, but the plain grain does not show off the bowl form well.

As a turner I count myself primarily a sculptor, so form, proportion, edge and shape are important. I want to show these off, but I'm not likely to put cows or flowers or faces on my bowls. To put these on a bowl is to distract and obscure the form and they become the "art", the bowl form is lost.

- Image 102-3115 photo 1
  - Bowl, 11" diameter x 3-5/8 tall, Norway maple, plain grained and sanded to 600 grit.

To overcome this, I prefer to use modest abstract decoration to accentuate the form. In my case I like small squares. To this end I've developed a way to accurately divide a bowl down to a single degree. From here I layout the horizontal lines by eye so that each division is a square. These line intersections

could be considered as center lines for other patterns such as inlayed circular plugs. Instead, I use them as is to burn in squares in lines or spirals.

- 3138 Photo 2
    - These little squares in a spiral pattern act to show off the form of the bowl without obscuring the wood.

The indexers on wood lathes are useless so I ignore mine.

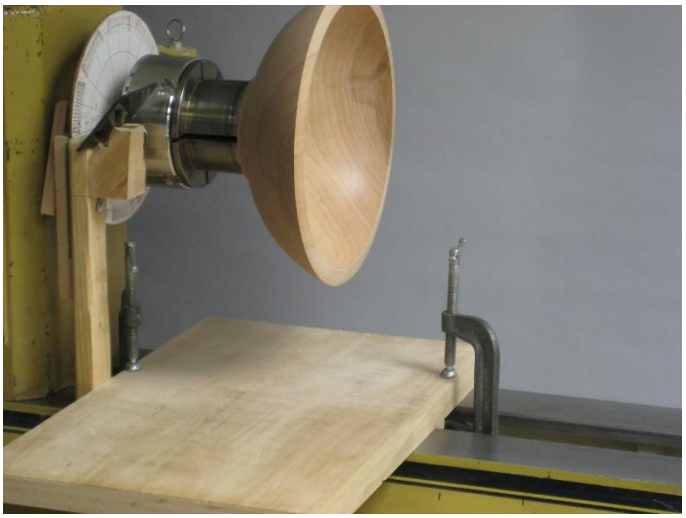
Being able to divide a circle into 360 radial lines is the key to being able to lay out spirals, diamonds and other patterns your mind might dream up.

- See PDF files

Because there are so many different lathes in use today, the drawings can only be used as a guide.

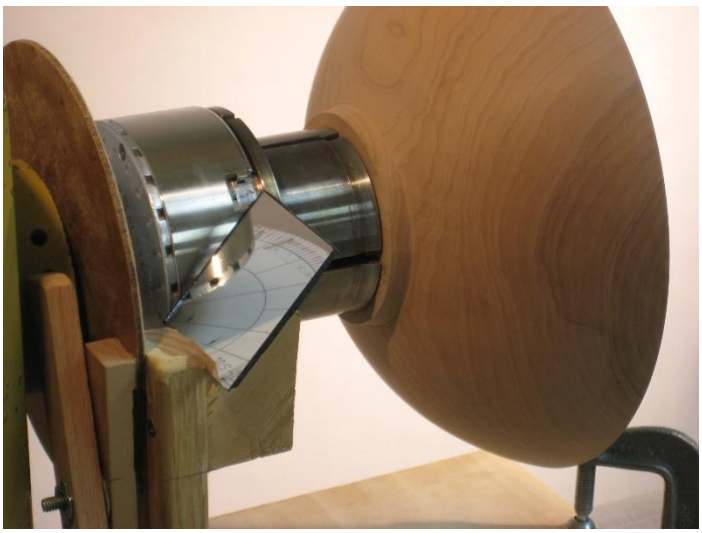
The heart of accurate layout is an accurate disc with crisp black lines. I used a CAD program to make a circle 8” in diameter, this size allows it to be printed on a regular printer. So far, I’ve tried three spacings for different applications; 360, 216 and 180. Next, I made groups of nine and then 18. This just keeps me from getting lost among the lines. Last, the center circle is the same size as the pilot on the spindle. The first group of lines should be at least ½” or 5/8” long. The second group is one inch long and the third group ends at the pilot diameter. Avoid water soluble glue to avoid wrinkles in the paper; use a spray adhesive to mount the paper to a 1/8 thick piece of hardboard, 3M makes a good one, but do this work outside because of the fumes. After the paper is mounted, drill or saw an undersized hole for the pilot and saw out the 8” circle near to size. Use a disc or belt sander to trim the diameter to size. Use cyanoacrylate to stiffen the

hardboard fibers of the pilot hole, then wrap a medium grit piece of sandpaper around a round handle or dowel and carefully bring the pilot diameter up to a firm fit on the spindle using the center circle to keep the pattern centered.



- 3116 Photo 3
    - Mount the disc with the two-degree markings behind the chuck.

The base plate is mounted to the lathe ways with two “C” clamps. I’m using a 2-3/4” square make-up mirror for the photography, but a 1-1/2” square would be less bulky.



- 3117 Photo 4
    - Detail of mirror.

Mount the disc with the paper toward the tailstock. I use a chuck to hold the disc in place, but up to a 6” faceplate could also be used. Lightly tighten the disc in place.

I use a good flat piece of plywood as my work surface. I chose 1” thick Baltic birch plywood. My piece is 12’ by 20”, but I think 13 or 14” would be better. This depends on the size of the work that is to be laid out; mine is usually under 20” in

diameter and less than 8” tall. I have had to add another piece of 1” plywood across the lathe ways to layout taller pieces.

The vertical piece that is attached to the base does several jobs. First, it acts as the accurate reference for the height to the center of the spindle. With the mirror mounted, the top surface acts as the sighting plane to accurately see the line on disc. Second, it holds the drag brake and acts as part of the friction and third, it has an angle block attached to mount the mirror. Measure the distance from the top of the lathe ways to the center of the headstock spindle, then add at least an eighth of an inch to this. This length will be adjusted later. I mounted this piece 9” back from the front edge with two #10x 1-1/2 long flathead square drive screws and yellow glue. Sand off any remainder below the base plate.

Mount the base plate to the lathe with a couple “C” clamps. Mount a flat disc of plywood in the chuck. Place the pencil holder on the base plate and set the pencil to the center of the disc in the chuck. Mark a horizontal line on the disc then revolve the disc 180 degrees and mark it again. Chances are that one line will not be drawn exactly over the other, so adjust the pencil and try again. When one line is drawn perfectly over the other, the pencil is exactly at the centerline of the spindle. Now, mark the vertical piece. If possible, saw this surface on the table saw using a fine carbide blade and miter gauge. This surface needs to be smooth and flat.

I use a mirror mounted on the angle block to allow sighting across the top of the vertical piece without bending down to the center line of the spindle 360 times per bowl. A piece of mirror 1-1/2” square or a 1-1/2“ diameter round is attached to the angle surface, then the block is moved up or down to find the best view for sighting across the top of the vertical. Glue and screw the mirror block here, but make sure the flat head screws are below flush because this is a braking surface. Next, mount the brake arm with glue and two more screws.

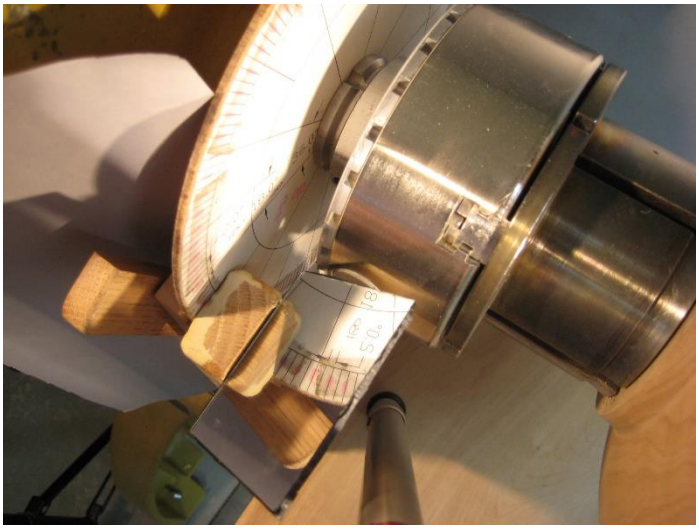
A little trial and error is called for next. Temporarily mount the cleat to the bottom of the base plate so that there is a good view across the top of the vertical piece and the brake arm will make nearly full contact with the back of the indexing disc. Get the cleat perpendicular to the long edges of the base plate and the position just so, then clamp two more pieces of wood tight to the cleat as a reference for location. Remove the cleat, then glue and screw it back in place.

- 3119 Photo 5
    - The pencil in the holder is set to the height of the view table (center height of chuck). Notice how the pencil has been sharpened with a sanding block. I make mine about ten degrees included and less than 1/32 thick at the tip.

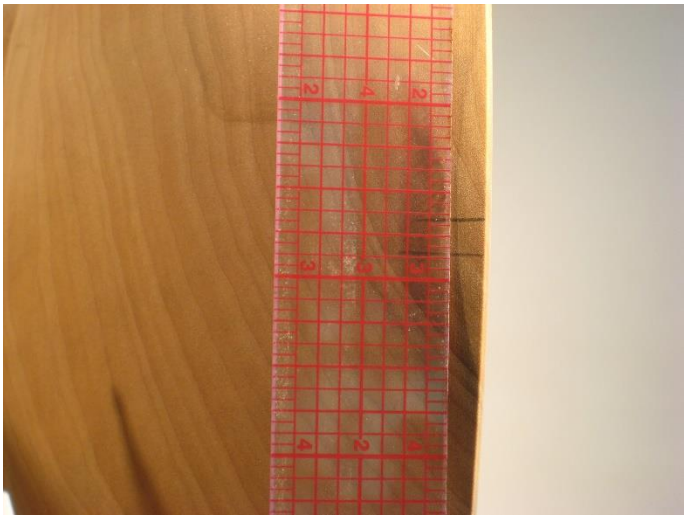
In use, the pencil holder can be quickly set to center from the top of the vertical.

To start, decide how large and small the squares need to be for your project.

For an 11” bowl, the “two degrees” disc (180 divisions) works well. Held by the foot, finish the bowl inside and out. Sand to 600 grit paper. Remove the chuck, put on the disc of choice and return the chuck to the spindle. Snug the chuck, place the base plate on the lathe bed so that the brake is around the disc and the cleat is pulled tight to the front lathe way, then “C” clamp the base to the ways. One clamp under the chuck and under the front way, one clamp toward the tailstock under the back way.

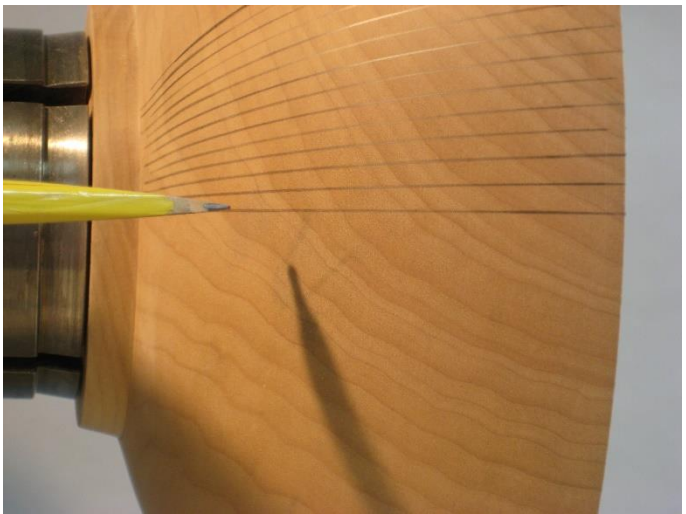


- 3120 Photo 6
    - Look down through the mirror and across the view table to locate disc lines accurately. Set the brake lever for light drag, so that the bowl remains steady while drawing on the lines.



- 3122 Photo 7
    - Here, I'm measuring the size of the largest squares. In this case, a bit more than 3/16," using the two degree spacing. This is just what I want for this project. For your project, use different numbers of degrees for different sizes of bowl or artistic requirements.

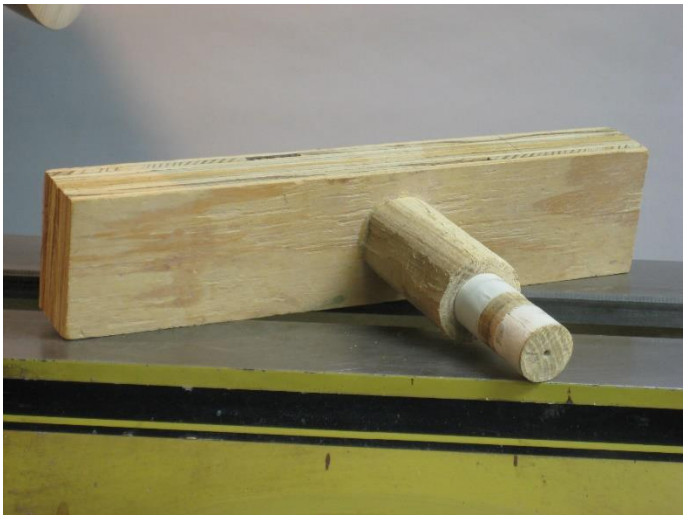
- 3124 Alt. Photo 7
    - This is an alternate for Photo 7. I used a different rule that might be more readable.



- 3123 Photo 8
    - For this bowl, I'm drawing lines on the bowl every two degrees, inside and out.

- 3125 Photo 9
    - Inside detail.

Mark all the divisions. Sometimes I only mark inside or outside, sometimes both. Remove the indexer, remove the disc and return the chuck to the spindle.



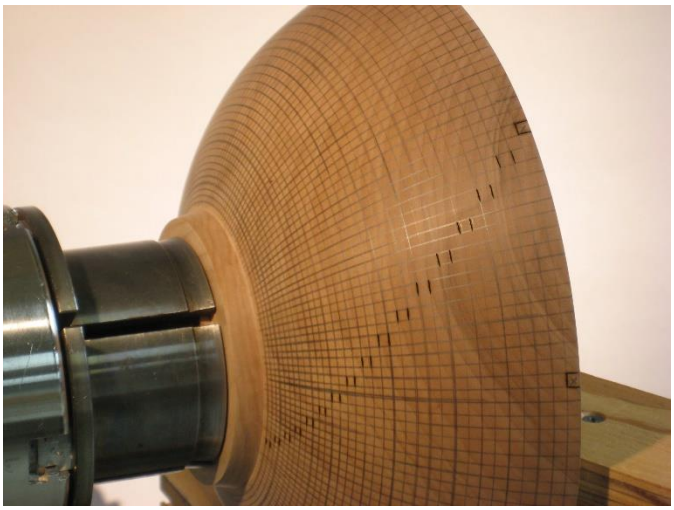
- 3126 Photo 10
    - Make a worktable to fit the banjo. Start with two pieces of ¾” scrap plywood, 3” x 12”. Drill a one-inch hole through one piece of plywood offset toward one end by one inch and centered on the width. Glue and clamp these pieces together face to face, so that the corners align. Next, turn the leg to fit your banjo, so that the height of the table will be 1/8” to 3/16” less than the center height of the chuck. Make one end a snug fit for the one-inch hole and about 1/8”

shorter than the depth of the hole it will go into. Take care to cut the shoulder cleanly and also, that the rim of the shoulder is high. This will allow the table to sit squarely on the leg. The middle part of the leg should be at least 1-1/2” in diameter and the length to fit your banjo and center height. Make the last bit of leg a close fit for your banjo and long enough to clamp with the banjo clamp. Glue the leg into the table mortise and add a flat head screw into the top of the leg for extra strength and to hold things together while the glue sets.

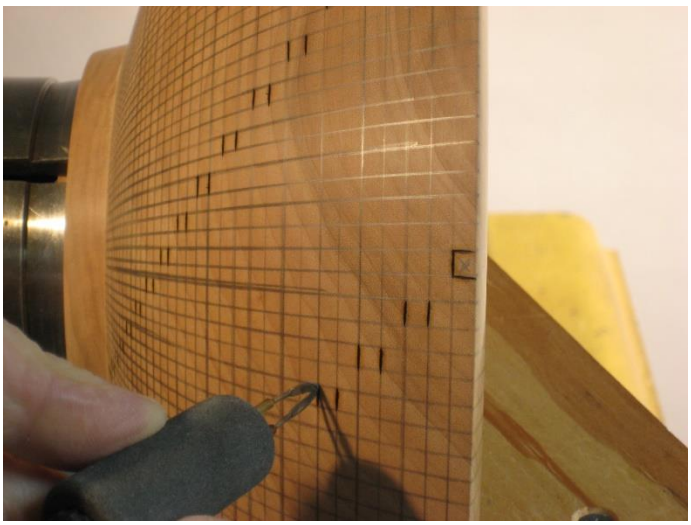
Put this shop made work surface in the banjo and using a spring clamp and a scrap of plywood as a guide for a pencil, I mark the lines that will be horizontal in the finished bowl. The squares are done by eye and decrease in size from the rim toward the center.

- 3127 Photo 11
    - Using a scrap of plywood and a spring clamp as a pencil guide, I begin laying out the cross lines (latitude). Hold the pencil against the guide, lightly press the pencil to the bowl and revolve the bowl. By eye measure the length of the square to its width. The squares get progressively smaller as the center of the bow is approached.

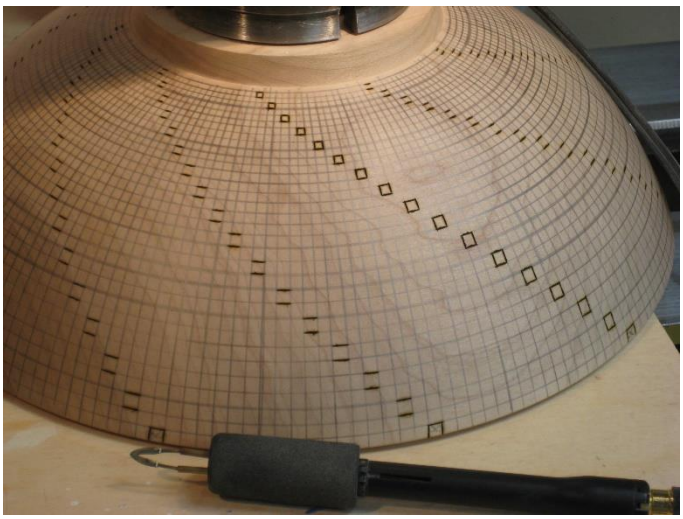
With all the lines drawn, it’s time to decide the check pattern. I start at the rim with a square, then count toward the headstock two squares and down two more. Burn another square.



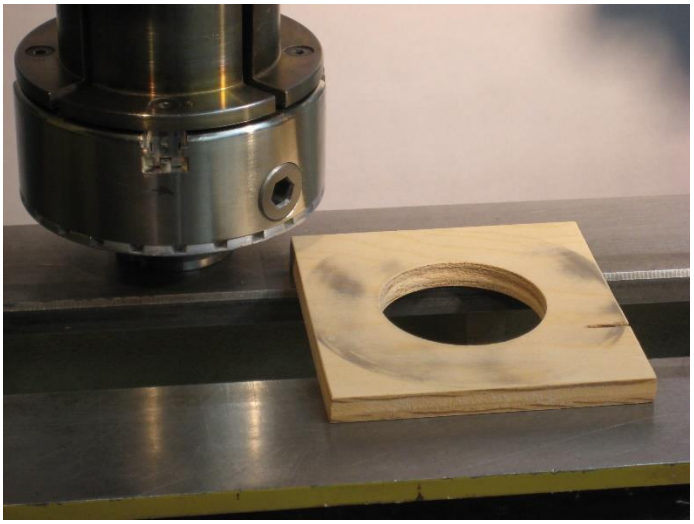
- 3128 Photo 12
    - For this bowl I'm using a double spiral pattern. So, starting at the top, outside of the bowl, I'm marking every 18th square for ten spirals. For this spiral, count two squares toward the foot and two squares down and burn the two horizontal lines. Then, with the burning knife, burn all the horizontal lines for the first spiral. Using this example, burn the rest of the horizontal lines for the first spiral set. The second spiral set is based on counting four squares by two squares.



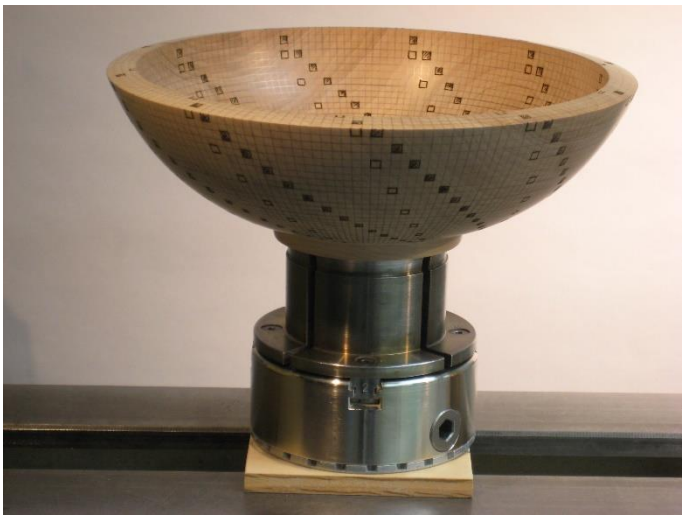
- 3129 Photo 13
    - Detail.



- 3131 Photo 14
    - The latitude lines I do with the chuck on the lathe, but the vertical lines are easier off the lathe. Leave the bowl in the chuck of course.



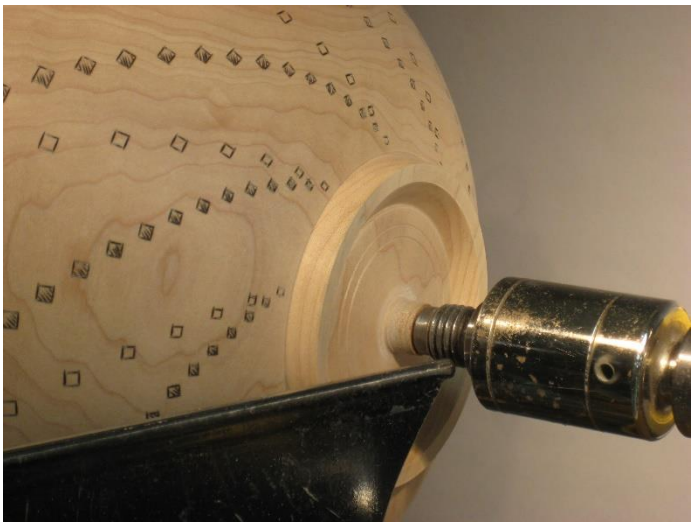
- 3133 Photo 15
    - A 5” x 5” piece of plywood with a 2-1/2” diameter hole-sawed through lets me work over the lathe ways, making the burning more ergonomic for some of the lines.



- 3132 Photo 16
    - All the wood burning is done, so erase all the pencil lines. The graphite will get imbedded in the grain and darken the wood. Even with a good draftsman's eraser, some of the graphite remains, so I now wet the full surface of the bowl. I use a piece of old tee shirt. This raises the grain and helps with the small dents caused by penciling the lines. Fully wet the surface, but it shouldn't drip. Let the bowl dry completely. Re-sand the bowl with 320 grit paper to remove all traces of the graphite and the raised edges of the burn lines, then bring the surface back with 400 grit and 600 grit paper.

- 3135 Photo 17

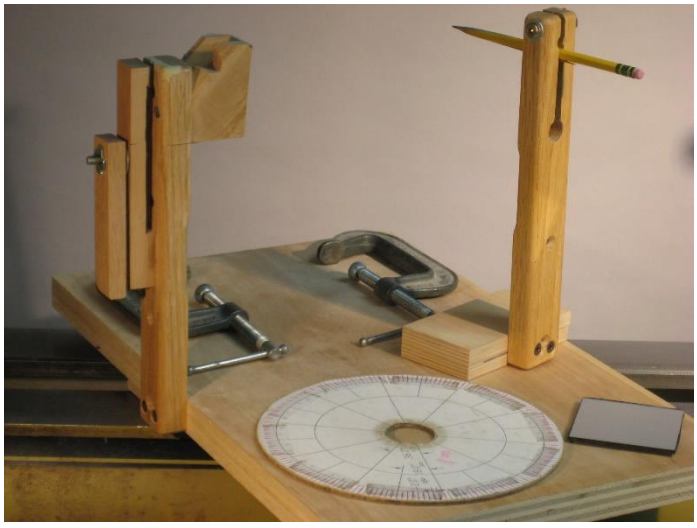
- Using a shop made jam chuck and ½” foam, bring the tailstock up to finish the bottom.



- 3136 Photo 18
  - Finish the bottom.

Remove the bowl from the chuck and mount to finish bottom. Ready for your favorite finish.

- 3139 Photo 19
  - The indexer kit.



Bio

Steve Wilson has been turning since the mid 70's, showing since 2010, demonstrating and teaching since 2008.
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