



Discover what it was like to work wood 200 years ago when all you had was a few well-tuned saws, a couple chisels and a steady hand.

# Shaker Stepstool

**B**ack when the Shakers started making furniture in the late 18th century, the only tools available to them were powered by people. No table saws, no electric jointers or planers. Your tool kit consisted largely of hand saws, chisels and planes. Your planer, jointer and table saw were usually a young apprentice who prepared stock by hand. The skilled woodworkers handled most joinery tasks.

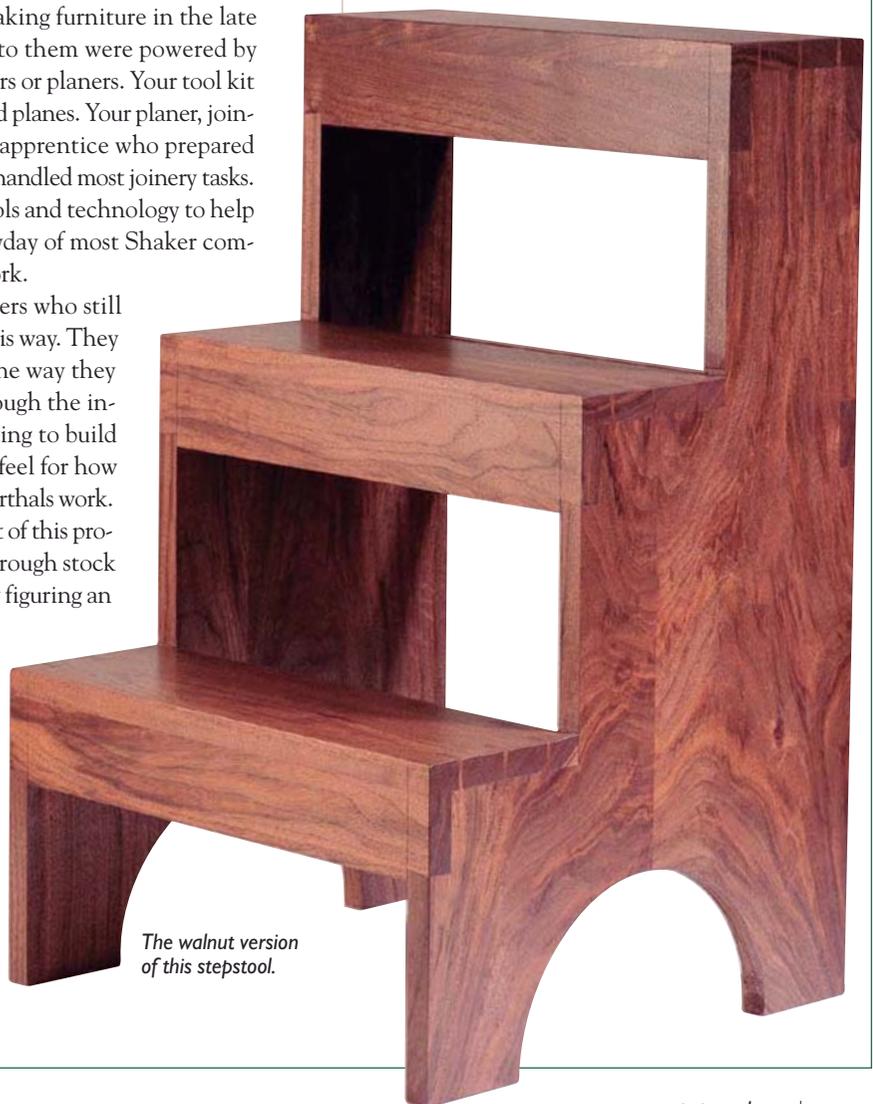
Shakers eagerly sought out power tools and technology to help them do their work. But during the heyday of most Shaker communities, hand tools did most of the work.

Today there is a group of woodworkers who still pride themselves in building furniture this way. They call themselves “Neanderthals.” And the way they communicate is, ironically, usually through the internet. We thought it would be interesting to build a project using only hand tools to get a feel for how early Shakers and electronic-age Neanderthals work. Admittedly, we copped out on one aspect of this project: We didn’t surface the lumber from rough stock using hand tools. We rationalized this by figuring an apprentice would have done this work.

I think you’ll enjoy unplugging your router for a few days to tackle this modest but satisfying project. And if you cannot give up your power tools, you can rest easy knowing that the early Shakers would have paid almost any price for that precision plunge router on your bench.

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by Jim Stuard



*The walnut version of this stepstool.*

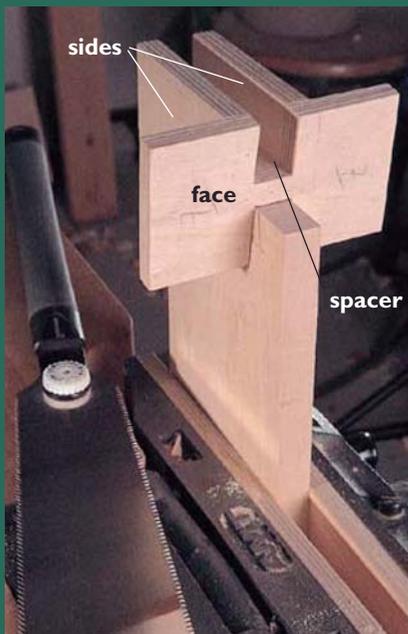
## THE 10 CENT DOVETAIL JIG

In the midst of laying out the dovetails for these stools, I decided I wanted a way to make the cuts for my tails as clean, accurate and quick as possible. There are 44 angled cuts for the dovetails alone. So I made this jig, and I think it will help the first-timers out there. Look at this jig as training wheels for cutting tails.

Basically, the jig is an "H" that fits over your work and guides your saw at the perfect angle. Flip the jig over, and it cuts the other way. Tails have never been easier to do. Begin by cutting two sides pieces  $\frac{1}{2}$ " x 3" x 4" from plywood. Then cut the spacer that goes between the two using falloff from your stool. This will ensure your jig sleeves tightly over your work. The spacer should be  $\frac{3}{4}$ " x  $\frac{3}{8}$ " x 4". I glued and nailed the spacer between the two sides and then cut one end at a 7- or 9-degree angle. I cheated and used a chop saw for this cut.

Then cut out a face piece ( $\frac{1}{2}$ " x 3" x 5") out of plywood. Glue and nail the face on the angled ends of the "H." Now use a Ryoba and a coping saw to cut the notches out of the face and fit the jig to your dovetailing stock with a rasp. When you've got a snug fit, try a couple of test cuts. Gently hold the Ryoba against the jig as you begin to make your cut. The guide will do the rest of the work.

It's pretty easy to hold the blade in position and cut down to the gauge marks. As a bonus, you can use the other end of the jig to make square cuts. With practice, you won't even have to trim the tails when fitting.



Clamp a straightedge to the back line of the stool, gently press the saw against it and rip the back edge (left). Use the ripping teeth on the back of the Ryoba.

After cutting the bottom, lay out the radius (below).

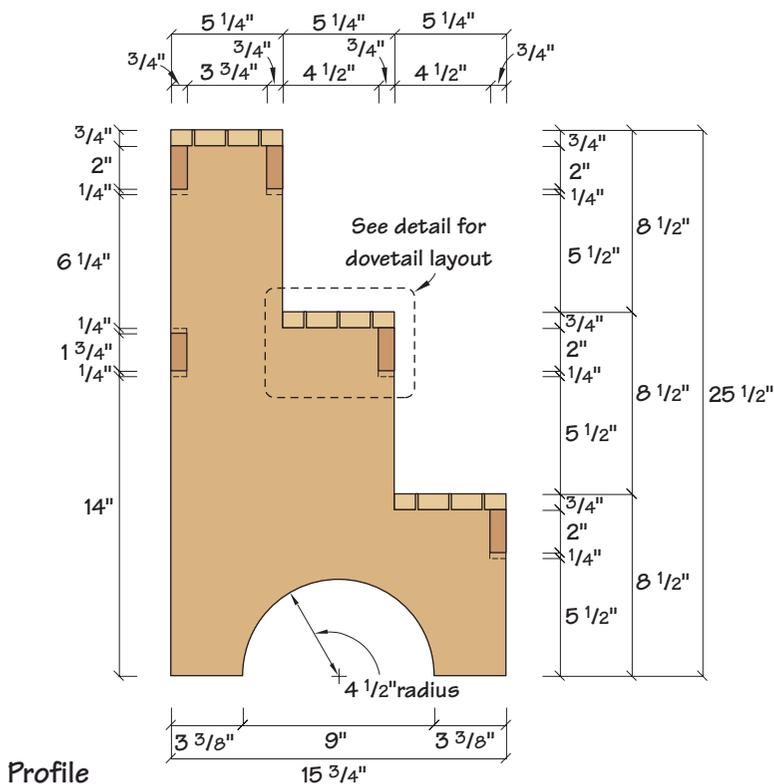


These stools were used in Shaker housing to get to the upper drawers in the enormous chests built for communal use. The stool was placed against the lower part of a chest for support. If you want to use this as a freestanding stool, add a hand rail.

The tools needed are as follows: clamps, a block plane, jack plane, a couple Japanese saws, two sharp chisels, a coping saw and a hand drill. For marking dovetails, I use a sharp knife, a square and a sliding t-bevel.

Begin construction by laying out the panels for the sides. Use a cardboard tem-

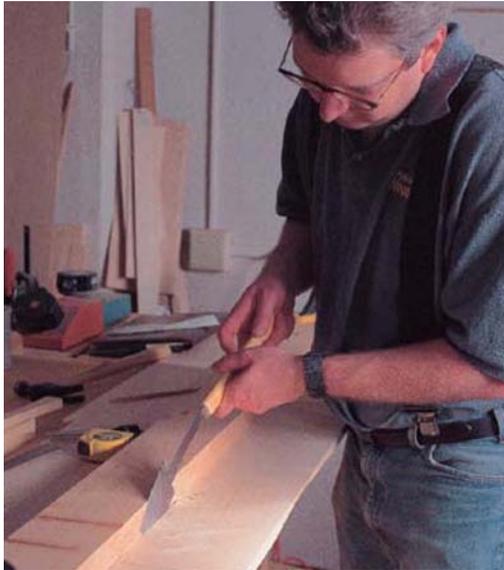
plate to lay out the best yield from your panels. Because you aren't going to make these cuts with a table saw, you will have to make stopped cross-cuts and rips in the middle of the panels to cut out the steps using hand saws. I've found the best way to do this is with Japanese saws.



Profile

After laying out the steps, start making the plunge cuts in the panel for each rise and run on the steps. Remember to use the larger ripping teeth for the long grain and the shorter crosscutting teeth for the cross grain. Start each cut by gently pressing the saw against the straightedge and use a rocking motion to use the entire length of the blade to make the cut.

When you've penetrated the other side of the panel, cut a slot large enough for the Ryoba. Finish the cuts into the inside and outside corners, but be sure to use the correct teeth for the direction you are cutting.



### Courtesy of Japan

There is a style of saw called an Azebiki-Nokogiri. In short, it's a saw with a curved blade for doing a "plunge" cut in the middle of a panel. The other saw I used was a Ryoba style. It's a two-edged blade with rip teeth on one edge and crosscut teeth on the other. There are other Japanese saws designed for dovetailing, but I appreciate the utility of the two-sided blade.

Begin by laying out your cutting lines in pencil on the sides. The object is to first cut the back edge of the side, then cut the bottom edge square to that. Then lay out the steps from these two perpendicular lines.

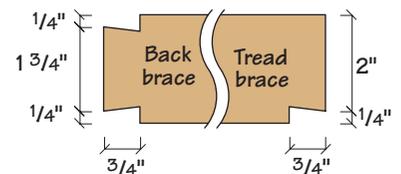
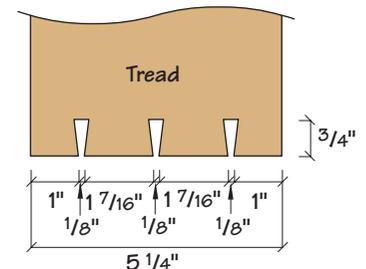
Cutting a straight line isn't difficult, especially if you clamp a piece of wood to your work to serve as a guide. Simply clamp the guide to the work and begin making the cut with your Ryoba. Use your fingers to gently hold the blade against your guide. Take it slowly and your cut will be true.

Set up another straightedge and, using the finer crosscut teeth of



The results speak for themselves. With a kerf less than  $\frac{1}{16}$ ", it's possible to do some fine cutting. Notice the radiused cuts that resemble cuts from a table saw. These marks are from the Azebiki-Nokogiri saw.

### Dovetail Layout Detail



7° angle on tails for hardwood (shown)  
9° angle for softwoods



After cleaning up the edges of the side panels, begin laying out the tails on the treads. Use the diagram to help. If you're going to use the training-wheels jig mentioned at left, don't lay out the sides of the tails on the top and bottom of the tread. Simply lay out the  $\frac{1}{8}$ " spaces between the tails on the ends. Use the jig to define the tail shape. Braver souls will start with a marking gauge and then, using a sliding t-bevel set to 7 degrees, make knife cuts into the wood to mark the tails. If you can't see the cut lines, use a sharp pencil to put a little "make-up" on them.

Those of you using the training-wheels jig can now cut all of the tails on the treads and braces. You'll have to figure out which way the jig works best on each cut. If you're not sure, mark the tails with a pencil so there's no confusion. I like to use the rip side of the Ryoba to cut dovetails. This might rankle some of the hardcore Neanderthals out there, but I've found it's aggressive and the cut needs little or no trimming after.

the Ryoba, cut in about 4" from the front and back edges of the stool. Mark the center of the bottom and lay out a 9"-diameter semi-circle. Now cut the half circle on the sides using a compass saw. Clean up your cuts with sandpaper.

The best way to cut the steps is to make a plunge cut with the Azebiki saw and finish with the Ryoba, crosscutting against the grain and ripping with the grain. Again, clamping a piece of straight wood to your work will ensure your cuts are straight.

There's nothing fast about this process. Slow and deliberate will do the trick. Once the sides are complete, cut the treads and risers to size. Clean them up with a plane and make sure everything's square.

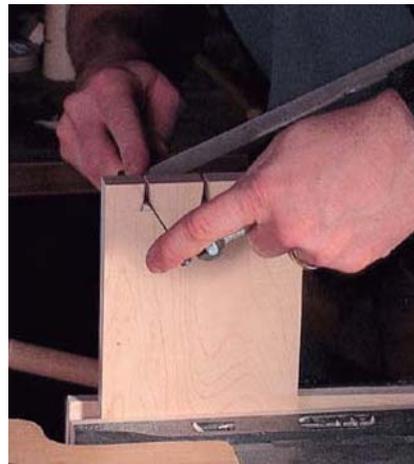
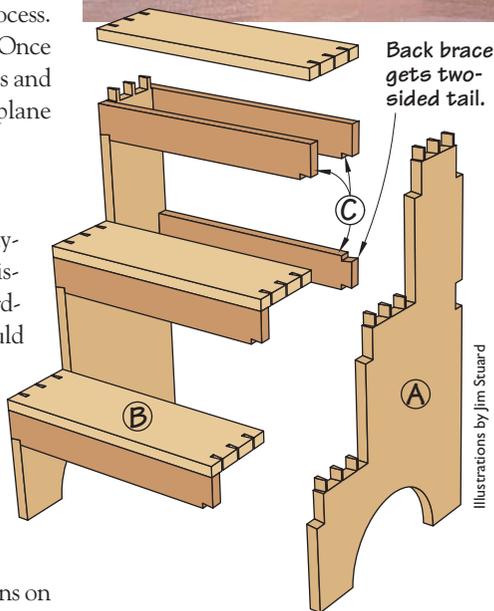
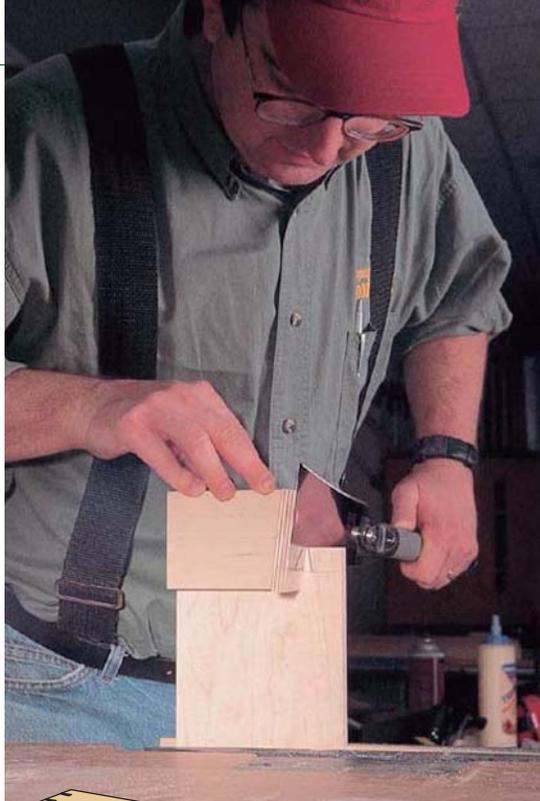
### Dovetails

Start cutting the dovetail joints by laying out the tails on the treads and risers according to the diagram. On hardwood joints, the dovetail angles should be at a 1:8 ratio (7 degrees). On softwoods the ratio is 1:6 (9 degrees). Cut the tails, then number each joint for reference.

I built a couple little jigs to make cutting my tails easier. See the accompanying story for details.

Now use the tails to lay out the pins on the side pieces. Cut the tails by making the first cuts with the Ryoba and clean out the waste with a coping saw. Now try to fit the joints. If they are too tight, use a chisel to clean up the joint. If they are too loose, you can glue thin shavings into the joint to fill it out. Most people will never notice.

When cut correctly, the joints should tap together and be snug without beating on the stool. When you're satisfied with the fit, glue all the joints and mating edges together. Sand and apply three coats of your favorite finish. I used Watco, an oil and varnish blend. **PW**



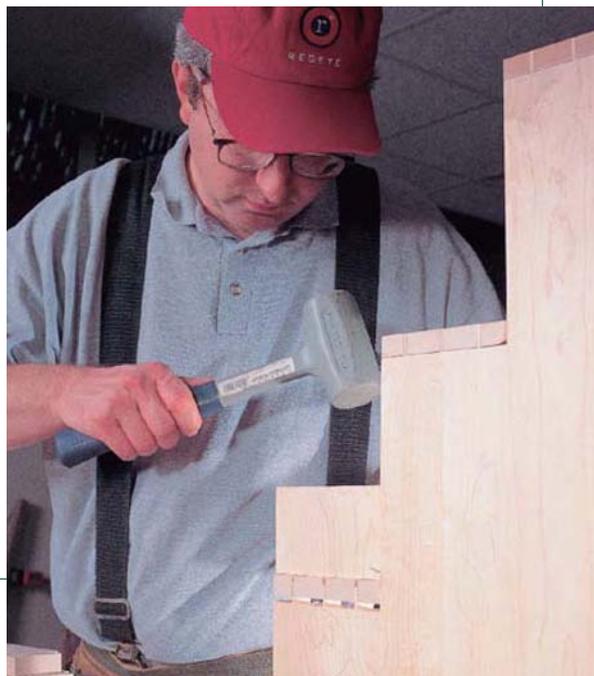
After defining the tails, remove the little triangle of wood between them with a coping saw. The 1/8" gap is big enough for a small chisel to fit into for trimming.

### SCHEDULE: SHAKER STEPSTOOL

No.	Ltr.	Item	Dimensions T W L	Material
2	A	Sides	3/4" x 15 3/4" x 25 1/2"	Maple
3	B	Treads	3/4" x 5 1/4" x 16"	Maple
5	C	Braces	3/4" x 2 1/4" x 16"	Maple

Clamp a panel into a vise and use the tails on the tread ends and braces to mark the locations for the pins and brace notches. Use a knife to get a more accurate layout. Since they're easier to fit, I don't use a jig for the pins. Just lay them out from the tail marks, using a knife and sliding t-bevel set to 7 degrees. Fit the pins to the tails with a four-in-hand rasp, removing material from the pins until the tread can be lightly tapped onto the side.

Use a backer block to do this so you don't split the tread.



### HAND TOOL WEBSITES

The Electronic Neanderthal  
[www.cs.cmu.edu/~alf/en/en.html](http://www.cs.cmu.edu/~alf/en/en.html)

Shavings.net  
[www.shavings.net](http://www.shavings.net)

Museum of Woodworking Tools  
[www.antiquetools.com](http://www.antiquetools.com)

Ralph Brendler's Old Tools Page  
[www.mcs.net/~brendler/oldtools/oldtools.htm](http://www.mcs.net/~brendler/oldtools/oldtools.htm)