



Turning a Three Sided Box with Sloping Sides

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This article describes making a 3-sided box with a lid. The front page shows a completed box and the last page as a salt and pepper mill by Pete Wiens.

**Caution:**

***Always use safety glasses or a full-face shield when turning anything on a lathe.***

Materials List

Wood: 3 x 3" x 4 1/4" (minimum) and for a jam chuck.

Copy of the Multi-Sided Box documentation.

Equipment Required

Oneway Safety Drive  
 Revolving Live Center  
 Scroll Chuck  
 Jacobs Chuck  
 Compass  
 Ruler  
 Spindle Roughing Gouge  
 1" Forstner Bit

**Marking the wood blank**

- Mark the blank as described in Section 2.2.1 of the Multi-Sided Box document so that the completed box has sloping sides. For this project use a square (3" x 3" x 4 1/4") or rounded wood blank

Top



Side



- b. Draw a line down the side of the box to assist in lining up the markings on the bottom of the blank

Bottom



- c. Mount the wood blank on the true center and ensure the tailstock is locked tight. In this project a Oneway Safety Drive is used in the headstock. Any catches with the wood blank the blank will stop spinning without any problems. Using a spindle roughing gouge turn the blank to the shape below using the *outside* circles previously marked at each end of the wood blank.



- d. Remove the turned blank, and using reference points 1, 2, and 3 mark the three sides or arcs with a compass at both ends of the wood blank. This is a reference for the maximum size of each of the three sides. Use the instructions as described in Section 2.2.1 of the Multi-Sided Box document. Finally, draw lines down the side connecting reference points 1, 2, and 3 at the top and bottom of the wood blank. These lines will identify where each sides is connected.



- e. Remount the turned blank placing drive point **1** on the top of the wood in the lathe drive center, and drive point **1** on the bottom of the wood in the tailstock. Ensure the tailstock and the tailstock drive are locked tight. Ensure there is sufficient clearance with the tool rest. Rotate the wood as fast as you are comfortable with, and the lathe is not vibrating.

**HINT** - Place a dark board or cardboard behind the wood so that you can see the edge you are turning. This will help to ensure straight edges.

- f. Turn the cylinder down close to the arcs at each end of the cylinder. The intent is to get close to each arc to begin with, then with the lathe at a higher speed complete each of the three sides. The higher speed will give a smoother finish.

**HINT** - Stop the lathe frequently to ensure you do not go past the arcs at both ends of the cylinder.



- g. Repeat this process using drive points **2**, and **3**. Use the lines down the side of the wood blank as a reference point to stop removing wood.



- h. When the turning blank is balanced turn up the speed of the lathe until you are comfortable. The faster the lathe the better finish on the sides of the box.
- i. Keep repeating this process using drive points **1, 2, and 3** using the arcs at each end and the points of each of the arc intersections to ensure the three arcs are the same size.



**HINT** – If necessary, use a disc sander very lightly to make each of the three edges sharper, and finally hand sand to a smooth finish.

## Drilling a hole and finishing the top

- a. Mount the wood blank on the true center and ensure the tailstock is locked tight. Cut a tenon on the base of the box to fit your chuck jaws. Do not cut the tenon too small.



- b. Mount the chuck in the headstock, and the tenon in a scroll chuck jaws. Use the tailstock drive to check the alignment is correct.
- c. Use a 1" Forstner bit to remove the bulk of the inside of the base. Use a scraper to complete shaping the inside of the box. Finish the walls to about  $\frac{1}{4}$ ", and sand the inside to finish. As a guide the inside will be parallel with the outside edge, so be careful of not cutting through the side.



- d. The top of the inside should be finished to exactly  $1 \frac{3}{8}$ ".

- e. Use a 3/8" bowl gouge to cut the indentation in the top of the box. Again, turn up the speed of the lathe you are most comfortable with.



- f. Finally cut a groove in the top of the box for the bottom of the lid.



### **Finishing the base of the box.**

- a. Make a jam chuck or expansion chuck to fit the diameter of the hole in the box. Install the jam chuck/expansion chuck with the box attached on the lathe. Using a 3/8" bowl gouge cut and shape the base of the box.

### Completing the lid.

- a. Start by mounting a piece of wood for the lid between centers and turning a cylinder slightly larger than the diameter required for the lid. Cut a tenon at one end for your chuck.



- b. Place the tenon in the chuck. Measure the inside diameter of the box and cut a tenon on the end of the blank. The first tenon will fit into the inside of the box.
- c. Measure the outside diameter of the groove and cut the second tenon to this diameter and to the depth of the groove. Approach this cut slowly by stopping the lathe and using the box to ensure a good fit.
- d. Sand and polish the inside of the lid.





- e. Turn the lid blank around, and using the tenon cut in c. above insert in a chuck. Shape the lid to any design you like. Sand and polish the lid.



### The Completed Lid



**Completed salt and peppermill by Pete Wiens**

