

Shaker Oval Boxes

Reproductions make fine gifts or storage

by John Wilson



Oval boxes continue to be the most popular product the Shakers ever offered to the outside world. Originally produced for their practicality (nesting boxes inside each other required little storage space) and utility (almost anything and everything was stored in these durable containers), they have become collector's items for their simple beauty.

As testament to the boxes' enduring appeal, I've been able to make a living for the last 10 years by traveling around the country teaching Shaker box making to groups of woodworkers. Box making's appeal is that, in short order, you can have a stack of boxes, as shown in the photo at left, that any woodworker would be proud to show off or to give as gifts. In just a day and a half, my students, who range in ability from novice to advanced woodworkers, complete a stack of five traditional Shaker oval boxes.

The secret to the classes' efficiency is that we start with the tops, bottoms and band material thickened and rough dimensioned. I also bring the necessary patterns and forms for cutting the band's fingers, bending and drying the bands and shaping the tops and bottoms. I can supply all the necessary materials, hardware and forms if you want to make the boxes that way. But this article will show you how to prepare the stock and make your own patterns and forms.

There is no one right way to make an oval box, just as there is no one material for bands, no one system for numbering sizes of nesting boxes, nor one shape to the fingers. What can be said for the following procedure is that it works for me and for participants in my workshops to produce a stack of five boxes, from a small #0 to a #4 box, in the Shaker tradition. Because the #2 box is the mid-sized and easiest to work of the stack of five boxes, I suggest students start with it.

Selecting and preparing stock

Box bands for the base and the lid of an oval box are thin slices of hardwood, or thick veneers, that will bend and tack without splitting. The Shakers used maple bands and pine tops and bottoms more than anything else. But there are a wide range of hardwoods that are suitable for box making including ash, cherry, walnut,

A stack of five Shaker boxes can be built in just a couple of days, even by novice woodworkers, as the author proves in his classes many times every year. The boxes are great for display or storage and make gifts that everyone loves to receive.

apple, hackberry, hard and soft maple and birch. Straight-grained wood is best for bending. Any wood can be used for the tops and bottoms.

I prefer quartersawn wood for both the bands and the tops and bottoms. In bands, the quartersawn grain reduces curling along the edges of the fingertips. Quartersawn wood is preferable for tops and bottoms because it has half the wood movement of flatsawn stock and is less likely to cause structural problems, especially in the larger sizes.

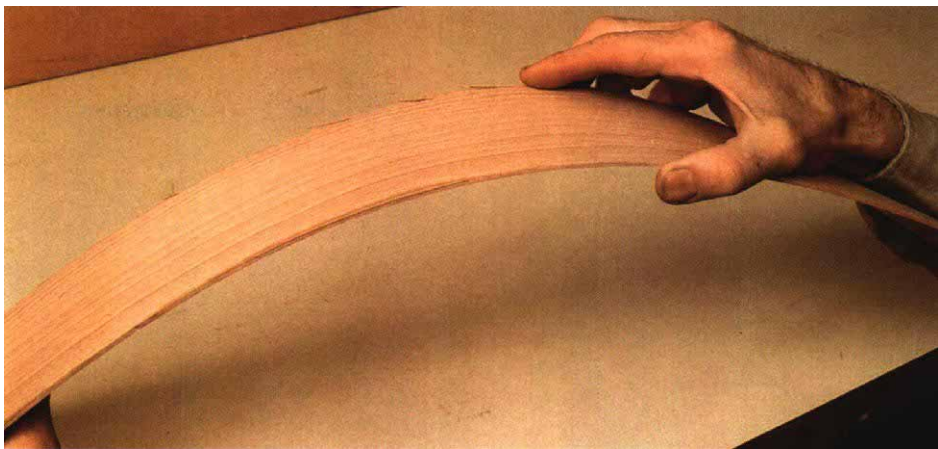
Moisture content also influences the workability and stability of the wood. Tops and bottoms should be dried to a moisture content (MC) of 8% to 9% to help prevent gaps showing up at the edges from shrinkage or splitting the band at the ends from expansion. Bands are easiest to work when air dried to 15% to 20% MC. Kiln drying band stock makes it brittle and more difficult to bend.

The thickness of the bands, tops and bottoms varies with each size box, as shown in the chart on p. 57. The most difficult part of preparing box stock is thickening band stock. Smaller boxes require thinner bands to make the tighter radius bends, but the larger boxes need the heft of the thicker veneers.

When I first started making boxes, I resawed stock on my tablesaw. A sharp, carbide-tipped, 40-tooth blade yields a clean cut, and the 3-in. capacity of a 10-in. table-saw is enough to cut bands for a #4 box in one pass. Tops and bottoms for up to a #4 box can be resawn by making a pass along each edge of the stock.

Most of the stock less than 10-in. thick that I use now is veneer-sliced to my specifications. These veneers are uniformly thick, and the knife leaves a smooth surface. But because the knife bends the wood during the cutting process, it can create checking in one side of the veneer. The checked side of the veneer will be more likely to split if placed on the outside of the box. The best way to determine the knife-checked face of veneer-sliced stock is to flex the band across its length in both directions. The side of the band that shows splitting or checking, as shown in the top photo on this page, should be used as the box's inside surface. Then bending will help control the splitting.

If a band does split while bending, you can still salvage the stock. Trim off the split edges and make a shallower box, often called a button box, or add a handle and make a carrier. The Shakers also had plenty of odd-sized boxes and carriers, although such boxes are less common.



Splits or checks in a veneer face, caused by the veneer slicing process, are quickly revealed by flexing the band across its length. The split face should be to the inside of the box to prevent the splits from continuing along the grain line.

Patterns, forms and hot-water trays

I developed finger patterns and top and bottom oval patterns from drawings in *Measured Drawings of Shaker Furniture and Woodenware* by Ejner Handberg (Berkshire Traveller Press, Stockbridge, Mass., 1991). I then made permanent patterns from prepainted aluminum coil stock used as trim by residential siding contractors for windows and doors. The coil stock cuts easily with a utility knife. Straight cuts are made by scoring the aluminum and then flexing it along the score. Curved lines can be scored freehand or cut with shears. I drilled $\frac{3}{64}$ -in.-dia. holes to show where the copper tacks go.

Oval bottom patterns are made to the dimensions shown in the chart on p. 57. The top oval patterns are about $\frac{1}{8}$ in. larger. If you enlarge the bottom pattern by 2% on a copying machine, you will have a close approximation.

I use two different types of forms when making Shaker boxes. One form is the core around which I bend the bands, and the other form is the shaper that I plug into both sides of the bands for drying. By making up several sets of the shapers, I can mass-produce boxes with just one set of cores.

I made the cores out of pine or basswood, bandsawing them to rough shape and then disc or beltsanding them to refine the shape. The shapers are made from $\frac{1}{2}$ -in.-thick pine for the #0 and #1 boxes and $\frac{5}{8}$ -in.-thick pine for the #2 through #4 boxes. Use the same oval patterns as for the cores, but cut slightly outside the line at a 10° bevel. The shaper slides easily into the band, but the increasing diameter of the beveled edge stretches the oval band as the shaper is pushed deeper into the band. Two holes drilled through



Beveling the finger edges and ends is much easier if the band is first soaked in hot water and securely clamped to the bench. Reposition the hardboard cutting block for each finger set so that knife kerfs from previous cuts don't affect the cut.

the shapers provide ventilation and a grip for pulling them out of the bands.

Another necessity for bending is a means of soaking the bands in hot water. I use a copper tray with a hinged lid, but a painted-steel window planter tray with a board on top also works well. Alternately, a vegetable drawer from an old refrigerator or a length of steel gutter with end caps and a plywood cover will do as well. An electric hot plate, as shown in the background of the photo at left on p. 56, works great for heating the water.

Shaping the fingers

Begin preparing the band stock by marking the finger pattern and tack locations, as shown in the drawing on p. 57, on the outside face of the band. Bandsaw the fingers along the layout lines to rough shape, and drill the $\frac{3}{64}$ -in.-dia. tack pilot holes. Trim the fingers to finished form by clamping the band onto a Masonite cutting



Tacking bands with an anvil backup, clinches the tack. Once tacked, the top band will be dried in place on the box band. Shapers in the box band on the bench keep the band's oval shape while it dries.

When wrapping a box band around the core, be sure the beveled fingers face out and that the tack line is centered on the oval. An electric hotplate heats the copper tray in which the bands are soaked for about 20 minutes before bending.

board and beveling the curved edge and end of each finger with a utility knife, as shown in the bottom photo on p. 55. I find it much easier to make and control the cut if I soak the fingers in a glass of hot water for a few minutes first. Try to maintain the bandsawn shape, and keep the tip of the finger about $\frac{3}{16}$ in. wide. Note that the bevel is greatest at the bases of the fingers, about 20° , and decreases to about 10° at the tips.

The final step in preparing the band stock for bending is to feather the end of the band opposite the fingers. Tapering the last 1 in. to $1\frac{1}{2}$ in. of the band eliminates a bump inside the box where the band ends. I prefer to taper the band on a belt sander using a scrap of wood to apply even pressure to the band. If you don't have a belt sander, then you can hand-plane this taper.

Bending the bands

Some folks shy away from projects that involve bending because they think it is difficult. However, the thin band stock, aided by a good soaking in hot water, bends easily around the core. You'll want to have everything ready, though, so you can bend the band before it cools, which it will do in about half a minute.

I soak the bands in hot water (180° or hotter) for at least 10 minutes; 20 minutes will ensure that the troublesome bands are fully soaked (nothing is gained or lost after a half-hour). When ready, wrap the

band around the core, making sure that the beveled side of the fingers faces out and that the tack line is aligned with the center of the oval core. If, during the bending process, you notice the veneer splitting or feathering, as shown in the top photo on p. 55, stop. Turn the band inside out, rebevel the fingers, reheat the band and rebend it with the better side out. From this point until the band is tacked together, be sure to hold all the fingers all the time or the band is likely to split up the middle between the fingers.

With the band wrapped around the core and the tack line centered on the core, draw a register mark across the top edges of the overlapped section at the front of the band. This register mark lets you open the band to release the core and then to push the band back together into the same size oval shaped on the core. Hammer the copper tacks, and clinch them at the same time by nailing over a pipe anvil, as shown in the photo at right on this page, to secure the fingers.

The top band is made by repeating all the steps for the box band, except the box band is used instead of a core to bend the top band. After tacking the top band, slide it back on the box band to dry.

Let the bands air dry for two days before continuing. Oval shapers pushed into the top and bottom of the band will maintain their shape. You can speed up the process with a fan, but this can increase the edge curling around the fingers.

Fitting tops and bottoms

Before proceeding with the top and bottom, I like to sand the inside of the box and top bands with 120-grit sandpaper. I also make sure the ends of the bands feather well into the inside contours while it's still easy to get at these surfaces.

To mark the oval shapes for the tops and bottoms, you can make appropriate-sized patterns for each box size or you can use the bands themselves as patterns. It usually doesn't make any difference when making the bottoms because the shapers have made the bands oval. But the top bands have a bump in them where they were wrapped over the fingers of the box band. On the #0 through #4 boxes, a pattern-shaped top can even out the oval. On larger boxes, the band is thicker and doesn't stretch so easily. Therefore, on the larger sizes, using the band for a pattern gives a better fit.

Once the bottom is marked and roughly bandsawn to shape, the final fitting is done on a disc sander with the table set to bevel the edge 4° . The cork effect of the beveled edge provides a tight fit between the bottom and the band where the edge has been flared by the shapers. Check the fit frequently as you gradually sand to the line. The bottom should be snug but not overly tight.

Finger direction on a box is determined by the side of the band on which the bottom is fitted. Most boxes have fingers pointing to the right, although left-point-

ing fingers are not uncommon. Top band fingers always point in the same direction as the bottom band. Determine which direction you want your fingers to point, and insert the bottom by fitting it against the front lap of the band and into both ends; then stretch the back of the band over the opposite edge. Press the bottom into place until the entire rim of the band is slightly above the surface.

When the bottom is pressed firmly into place, lightly sand it level on the belt sander. Now you also have a good opportunity to hide any gaps between the bottom and the band. First work some glue into the gap, and then immediately sand the bottom, either on the belt sander or by hand. The sanding dust will mix with the glue to form a filler that blends perfectly with the box.

The bottom is held in place with square, wooden pegs (toothpicks) driven into predrilled pilot holes. Pilot holes are $\frac{1}{16}$ in. dia. for the #0 and #1 boxes and $\frac{3}{64}$ in. dia. for #2 and larger boxes. Drill holes equally spaced around the box, 2 in. to 3 in. apart, tap the pegs into the holes and snip off the ends with diagonal cutters. You can then sand the toothpicks flush or trim them with a utility knife.

The top is made following the same procedure as for the bottom. However, a loose-fitting top band can be snugged up by changing the shape of the top oval. Elongating the top oval will move the slack in the band to the ends of the oval, causing the band to hug the box in the middle for a positive friction fit.

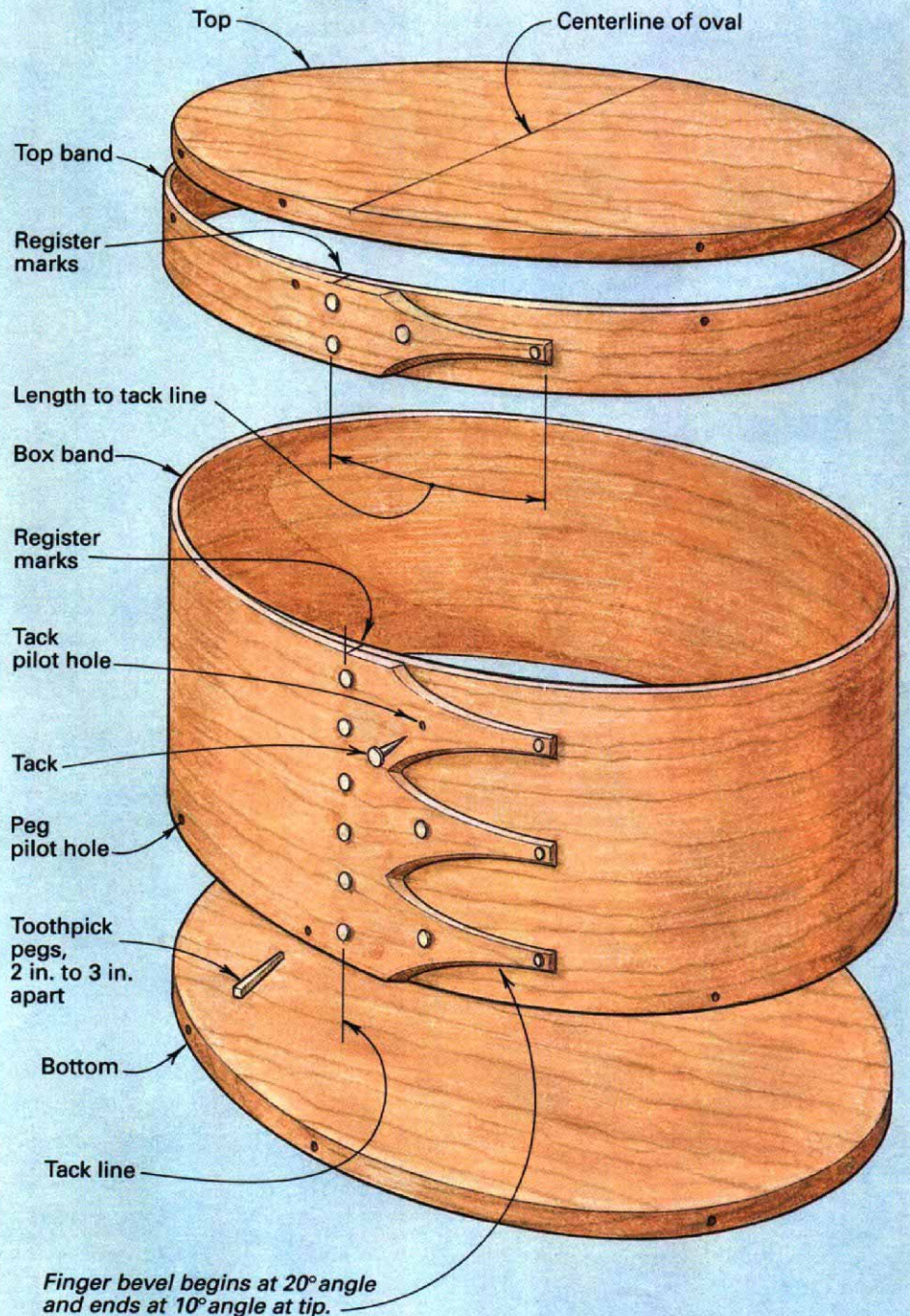
Finish the box

Shaker boxes can be painted, varnished or oiled. Before the mid-1800s, the Shakers usually painted their boxes. In later years, they varnished them. I use a clear lacquer on my boxes after hand-sanding the outside with 120-grit paper. I first brush on a sanding sealer, followed by a coat of lacquer. Although many woodworkers like the ease of application of an oil finish, I don't like the odor that lingers for months inside the closed boxes. Lacquer and shellac also give the sharpest image to my favorite bird's-eye maple tops. □

John Wilson is a Shaker box maker, instructor and supplier of parts, hardware and related tools in Charlotte, Mich. Contact the author directly for details on classes in your area or information on his complete line of Shaker box supplies and instructional material: The Home Shop, 500 E. Broadway Highway, Charlotte, Mich. 48813; (517) 543-5325.

Shaker oval boxes

The dimensions of oval box components vary depending upon the boxes. The chart below provides dimensions for the five most popular sizes.



Oval box dimensions

Box size	Bottom oval* (WxL)	Top and bottom thickness	Box band (TxWxL)	Top band (WxL)	No. of fingers-length to tack line	Tack size
#0	1 $\frac{1}{8}$ x 3 $\frac{1}{2}$	.195	.060 x 1 $\frac{1}{16}$ x 11 $\frac{1}{8}$	$\frac{7}{16}$ x 12 $\frac{1}{4}$	2 - 1 $\frac{1}{8}$	1 or 1 $\frac{1}{2}$
#1	2 $\frac{1}{16}$ x 4 $\frac{1}{16}$	.210	.062 x 1 $\frac{1}{2}$ x 15	$\frac{1}{2}$ x 15 $\frac{1}{2}$	2 - 1 $\frac{3}{4}$	1 or 1 $\frac{1}{2}$
#2	3 $\frac{1}{2}$ x 5 $\frac{3}{4}$	$\frac{1}{4}$	.067 x 2 x 19	$\frac{5}{8}$ x 19 $\frac{3}{4}$	2 - 1 $\frac{1}{8}$	1 $\frac{1}{2}$
#3	4 $\frac{1}{2}$ x 7	$\frac{1}{4}$	.072 x 2 $\frac{1}{2}$ x 23	1 $\frac{1}{16}$ x 24	2 or 3 - 2 $\frac{1}{16}$	1 $\frac{1}{2}$
#4	5 $\frac{1}{2}$ x 8 $\frac{1}{4}$	$\frac{1}{4}$	.077 x 3 $\frac{1}{16}$ x 27	$\frac{3}{4}$ x 28	3 - 2 $\frac{1}{4}$	2

* Top oval about $\frac{1}{8}$ in. larger than bottom oval.