Shaker Oval Music Box

BY JOHN WILSON

A simple gift for the holidays.

Two Shaker accomplishments were prolific song writing (there are more than 10,000 extant songs) and gracefully fingered oval boxes. This music box combines both. The song "Simple Gifts" is familiar to many from Aaron Copeland's "Appalachian Spring."

Shaker oval boxes were featured in the August 2003 issue (#135). A set of five nesting boxes was described there, and for those familiar with that set, this music box is the next-to-smallest size, called a #1. For those interested in looking at that article, it is on my web site ShakerOvalBox.com, along with the supply catalog and class schedule for The Home Shop, which specializes in materials and instruction in this traditional craft.

Making this particular oval box project has been simplified so that fewer wooden forms are needed to get it done. It is expected that first-time box makers will find this helpful. Certainly there is more than one way of doing things, and those familiar with alternatives should choose what suits you best.

Oval boxes are made in two stages: the bending of side bands, and the fitting of oval tops and bottoms. The bending requires an oval plug called a core for bending the hot, wet wood strips for the side of the box, and two oval shapers, or wood corks, to fit into each side to hold the bands while drying. This article describes using a piece of 1" foamboard (used for home insulation) as both the core and shaper. It is easy to make and use, and scraps of this material are thrown away either from damaged boards at the lumberyard or from building sites. A full 4' x 8' sheet of foamboard costs about $12.

The bands and top and bottom boards are fairly accessible to those with a woodshop. The dimension of the bands are 1 1/2" x 15" and 1/2" x 15 1/2". Both are made from wood 1/16" thick or a little thicker (.062" to .068"). Thickness is important for both bending flexibility and clinching of the small copper tacks. Cherry is used in this project, but Shakers used hard maple for most of their boxes. Veneer is available in 1/16" thickness, and the hard maple is perhaps more likely to bend better than any other species when using commercially sliced veneer.

A band of the size used here that is 1 1/2" wide can be sawn on either a table saw or a

A simple gift. *This Shaker oval box is simple to make, and more than just pretty to look at. Inside is hidden a music works that plays the classic Shaker hymn, "Simple Gifts."*

LEAD PHOTO BY AL PARRISH; STEP PHOTOS AND ILLUSTRATIONS BY THE AUTHOR

band saw. Drum sanders will finish the thin strips to exact size, but a few bands can be worked into shape if carefully sawn without using a thicknessing sander. Your table saw needs a zero-clearance insert at the blade to prevent the thin band from dropping out of sight. You will need something more accurate than your tape measure, however. Use a dial indicator. Flexibility is a function of accurate thickness, straight grain and wood that is fairly fresh that has not been excessively heated in the drying process. If one piece of wood turns out to be brittle, try another. Many different species will bend; hardwoods are generally better than softwoods.

The top and bottom boards are easier to dimension in the woodshop, as the 7/32" top and 3/8" bottom can be planed. (Check the length of the wind-up stem on your music works before dimensioning your bottom-board thickness. You want the wood slightly thicker than the stem length.)

Part I: Bending the Sides

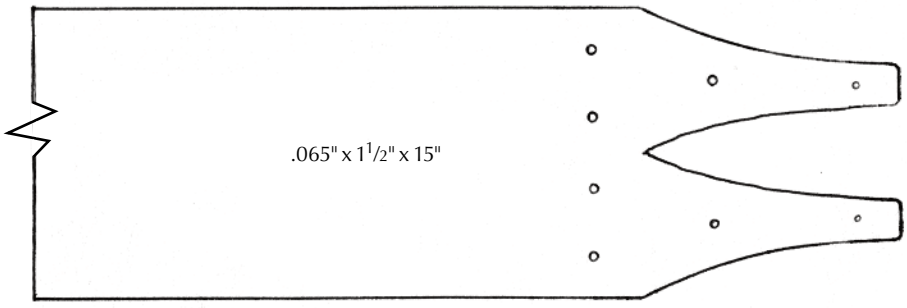
To bend the wood you'll need to cut the 1" foamboard into the ellipse given in the pattern at right. Be sure to transfer the start mark at the same time to know where to begin bending. Cut the ellipse with either a saw or a knife, and finish with sandpaper over a wood block.

The bands for the box are boiled in water for 15 minutes before bending them. These small bands can be handled in a cooking pot as long as it is not plain aluminum, which discolors cherry wood.

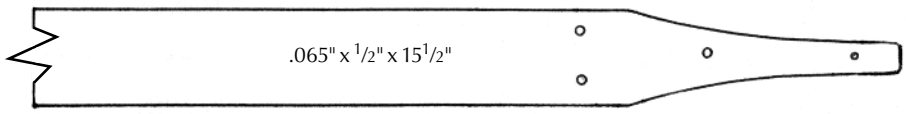
To prepare the bands for soaking, the non-fingered end is feathered with a taper starting 1" from the end. The fingered end is cut and drilled following the pattern above for fingers. Use a 1/16" or 3/64" drill bit for the copper tack holes. The fingers are trimmed using a utility knife to give the graceful shape with a slight 10° bevel to the cut. Both bottom and lid bands are prepared in this way.

Both the soaking and the heat (above 180°F) are important to successful bending. Bands with reasonable flex are done in 15 minutes, others may require 20 or 30 minutes. And, as mentioned above, some wood no longer retains flexibility for bending. Here, experience and perseverance are needed.

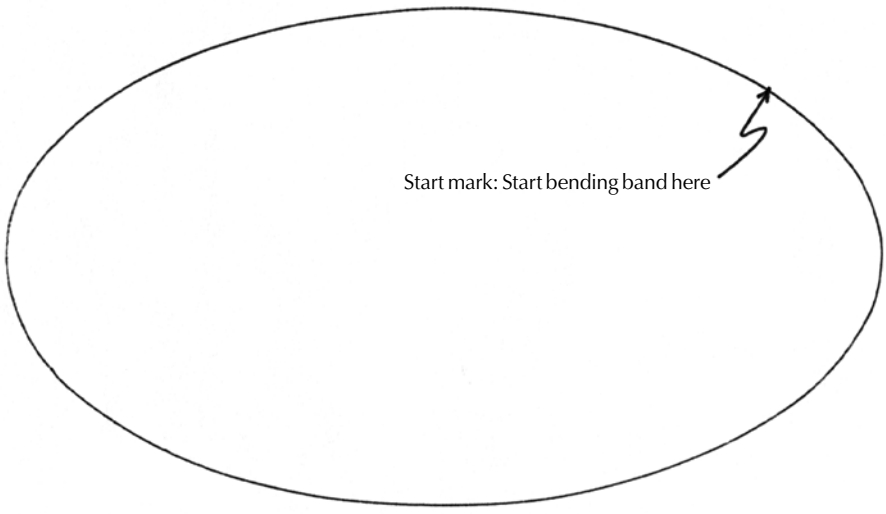
It is important to anticipate the next steps for bending. The thin wood cools quickly, so understand what you will do before removing it from the hot water. The start mark indicates where to begin and the band goes across the front of the oval. Bend the wood, giving



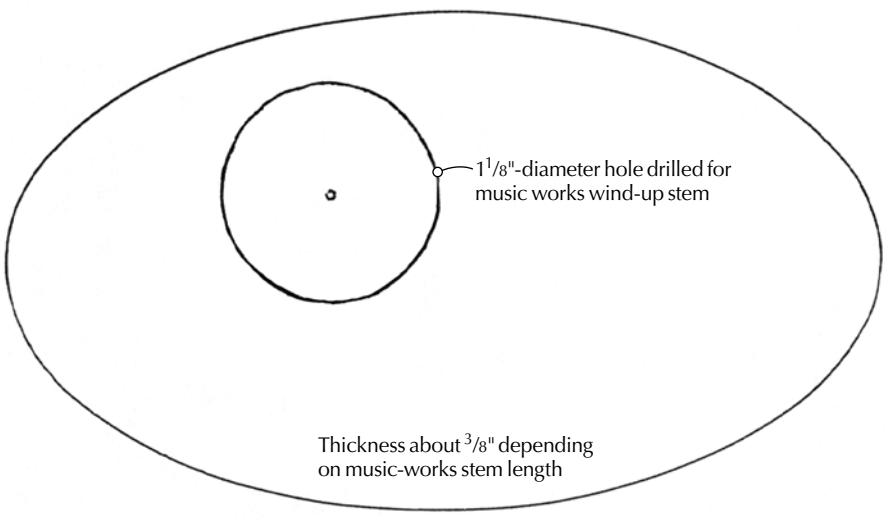
MAIN BAND



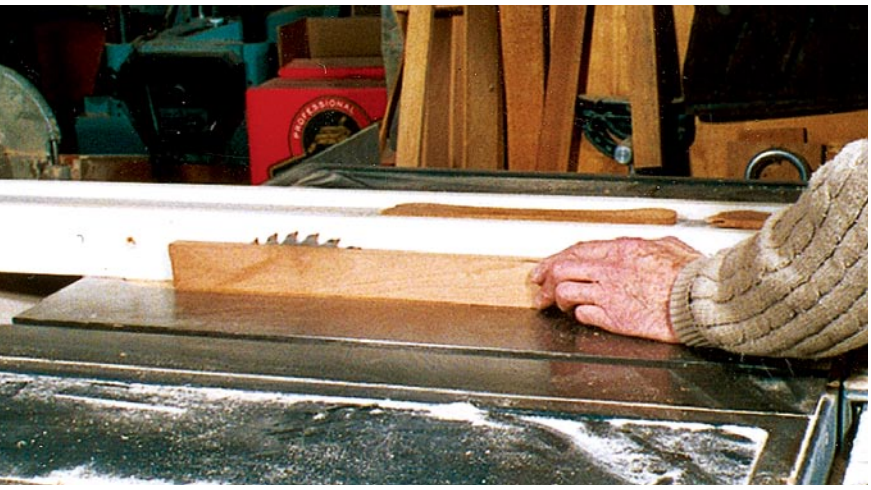
LID BAND



PATTERN FOR CUTTING CORE
on which to bend box band

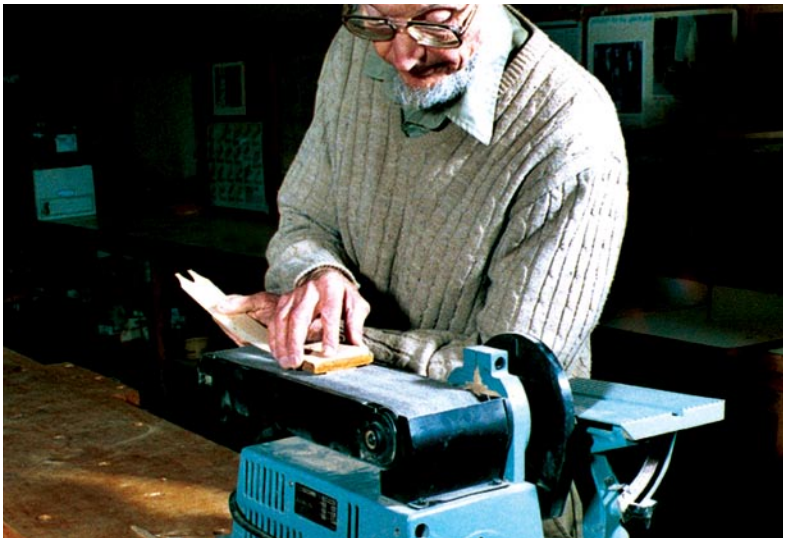


BOTTOM



1 ***Cutting the box band*** *1/16" x 1 1/2" x 15" on the table saw takes special precautions. Use a zero-clearance insert in the saw. Cut from stock that's twice the band length and keep push sticks handy. A sharp 40-tooth thin-kerf blade works best. Resawing on a band saw works well too, especially if you have a drum sander to smooth the band.*

2 ***Trim the finger end*** *after cutting the profile with a fine-toothed blade, or you can cut the entire profile with a knife. The holes for copper tacks are drilled as well. Keep the bevel edge at 10°.*



3 ***The band will be ready for hot water*** *after feathering the inside end. A wood block holds even pressure on the band to bevel the last 1" of the band.*

4 ***A piece of 1" foamboard*** *can make a handy core and shaper for the wet band. It is shown here being finished after cutting. The arrow points to the start mark for bending. If solid wood is used, separate shapers will be needed that are cork shaped to go in each side of the opening, as shrinkage in drying would lock up a wooden core with straight sides.*

5 ***A band of this length*** *can fit into a pan already on hand. However, plain aluminum pans will discolor cherry wood. The water needs to be hotter than 180° for a soaking that takes from 15-30 minutes, depending on the wood.*

6 ***Bending the hot wet band*** *into an ellipse on the foam oval core. Start at the mark, cross the front and press the band into the curve of the tight ends to give ample support to the wood fibers as they bend.*

support behind it with your hand (as shown in photo #6) rather like pressing it into the bend. When done, hold both fingers to prevent splitting up the middle. Make a pencil mark across the lapped band to record the size.

The band is allowed to open slightly so the foam core can be removed. Restore the size by observing the pencil mark. Because the foam core will be inserted to hold the band shape while drying, you want to pass the pencil mark slightly by 1/8" to make the ellipse smaller to ensure a tight fit. The band is tacked with #1 copper tacks made especially for Shaker oval boxes. These will clinch on the inside to make a permanent joint. An 8" length of 1" steel pipe will serve as an anvil.

The oval foam core is now used as a shaper by inserting it into the tacked band. A solid-wood oval would not work as shrinkage of the wet band would leave it permanently inside the band; only the foamboard is flexible. This is now ready for the top band to be bent and marked. Unlike the first band, you will observe this circumference mark exactly. Tack the lid band and return it to the bottom unit, matching the finger design for position and direction. This will now be left to dry for a day or two.

7 ***When done with the bend,*** *mark the overlap with a pencil to record the circumference. Hold both fingers of the band securely to avoid splitting, then remove the core. Close the band to its pencil mark, and then close it 1/8" more to ensure a snug fit when the foam core is used as a shaper.*

8 ***Small copper tacks clinch the band.*** *They need to go in straight and hit the pipe anvil to hook well on the inside. Avoid hitting the last tack at the finger ends too hard as it might split the wood.*

9 ***When the band is tacked,*** *press the foam core into the wet band to hold its shape for drying.*

10 ***The top band,*** *which will go around the lid, is prepared, soaked and bent in the same way as the bottom band. Here the band is being bent around the completed bottom band. Pencil mark the lap.*

11 ***The top band is removed*** *from the bottom, and closed to its proper size as marked. Do not go past the pencil mark this time. Use the same small tacks, and return the band to the bottom section for drying. Align the fingers as shown. Allow to dry for one to two days.*

12 ***The dry band is sanded inside,*** *and used as the pattern for cutting the top and bottom ovals. It is now that the finger direction is determined. Both the top and bottom go the same way. Note that the lid band will be turned over to fit on top when complete. Therefore, finger direction now will be as shown in the photo.*

Part II: Fitting the Top and Bottom

The dimensions of stock for the top and bottom are each different due to the music-works stem. It is the winding stem that defines the thickness of the bottom. Also, resonance varies with different wood. Pine, cedar or mahogany are preferred by instrument makers over cherry or hard maple, which are better bending stock. A bottom board 3/8" thick is the right size on the current stock of music works, but I've had some that were 7/16". A 1 1/8" hole is cut for the winding stem before fitting the oval board. The top for a #1 box is 7/32" thick. Both should be thoroughly dry so no shrinkage occurs after fitting into the band. Wood stored outside or in an unheated area should be allowed to dry inside for a few days after dimensioning and before fitting. Stand boards on edge so both sides dry equally.

13 ***Cut the boards on a band saw*** *keeping slightly outside the pencil line.*

14 ***Sanding to fit is done here*** *on the disc sander. The table is tilted up beyond a right angle to the disc (it's about 2°) to give the boards a slight cork effect. This will ensure a tight fit.*

15 ***Press the oval board into place*** *beginning with the front edge and ending at the back. This will avoid catching the feathered end as the oval is pressed in. Any gaps remaining in the joint are filled with a wipe of glue and sanded immediately to load the wet glue line with sanding dust.*

16 ***A simple guide is used for drilling*** *the holes for wood pegs. The wood strip is 1/16" x 1/2" x 8". The 5/64" drill bit is chucked with 1" exposed from the drill motor. Holes are centered on the top board. To the left you can see a scrap of top board used to check accuracy before drilling the holes every 2" around the perimeter.*

The bands are used to trace the oval for both bottom and top. Use a mechanical pencil for line accuracy. The direction of the fingers is determined by how you lay the band on the board. Most Shaker boxes point right, but whether right or left, both top and bottom point the same way.

Cut the oval then sand up to the line. For this project the edge is slightly beveled to aid in a tight fit. About 2° seems to work with the thick bottom board. The drawing is on the inside surface, so slightly lift the disc sander table to achieve the 2° cork effect. Lift the disc sander table until 1/8" shows at the heel of a square laid against the disc. If your disc table will not go beyond 0°, try taping a scrap of 1/16" veneer to the table to support the outside edge of the oval board when sanding.

Engage the oval board into the front face of the band, then work the back into place and push down with hand pressure. This will avoid catching and tearing the feather end. When flush all around, sand flat.

The board is held in place with wood pegs (toothpicks cut in half work well) in holes 5/64" drilled 1/2" deep every 2" around the perimeter. Holding the drill accurately to avoid breaking through the surface of the board is a challenge. Without making a special drilling jig, you can tape a strip of 1/16"-thick x 1/2"-wide veneer to your bench. Chuck the 5/64" drill with 1" of the bit exposed. Photo 16 shows how the veneer will guide your drill bit for depth and placement during this step. I suggest you try a scrap of the top board to be sure it is working as you expect.

The wood pegs are tapped firmly into the holes before being snipped off and sanded flush. Any gaps in the joint where board meets band can be filled with carpenter's glue wiped into the crack and sanded immediately so the wet glue line is filled with sanding dust as well as removing all traces of glue from the surface.

Part III: Music Works and Finishing

After all box parts are complete, the box is sanded. Oval boxes are traditionally left unfinished on the inside to avoid pent-up odors from oil or varnish. Any finish you use for other projects will work for your box. Cherry will achieve its own patina if left with a clear coat rather than stain.

The music works are attached with four small screws. Center the winding stem in the hole and locate the screw holes with a nail or sharp awl.

Children and adults too find the music box fascinating, especially hearing the sound amplified by putting the top on and covering the music works. The message of the Shaker song is one to match the beauty of the box – "'Tis the gift to be simple." **PW**

John is the founder of The Home Shop (ShakerOvalBox.com) in Charlotte, Michigan, which produces and sells supplies for making Shaker oval boxes. His shop was featured in Great Woodshops, in the August 2007 issue of Popular Woodworking *(#163).*

17 ***Tap toothpicks into the holes.*** *If securely in place, no glue is needed. Snip off and sand flush.*

18 ***The music works is screwed into the box*** *after all sanding is complete. Shaker boxes are normally left unfinished inside while clear coating the outside. Four small screw holes are centered and drilled if a hardwood board is used In softwood, only an awl point is needed. The stem will center in the hole. The 3/8"-thick bottom board allows it to sit flat on the table.*

Supplies

Any project is the conclusion of a variety of sources. The author acknowledges his debt to two individuals who have made this exact project first seen 20 years ago: Dick Soule, founder of Orleans Carpenters, and Dick Dabrowski, whose company, Shaker Workshops, has been at the forefront of bringing quality reproductions and adaptations of Shaker handwork to the public.

The Home Shop
517-543-5325 or ShakerOvalBox.com

A full line of Shaker oval box supplies, kits and instruction including:

- #1 copper tacks ($5/oz)
- "Simple Gifts" music works ($15)
- music box kit ($35)

Lee Valley Tools LTD
800-871-8158 or LeeValley.com

- #1 copper tacks ($5/oz)
- box making kits

Shaker Workshops
800-840-9121 or ShakerWorkshops.com

- "Simple Gifts" music works ($15)
- finished music box ($40)

Prices correct at time of publication.