

Clam Shell Box from Flat Stock

By Paul Coppinger

Abstract

Many Woodturners only have a Mini-lathe to turn on and often have an assortment of 4/4 flat stock lumber. And often this flat stock lumber is quality hardwood with figure. This project produces a small, decorative clam shell box suitable for storing a lady's rings or earrings using 4/4 flat stock on small lathes with minimum tools.

Materials

4/4 flat stock of figured hardwood such as curly maple, cherry or walnut, approximately 4" wide

Equipment

Mini Lathe, minimum

Chuck with step and #2 dovetail jaws

Tools

Bowl gouge

Parting tool

Bowl scraper

Vernier calipers or compass

Coping saw or Band saw, optional

1" forstner bit and drill or drill press

Procedure

Preparation of Flat Stock

Cut 2 square pieces, approximately 4" x 4" from flat stock lumber. Using a straight edge, draw diagonals to find the center of both sides of each piece. Either cut to a circle or leave square. To cut to circle, use a compass to draw a circle with a radius equal to the distance from the center to an edge and then cut a circle with a band saw or coping saw. Decide which side of each piece will be the outside. Use a 1" forstner bit to drill a 1/8" deep hole on the outside of each piece.



Fig. 1 Curly Maple Flat Stock with 1" Forstner Hole

Turning

Female (Mortise) Side

1. Install a chuck with step jaws on the lathe and lower the lathe speed before turning on the lathe. Attach one piece to the lathe by inserting the step jaws into the 1" hole, bringing the tailstock with a pointed live center to the center mark of the other side and expanding the jaws to hold. Manually rotate the piece to insure it is square to the lathe. Initially leave the tailstock in place for safety purposes. To avoid splintering of the side grain while turning, utilize a "3-45" pull cut. (The "3-45" pull cut means adjust the tool rest to 45 degrees to the lathe, lower the tool handle to 45 degrees and turn the flute to 45 degrees.) Move the tool rest as close as possible to the round edge or corner of the piece. Manually rotate to insure clearance. Turn on the lathe, always standing off to the side so nothing can fly off the wood and hit you, and then adjust the speed to a safe, fast speed (when turning wood with voids, the faster the rotation, the minimum time the tool is not in contact and hence, smoother cutting). Use the "3-45" pull cut to round the piece, using very light cuts.



Fig. 2 “3-45” Pull Cut with Tool Rest at 45 degrees to Lathe, Tool Handle down at 45 degrees, Flute closed to 45 degrees

2. Use a parting tool to cut a square shoulder cut a minimum 1/8” deep on the face, producing a diameter large enough for dovetail jaws to fit into, i.e., 2” minimum for Oneway Talon dovetail jaws. This shoulder cut is the inside diameter of the mortise side of the lidded joint. Use a bowl gouge to remove wood to the right of the shoulder cut, producing a dome shape to the inside of the bowl (remembering the forstner bit hole and point on the top side). Use a scraper to clean the inside of the bowl if necessary. Slightly bevel the area between the shoulder cut and the edge of the piece. Sand being careful to not damage the squareness of the shoulder cut. Apply wax to the dome.



Fig. 3 Mortise Side of Clam Shell Box-Inside

3. Reverse the piece and attach to the lathe with dovetail jaws on the chuck by expanding the jaws inside the shoulder cut. (Insure that the jaws contact completely against the side and bottom of shoulder cut.) A clam shell is basically an ogee shape on the top side. Mark the edge about 1/8" from the inside edge. Use the bowl gouge to reduce the thickness until the forstner hole and point are removed. Form the ogee with either a single bead-going-to-a-cove cut starting from the center or a cove cut from about half way from the center to the 1/8" mark, followed by a bead cut to round and smooth the inside edge of the cove. Shape and sand the top side to produce a smooth continuous ogee with rounded edges at the clam shell mouth.

The shoulder cut now becomes the female or mortise side of the box.



Fig. 4 Mortise Side of Clam Shell Box-Outside

Male (Tenon) Side

1. Repeat step one above for the other piece.
2. Using calipers or compass, measure the inside diameter of the shoulder cut in the female side. With the lathe turning, transfer this diameter by allowing the left point only to scribe the wood while the right point is aligned to the resulting scribed line. This is the outside diameter of the tenon of the lid joint. Use a parting tool to produce a 1/8" wide cut almost to the line. To make a "snap or pop" fit that requires two hands to open, taper the cut at the line until the mortise will go on the tenon halfway (approximately 1/16"). Now carefully cut a taper on the inside of the tenon producing a slight peak at the middle. Test fit the mortise side. Adjust cuts to both sides making very, very small cuts to each side of the taper and test fit again. Continue until the two sides "pop" when pulled apart. If you remove too much tenon, you have just made a one-handed opening joint. Leaving the tenon about 1/8" thick, use a bowl gouge to remove wood producing the inside of the bowl (remembering the forstner bit hole and point on the top side). Use a scraper to clean the inside of the bowl if necessary. Slightly bevel the area between the tenon and the edge of the piece. Sand the edge and inside of the dome being careful to not sand the outside of the tenon. Apply wax to the dome.



Fig. 5 Tenon Side of Clam Shell Box

3. Reverse the piece and attach to the lathe with dovetail jaws on the chuck by closing the jaws on the tenon cut. (Insure that the jaws contact completely against the side and bottom of tenon cut.) Mark the edge about 1/8" from the inside edge. Form the ogee with either a single bead-going-to-a-cove cut starting from the center or a cove cut from about half way from the center to the 1/8" mark, followed by a bead cut to round and smooth the inside edge of the cove. To insure both sides of the clam shell are equal thickness, more will have to be removed from this side. Shape and sand the top side to produce a smooth continuous ogee with rounded edges at the clam shell mouth and that matches the mortise side of the clam shell in shape and thickness.



Fig. 6 Clam Shell Edges

Finishing

Use an oil finish (such as tung oil), lacquer or wax for the outside finish being careful to not get any on the box joint.



Fig. 7 Completed Calm Shell Box