

## Barrel Hinge Boxes by Richard Anthony (rmartin)

"...there's a lot of decaffeinated brands on the market that are just as tasty as the real thing"  
Chris Knight (Val Kilmer) "Real Genius"



It's true; there are dozens of pen boxes, pouches, and tubes on the market at reasonable prices, so why go to the time and effort to make your own? You'll have to answer that question for yourself. In my case, I had the privilege of working with some historic Maple wood thought to be the inspiration for the late great American poet Robert Frost's "Tree at my Window" poem. I didn't start out to make a tutorial on barrel hinges, rather to document the use of this historic Maple wood. Hopefully you will find this record useful, or at the least, entertaining. So let's get to it shall we?

Unfortunately, I did not take a picture of the blocks of wood straight out of the shipping box. I can tell you the blocks of wood were neither flat nor square. I began by sanding one side and then running them through a table saw and then squaring the ends with a miter saw. After trimming and squaring, I had 6 blocks of wood which measured 1 1/4" thick by 2 1/2" wide by 6 1/2" long.

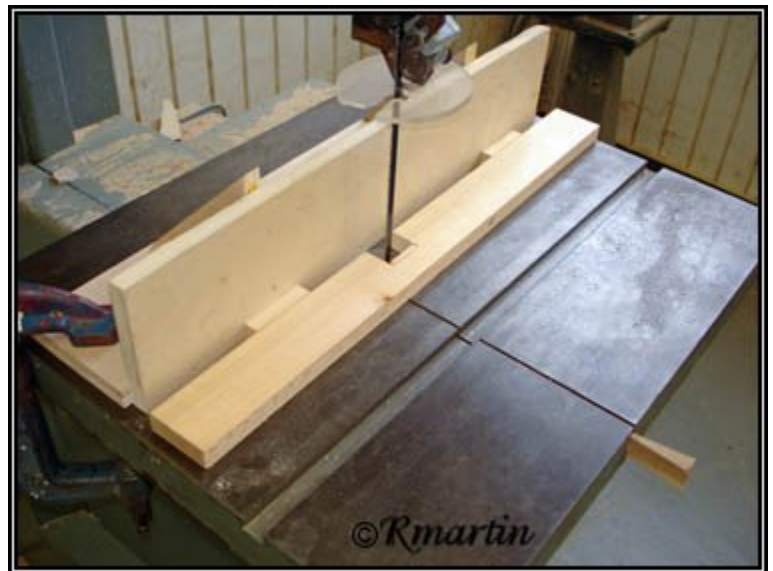
### Separating lid from box

The band saw is used to cut the blocks into 2 parts; bottom box and top lid.

Mark a pencil line down the center of a scrap piece the length of the bandsaw table. Cut freehand along that line half way. Without moving the piece, turn off the saw and clamp the piece in place. This sets the drift angle.



A rip fence jig is made by gluing and screwing together 2 pieces of plywood at a 90 degree angle. Shims are used to set the fence 7/8" from the blade. (Note: I recommend a 1" minimum for the bottom, but I was limited with the wood at hand.)



With the rip fence clamped in place, a scrap piece of wood is tested. and at every step in the process. Adjustments are made if necessary and another piece is tested. Once everything is just right, it only takes a few minutes to cut each block of wood.



## Drilling the holes for the barrel hinges

I'm using 5mm barrel hinges ordered online from Pen State Industries. They come in packs of 10 for about 5 dollars. I also purchased two 5mm drill bits as these are hard to find in my area. The trick with barrel hinges is to align the holes of the top and bottom precisely. This is accomplished at the drill press easily and made repeatable with two simple shop made jigs.

Cut a piece of plywood large enough so that it can be clamped to the drill press base. Glue two 1/4" strips in a T-shape making sure the inside of the T's are 90 degrees.



The second jig is made from 3/4" shop stock 1" wide by 12" long. A groove is center cut along one edge. This is done by making a couple passes on the table saw until the mortise is just wide enough to hold a piece of 1/4" plexi glass. Cut on a 45 degree angle and glue in an L shape. Glue in the plexi glass. Lastly, drill two holes in the plexi glass 1" and 5 1/2" from the inside corner.



Align the T-base, speed square and drill bit with the bottom of the box. Once everything is nice and snug, clamp the T-base to the drill press.



Once the depth stop on the drill press is set, the left side hole of 1 or 100 boxes can be drilled quickly and exactly. Repeat the alignment set-up for the right side hole.



The procedure is the same for the box lid. By using the upper section of the T-base, it's easy to visualize how the holes of the bottom and of the top will align.



Make sure the inside of the top is face up and the wood grain is aligned with the bottom. Drill the left side hole for each box lid. Rinse and repeat for the right side.



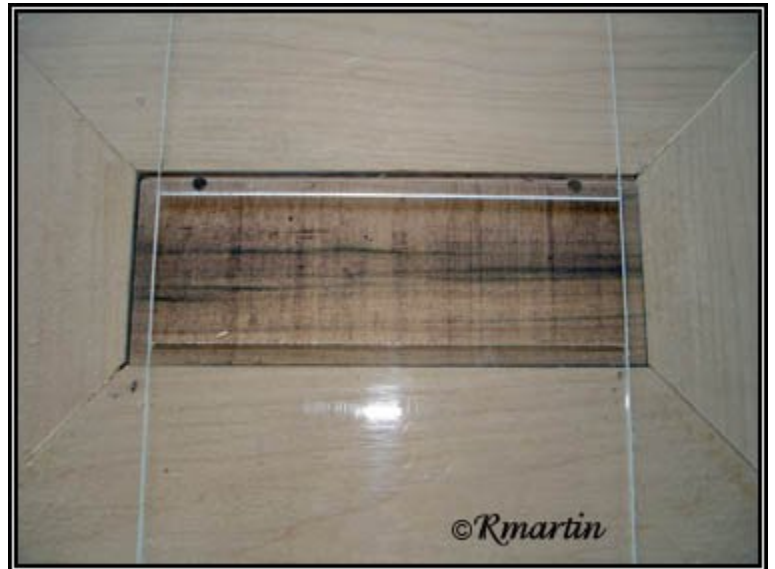
In order for the barrel hinges to function properly, a bevel is cut using the table saw set at 45 degrees taking just the thickness of the blade. This step is necessary if the box edges are kept square, but I will be using a 1/4" round over bit on all edges making this step superfluous.



### **Mortising the Box Cavity**

Make a frame for the box. It should be wide enough for a router base to operate freely. It should also be the same thickness as the box. Strips of 1/8" plexi-glass are screwed to the frame adding 3/8" overhang to the inside of the box cavity. This will create a stop for the router.

Place the frame over the box. If there is any play at all, use shims from underneath. Clamp the frame to shop table.



A router is one of the most versatile shop tools. Here, a brass collar has been added. They are available for most router brands. A straight edge mortising bit is installed.



Start by taking no more than a 1/4 inch. Everyone mows the grass a different way. I go around the edges and then pull the router towards me one row at a time. Make several passes until the desired depth is achieved.



A 1/4 inch round over bit is installed on a dedicated router table. All edges, top and bottom, inside and out, are routed.



### **Applying the Finish**

Sanding is the most important part of finishing. No finish will correct a poorly sanded piece of wood. In fact, the finish will magnify sanding defects. I spent 2 hours on each box using a palm sander, block sander, and hand sanding with 120 grit, 220 grit, 320, and 400 grit. The end grain edges were shoe-shined with 600 grit.



In the images below, the boxes have been washed with a proprietary mixture of sanding sealer and stain giving the wood a tanned look. They were then sprayed with 5 coats of high gloss lacquer. After curing, they were polished with micro-mesh sanding cloth.



### Installing Box Liner

After considering different patterns and colors, I decided to go with a neutral grey felt. An elastic band is glued in at an angle. CA glue was drizzed around the outer edge, and rope piping installed. The rope piping was then drenched with CA glue. The rope piping dried hard and clear. Note: CA needs time to cure before the box is closed. Failure to do so will result in a whiteish powder accumulating on the wood and liner as the CA "gases off".





### Installing the Barrel Hinges

By now you're probably saying, "Wasn't this tutorial about barrel hinges?" As I pointed out in the beginning, the trick is drilling the holes. Installing the barrel hinges is the very last step and it's a no-brainer. Use a little bit of epoxy glue and hand press in place. Adjust if necessary with lid in the open position and it's done. And now I'm done.



**Comments and suggestions**  
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