

Start easy, work your way up to 4 legs

Stool School

By Nick Cook



When I got a commission to turn my first stools about 30 years ago, I had no idea what I was doing. But somehow I got the job done.

I had never taught others how to make stools until I had the good fortune to work with George Hatfield of Sydney, Australia. I had watched George demonstrate at several symposiums and workshops and was impressed with his signature colonial stool, which he used in college classes he taught in Sydney.

A few years ago, George asked me to assist him in teaching a traditional woodturning class at the John C. Campbell Folk School in Brasstown, North Carolina. That was a great opportunity to work with George and start developing my own class in furniture turning. I have since taught that class several times and include variations of George's stool design.

Because a stool requires both faceplate and spindle work, this project offers many learning opportunities for turners.

Get started

If this will be your first stool, I suggest starting with a simple, three-legged footstool (or milking stool). For turning stock, poplar is a good choice. It's inexpensive, readily available, and easy to work with. You can leave it natural, stain it, or even apply a coat of paint.

The stool will be 10" in diameter and 10" high. You will need a piece of 8/4 stock just over 10" square for the top and three 8/4 squares 11" long. If you select S4S finished material, your stock should be approximately 1 $\frac{3}{4}$ " thick. For larger stools, I prefer rough lumber; it gives me a little more beef in the finished product.

For turning tools, you will need a $\frac{3}{8}$ " bowl gouge, a spindle roughing gouge, a detail gouge, and a skew. At the lathe, you'll need a screw chuck or small faceplate.

It is a good idea—especially if you have never made a stool before—to draw a full-size plan of your project. This will allow you to determine proper proportions, sizes, and details. Brown craft paper or newsprint is ideal. You will need a compass, straightedge, protractor, and solid, flat surface to draw the patterns.

Turn the top

You can use either a screw chuck or a small faceplate to turn the bottom side of the blank. For the screw chuck, use a $\frac{1}{4}$ " or $\frac{3}{8}$ " shim to reduce the screw length. If you choose a faceplate, make sure the screws do not penetrate the blank more than $\frac{1}{2}$ ".

Mount the blank on the lathe and face off the surface with the $\frac{3}{8}$ " bowl gouge. Make sure the blank is perfectly flat. Continue with the same gouge and create a profile on the edge of the seat. Mark the center with a pencil to facilitate the layout of the three legs. Stop the lathe; use the compass to draw a circle on the surface approximately $1\frac{1}{2}$ " from the edge. With the compass, divide the circle into thirds (**Photo 1**). Punch the intersections of the lines with a centerpunch or awl.

Using a drill chuck in the tailstock, bore a $\frac{3}{8}$ "-diameter hole $\frac{1}{2}$ " deep in the center of the blank. Remove the blank and flip it over to turn the top of the seat.

Use the $\frac{3}{8}$ " bowl gouge and face off the surface to ensure it is parallel to the bottom side. This will provide proper alignment of the holes for the legs. (One benefit

of a three-legged stool is that it will always be stable, even if the legs are not the same length.)

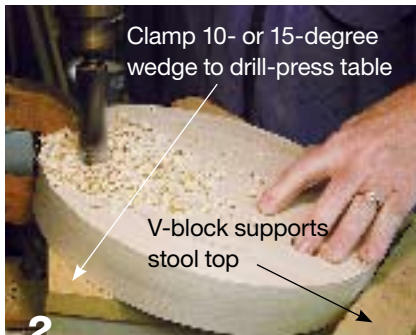
Drill the seat for the legs

You'll need a jig and a drill press to drill the holes for the legs. Make a simple jig from scrap plywood or medium density fiberboard (MDF). The bottom of the jig should be large enough to allow it to be clamped to the drill-press table (mine is 12×16").

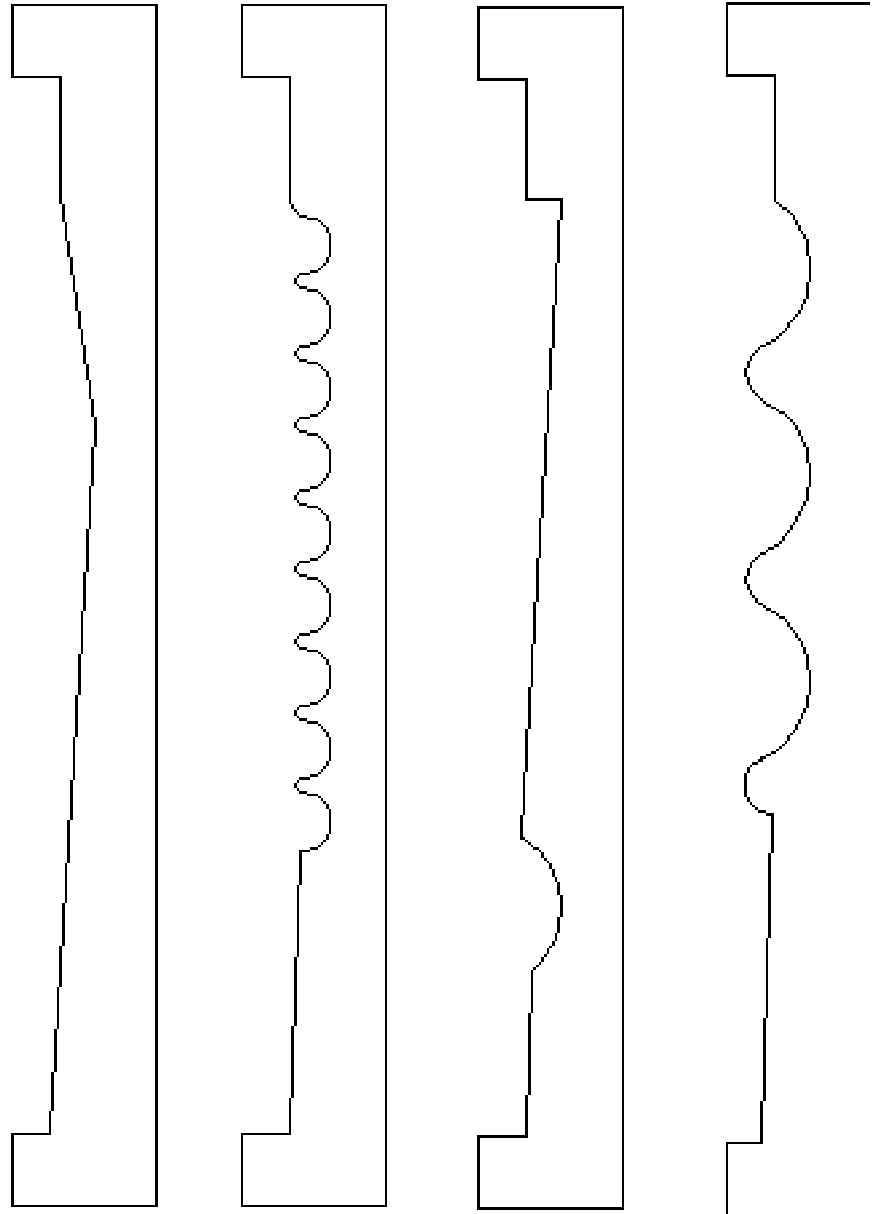
Add a V-block to the jig (two ¾×2×7" scrap pieces are ideal) to support the blank and simply rotate it to the proper positions for drilling the holes. Without the V-block, you will need to clamp the blank to the jig to prevent it from slipping. The wedge beneath the jig is cut at a 10- or 15-degree angle. If you do not have a drill press, you can use a hand drill or even a brace and bit. Either method requires a sliding bevel for proper angle alignment.



1 Using a compass, lay out the leg positions on the bottom of the stool seat.



2 With an angled jig and a 1" brad-point bit, bore the seat bottom.



Select one of the leg profiles above, then enlarge the template 200% for full-size.

Use a brad-point bit to bore 1"-diameter holes 1¼" deep (**Photo 2**). Once the holes are drilled, you should be ready to turn the top side of the seat.

Turn the seat top

Remount the blank onto the screw chuck. Use the ¾" bowl gouge to dish out the seat and eliminate the hole created for the screw chuck. Turn the edge to a pleasing profile and sand to 220-grit smoothness.

Make 3 legs just alike

For your first stool, keep the shape of the legs simple. (I prefer a simple cigar shape.) Before you begin turning, cut the three leg pieces to 11" long.

The tenon is your key component. Because the holes in the seat bottom are a fixed size, you must cut the tenons to fit. Measure and mark the length of the tenons at 1¼". Set your calipers or vernier scale to 1" and turn the end of the

tenon to this diameter. Because you don't want the brad-point bit to break through the seat top, check the setup on scrap material.

Stop and check the tenon in one of the holes; it should be snug but not too tight (no space around it). If it fits the first time, then continue to cut it to the full length of the tenon. I usually taper the first 1/2" or so to get a feel for the exact diameter.

Once the tenon is complete, continue to shape the leg to your chosen profile (see four examples on page 59). I usually chamfer both ends of the legs—the top to make it start in the hole more easily and the bottom to avoid chipping when the stool is slid across the floor. A skew and a detail gouge are ideal tools for this spindle work.

Assemble the stool

Always dry-fit the legs before applying any glue. Apply glue to the mortises and drive the legs into the bottom of the seat with a dead-blow mallet. Wipe away any glue squeeze-out with a damp cloth and apply your favorite finish.

Sign and date your work

This is a detail I picked up from David Scott, a North Carolina turner, many years ago. Turn a button about 1 1/2" in diameter with a small tenon on it to fit into the 3/8"-diameter hole at the center of the seat bottom. If you are leaving the stool natural, use a contrasting wood for the button. Glue the button into the screw center hole and use it as a place to sign and date the finished product.

Go bigger and more complicated

If you are feeling ambitious after completing your footstool, you

may wish to continue with the more complicated and larger 24"-high stool with four legs and four rungs. The 13"- to 14"-diameter seat makes this a comfortable stool, ideal for the playroom, kitchen, or shop. (The 24" height is ideal for an occasional break from standing at the lathe.) You can detail the legs and rungs to make it plain or fancy.

When you select ash, cherry, maple, walnut, or even a combination of woods, your stool becomes an instant heirloom.

Start at the top

Just like turning a smaller stool, begin by turning the seat. A full 2"-thick blank will give you a bit more material to work with over dressed or surfaced lumber. You can glue up material to make up the wide planks for this larger seat, but I prefer to use a wider blank, especially when applying a clear finish.

Follow the same basic procedure used on the smaller stool, except this time, lay out the bottom of the seat to accept four legs. You can do this with either a compass or a large framing square. Locate the leg tenons approximately 1 1/2" to 2" from the edge of the seat. Use the compass to draw the circle; where the circle intersects the cross lines are the locations of the holes for the legs. Using the drilling jig, align the fixture on the drill-press table and drill the four holes at a 15-degree angle. Return to the lathe and complete the turning, sanding, and finishing of the stool seat.

Turn 4 matching legs

Now you really have to plan your work! You can't just spit out four legs; they really do need to look alike. And, you will need four rungs that fit into the four legs.



I suggest you start with paper and a pencil or simply follow the plan that follows. If you would rather, you can also just turn the first leg and then copy it three more times. The most important things are the height and location of the rungs on the legs.

Start with four blanks (full 2"-square stock) cut to 24" lengths. Locate and mark the centers at each end of each leg. Then mark the inside corners on each leg; this will help you in laying out the holes for the rungs. Use a marking gauge or adjustable square to mark a centerline along the length of both inside surfaces of each leg. Then mark the height of the upper and lower rungs on each leg.

This stool design calls for the upper rung to be located 7" from the bottom and the lower rung to be located 5" from the bottom. (If you align all four rungs at the same height, you will weaken the legs.) Make sure you have one



Using a jig angled at 15 degrees, bore the 3/4"-diameter holes in the legs for the rungs. Use a straightedge to keep the holes aligned.



A pencil or marking gauge (sometimes called a story board) will help you turn four matching legs. After you've finished one leg, place the sample leg behind your lathe to use as a reliable reference.



To get an accurate measurement for your rungs, push two sections of all-thread rod into the rung holes, then tape together the rods. The rod threads lock onto each other, preventing slippage when you remove the legs from the seat.

upper and one lower hole at 90 degrees to one another on each leg. Use a centerpunch to mark the hole locations.

With a 3/4" brad-point bit, bore the rung holes 1" deep. It is important to hold the leg securely to prevent



After dry-fitting the stool, assemble the rungs in the legs.



Use a dead-blow mallet to drive the legs into the seat.

it from sliding on the jig. Although the angle mirrors the 15 degrees for the seat, I have a second jig set with a straightedge attached so it is easier to hold the leg in place while drilling (**Photo 3**). You can also wait until after you turn the legs to drill them, but then there are greater challenges to holding the legs in place.

Using a pencil gauge or marking gauge, lay out the details of your stool legs (**Photo 4**). Then turn each leg to match your pattern. Make sure you turn the 1x1 1/4" tenons to fit the bottom of the seat.

Dry-fit the legs into the seat and then return each leg to the lathe. Sand to 220-grit smoothness and finish the legs.

Turn the rungs

At this point, dry-assemble all the legs in place to measure the final length of the rungs. The upper rungs will be a little shorter than the lower rungs due to the splay of the legs. Push two lengths of all-thread rod into the rung holes in the legs and tape the rods (**Photo 5**). Remove the legs from the seat, pull out the taped rods, and you will have a precise length for each rung.

Turn a 3/4" tenon on each end of all four rungs, then turn the details between the tenons. Sand and finish each rung on the lathe.

Dry-assemble everything again before applying any glue. This will give you one more opportunity to make sure everything fits together and aligns properly.

When you're satisfied with the fit, disassemble, apply glue to all the drilled holes on the legs, and insert the rungs (**Photo 6**). Then pull the legs and rungs tight with a band clamp.

Apply glue to the holes in the seat bottom and drive the legs into them with a mallet (**Photo 7**). This may take a bit of effort as the final assembly will be under some tension. Remove glue squeeze-out with a damp paper towel.

Nick Cook (nickcook@earthlink.net) is an *American Woodturner* contributing editor. Nick, who lives in Marietta, GA, will teach several rotations in the Youth Turning Room at the Portland symposium.