Making Beads of Courage boxes using flat wood stock and thin walled 6 inch white PVC sewer pipe.

Top of the Beads of Courage box.

Safety first:

Talk of safety, wear eye protection, wear a dusk mask for the dust protection, loose clothing should be tied back or removed, long hair must be tied back.

Remember just because I, “Johnny”, do it this way may not be the only way. It is just how I do it and it works for me.

There are several different ways of doing the Beads of Courage boxes (BOC). This is just one example and it is my hope that you will take what I give and then make some BOC boxes of your own style.

Purchase 6” X 10’ thin walled white PVC sewer pipe, it is about $22.00 here in the Austin TX area from Ferguson’s. They have stores nationwide.

Describe how to cut the PVC pipe:

Use a 2” wide strip of thin Aluminum or even cardboard. Cut either material just short of going around the PVC pipe.

Place a hose band clamp over the aluminum or cardboard and tighten the clamp down onto the PVC at the length desired for a BOC box. I find from 4 to 6 inches makes a nice box.

Mark along the aluminum or cardboard with a permeant type of marker such as a Sharpie.

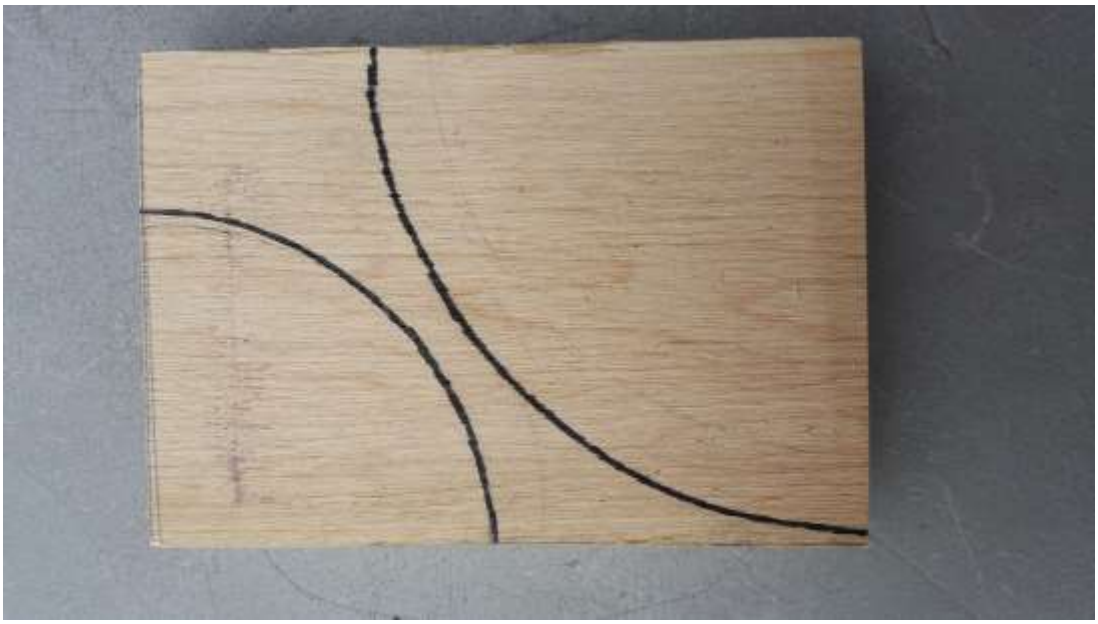
Cut the PVC pipe with a saw of choice, saws-all, saber saw, small skill saw, handsaw or band saw using a V block so the PVC will not roll. I use a metal type band saw with a platform table when cutting the PVC pipe.

Note: The PVC pipe is not exactly round so keep that in mind as you progress.

Making the wooden jaws:

These will be used to trim up the ends of the PVC pipe on the wood lathe.

Cut four pieces of hard maple stock, about 5&1/2” X 6&1/4” inches. Other woods may be used as long as it is strong wood.

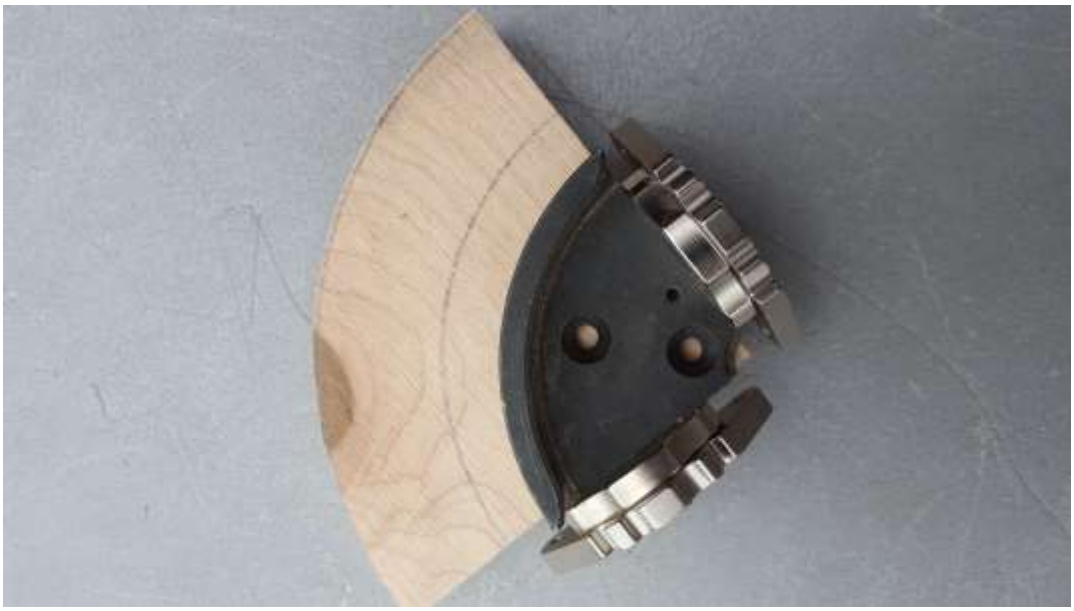


Use a compass and mark quarter circles, one for the Stronghold chuck 4&1/4 inches and the smaller quarter for the talon chuck at 3 inches as marked above. Do this on all four pieces of Maple stock.

All four should look something like this when marked.

Cut the large and smaller quarter’s out using the band saw. The picture below shows what the large and smaller quarter would look like.

Using one of the jaws from the chuck, place 2 magnets along the sides so part of the magnet is past the bottom edge of the jaw. Next, place this onto the wood keeping the magnets next to the wood. In the picture the magnets are from a hard drive, other magnets should work as well.



Use the drill press for better drilling, drill holes corresponding to the holes in the jaw being used. For Stronghold & Talon chucks. This is a number “C” Drill bit which is the correct size for 6 MM screws. Other chucks may use a different size screw. See the picture below.

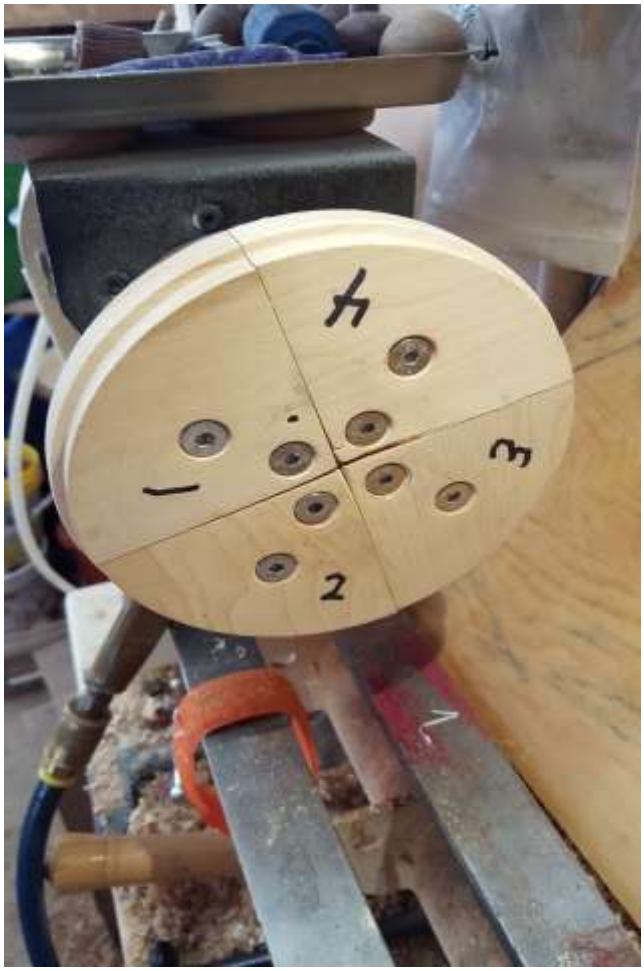
Counter sink all of the holes for the screws so that the screws will sit flush or below the surface of the wood being used.

Note: The 6mm screws may be purchased at most hardware stores.

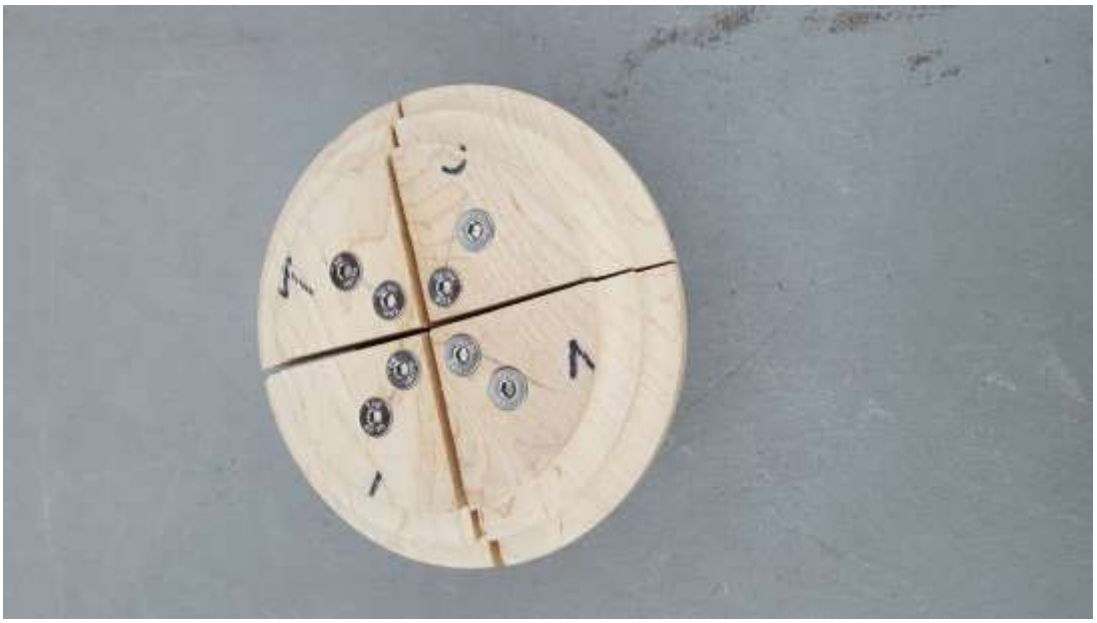
Place the drilled blanks onto the chuck with the screws slightly loose. Tighten the chuck down then tighten all screws. This will help align the wood to the chuck.

Place the chuck in the closed position onto the headstock. True up the outer side using the tool of choice. I use the Hunter tools as they give me a very smooth cut requiring very little sanding. I do sand the outer edge. This is done to make them look nice.

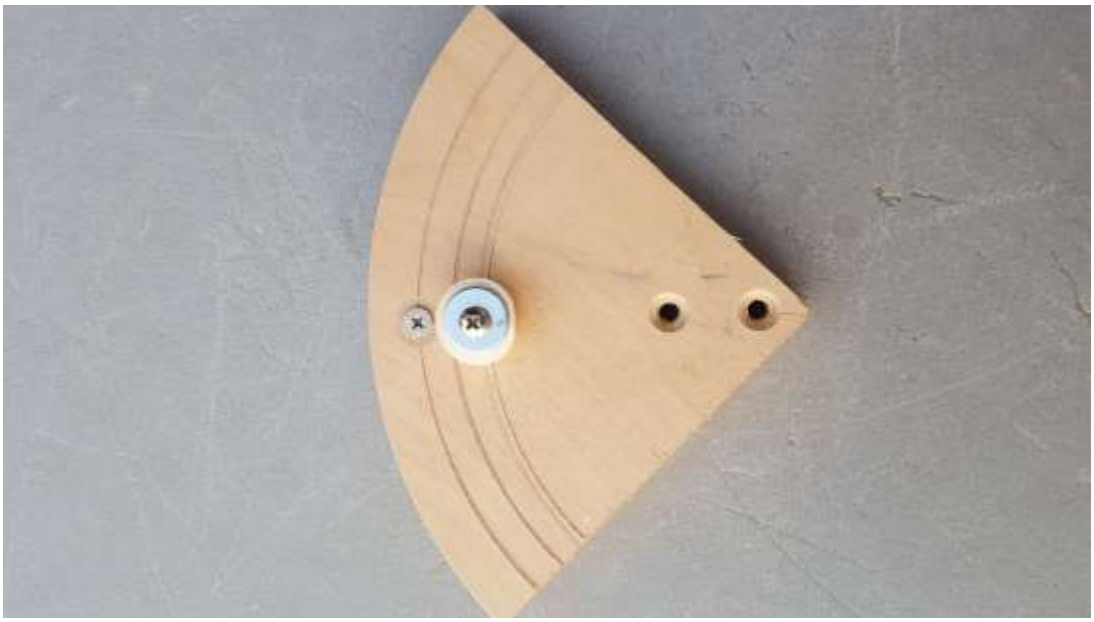
Cut a tennon on the inside face of the wood for the Stronghold chuck using a parting tool or skew chisel. Next see that the 6 inch thin walled PVC pipe will slide over the tennon on wooden jaws on the chuck. If not, trim the wood down some more until the PVC fits onto the tennon area.



I have cut steps in the jaws of the Oneway Talon chuck allowing me to mount the top to clean up the inside. More on this later.



I have made much larger wooden jaws to hold the top and bottom pieces for the BOC boxes. You can do this if you do not have the Jumbo type aluminum jaws.



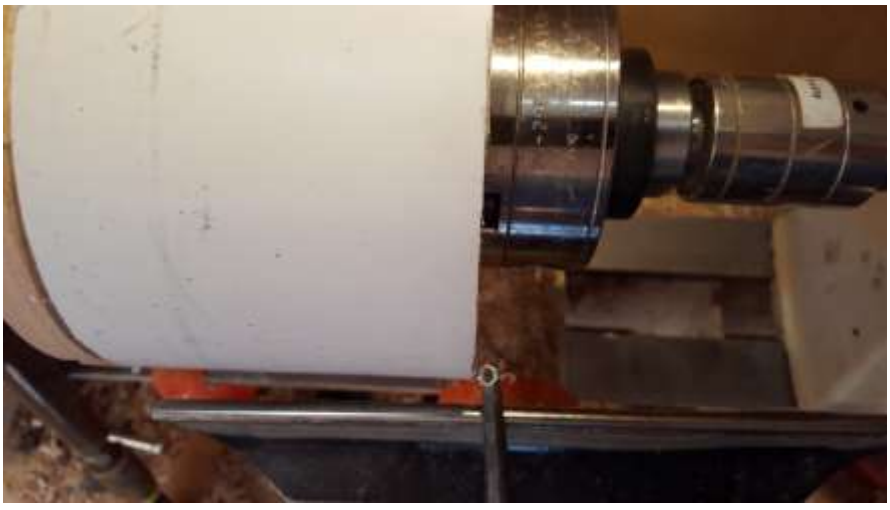
Trimming up the ends of the PVC pipe:

Note; it is a messy job, use a vacuum to suck away the PVC as it is being trimmed off. It will help but if you do as many as I have, you will still get the PVC everywhere.

Place a cut piece of PVC on the chuck at the headstock on the step of the tennon. Slide the tailstock up with the Talon chuck on live center. Expand both chucks to support the PVC pipe for cutting. You will need the tailstock adapter for this of course.

The picture below shows the live center adapter and Talon chuck for this operation.

Turn on the lathe, about medium speed and carefully true up the end of the PVC pipe at the tailstock end. Stop the lathe, loosen up both chucks, turn the PVC around, tighten both chucks and again true up the PVC at the tailstock end. I use the Hunter #1 tool, see the picture below.



Stop the lathe, use a deburring tool to remove any frayed PVC both inside and outside. This can also be done with the PVC off the lathe. Do NOT use a deburring tool with the lathe running as it may grab the PVC.

The picture below shows the use of the aluminum jaws to true up the PVC.

Friction drive:

Fasten some wood to a metal faceplate with sheet metal screws, turn the wood down and make sure the face is flat or slightly concaved. See the picture below for two examples.

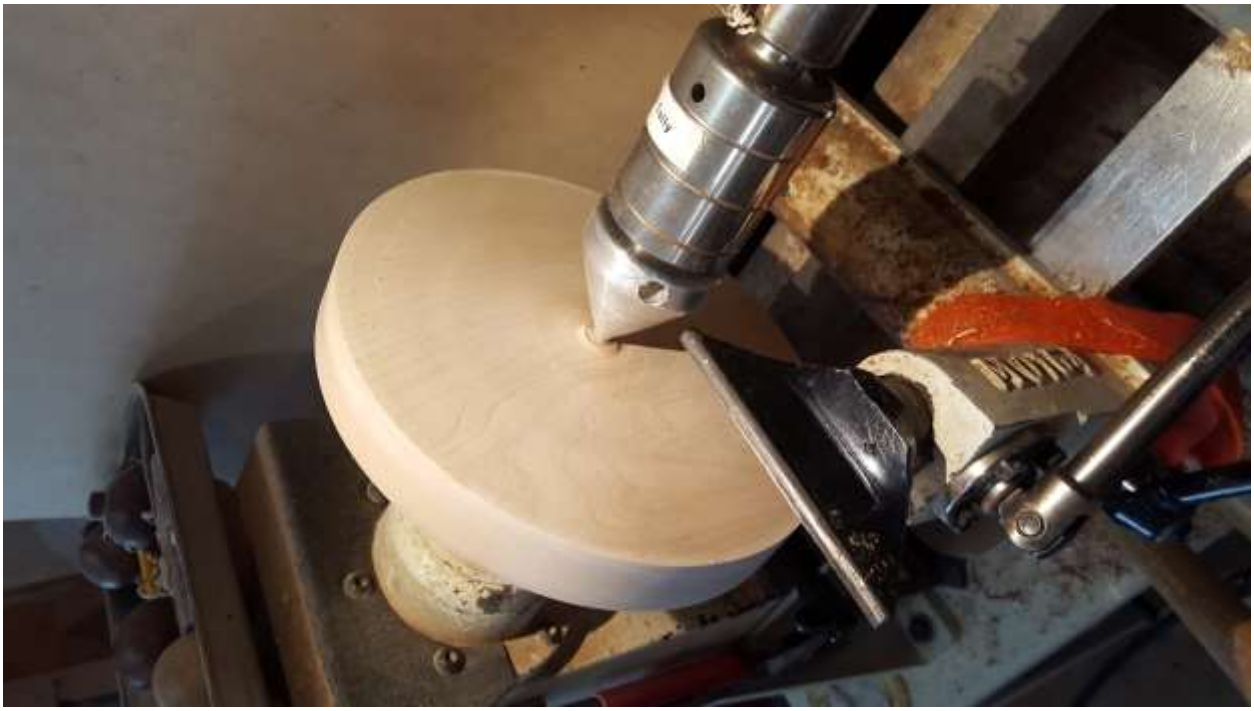
Place the wood that has been cut round on a bandsaw between the wooden disk and tailstock. I use the Hunter tools to true it up and also true the face towards the tailstock live center. You of course can use any tool of your choosing.

Making the BOC box parts:

Using flat woods, the wood can be same type or different woods. This is true for the top and bottom of the box.

Making the top and bottom:

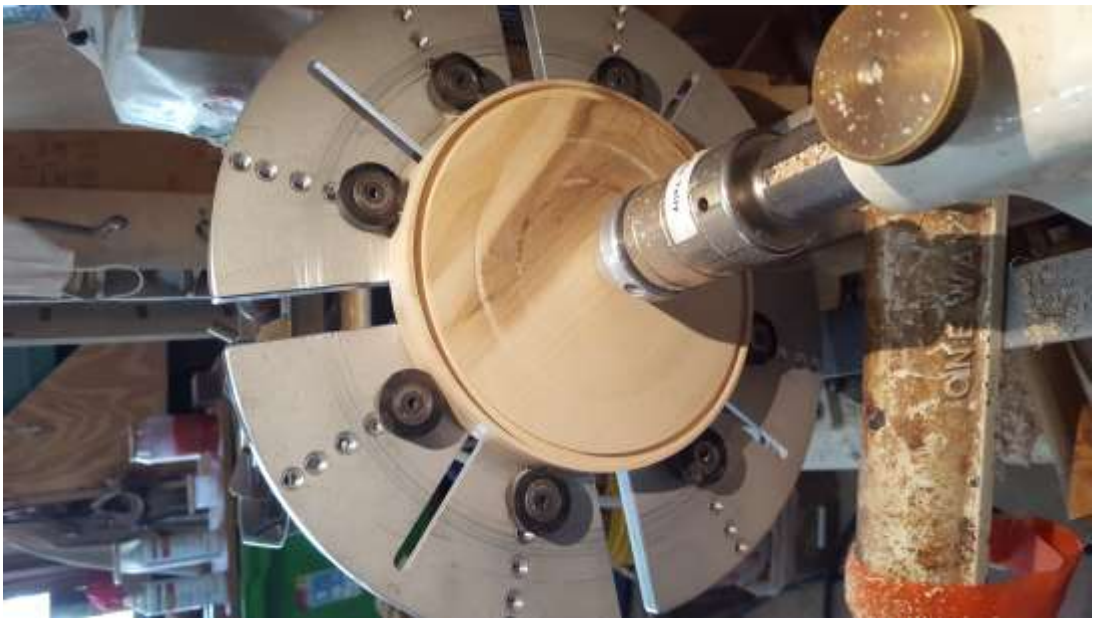
The outer diameter for the BOC boxes is about 7 inches. Back the tailstock away to access the wooden disk that you have made.



Using a compass, or dividers, mark a circle about 6 to 6&1/8”. Remember to allow for fabric on the PVC, test the fit with the fabric glued onto the PVC. The grove can be from 1/8” to 1/4” deep depending on the thickness of the wood used. You will get a feel for this step as you progress along.

The picture below shows the plywood jaws.

The picture below shows the aluminum jaws.



Test fit the PVC into the grove, see the picture below. Remember to allow for the fabric being used.

Thin down the inside of the bottom to make the BC box lighter. For safety, keep the tailstock up until just a small nub is left. See the picture below.

Back the tailstock away and remove the small nub.

Sand the inside of the bottom smooth going though all grits of sand paper.

Bottom inside is sanded smooth.

Turn the bottom around and finish the bottom as shown in the picture below. I like to put signature rings in the bottom.

Cutting the opening for the lid:

The top disk is basically turned the same as the bottom between the friction drive and the tailstock. Cut the grove for the PVC same as for the bottom. The picture below just has the tennon for the PVC not a grove, this is another option for the BOC boxes.

For the top opening, mark a circle with a compass and cut into the wood about half way, see the picture below.

Turn the top disk around and cut through to the previous cut as in the picture below.

Back the tailstock away and remove the center disk.

Put the Talon chuck with the wooden step jaws onto the headstock. See the picture below for the wooden step jaws.

Place the top onto the step jaws.

Clean up the inside and sand this area. Shape the outer area for the top of the box.

Top shaped and sanded smooth.

Turn the top around to undercut the wood to reduce more weight.

Top under cut and sanded smooth.

Making the lid:

Select either the same wood or contrasting wood for the lid. The lid may either fit into a recess or sit on top of the top of the box. I will just show one method below.

Form the tennon that will fit into the top of the box. Friction drive is again used for this step. Note the tennon near the live center, it will be used then the lid is turned around.

Test fit the lid as in the picture below. Here the wood is over sized and will be trimmed down to fit the top nicely in the next steps.

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Lid is held in the chuck, formed, sanded and 1/2-inch hole drilled for the top knob. You may drill a 9/16-inch hole for the knob if you wish. I just got used to the 1/2” tennon for my knobs which will be discussed later.

Under side of the lid sanded smooth.

Note: I often use a vacuum system to turn the lid both the inside and the outside. I will turn the lid around and undercut the lid reducing the weight. If not using a vacuum system, you may do one of the following.

Use double sided tape to hold the lid onto a faceplate with wood attached. Keep the tailstock up until there is only a small nub of wood left.

The picture below has the double sided tape on the wood.

Use hot melt glue to hold the lid to the wood fastened to a metal faceplate. Again keep the tailstock in place until there is only a small nub left.

Making the top knob:

I make a batch of knobs from maple and dye them different bright colors. I also used different small scraps of natural woods to make the knobs. See the picture further down for some knobs.

Use a small piece of desired wood, about 1&1/2” square X 1 to 1&1/4” long.

Place the blank between centers to turn.

Turn between centers to get the blank round.

Place the blank into a small chuck, true up the tailstock side, drill a hole the size and depth for the BOC bead being used.

Note: I got fancy and made a Bead go-no-go gauge out of scrap wood to insure that the hole is large enough for the cut bead. Measure your bead and make the gauge the size of the beads. See the picture below.

The picture below shows the go-no-go gauge in use.

The picture below shows a cut bead in the wood which will be the top of the finished knob.

Form the top of the knob and sand using all the grits needed for a smooth finish.

Remove the wood from the chuck and place it back between centers.

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Use a Step type center drive and form the 1/2” inch or 9/16 inch tennon at the tailstock end. Sand the knob as needed for a good smooth finish.

I made a simple go-no-go gauge to insure that the tennon is the correct size to mount into the lid. Use a forstner bit and small scrap of thin stock to make the go-no-go gauge.

See the picture below for the completed knob still on the Step center drive.

It was tiring to make one knob at a time so I made several and dyed the white maple different colors. I also used natural woods for the knobs in the picture below.

Picture below shows the completed items ready to make the BOC box, Bottom, Top and Lid with Knob and inset BC bead.

Note: I use regular Titebond II wood glue for gluing the knob into the top of the lid.

I use Silicone RTV type sealant for the top and bottom grooves to hold the PVC and fabric.

Fabric:

Places such as, Hobby Lobby, Walmart, Hancock Fabric, ETC. have what is called Fat Quarters. Ask the boss lady if you need help in this area.

You may need to clean the PVC if it has been outside, I use soap and water, rinse off and allow to dry completely.

Glue:

I use 3M-77 spray adhesive to glue the fabric onto the PVC pipe. Any type of fabric adhesive can be used. I also use the love of my life's shears and fabric cutter to cut the fabric a little wider and longer than the PVC pipe. Those Fat Quarters are just the right size.

I will do all of this before cutting the groves into the wood to insure that everything fits nicely.

Again, cut the fabric about 1/2" wider than the PVC pipe and maybe an inch longer than what will go around the PVC pipe. If there are creases in the fabric it is best to use an iron and smooth those out before proceeding

Attaching the Fabric:

Note: Again, I use 3M-77 spray adhesive but there are other glues to use for fabric.

Do this outside and of course away from any flames.

Spray a liberal amount of adhesive onto the PVC.

With the fabric on a flat surface, place the PVC square in the center then roll to one side then back to the other side making sure you have the edges covered and no wrinkles in the fabric.

Clamp the PVC with the fabric to the side of the table this makes it easier to cut the fabric. See the picture below.

Use a straight edge and a rolling fabric cutter or razor blade and cut both ends of the fabric at the same time. This is of course is across the PVC. See the picture below.

Peel back one side that was cut then the next side. Press the fabric back together.

I use clear “Elmer’s washable school glue” and glue along the seam and smooth it out. Allow to dry for an hour or so.

Use good fabric shears and cut the excess fabric from both ends of the PVC.

Put some of the Clear glue along one end of the PVC and fabric, using your fingers to smooth out the glue. Allow to dry for a few hours then do the other side.

A different approach is to fold the fabric under the PVC so that it will go inside of the PVC. The extra fabric will need to be trimmed after the glue is dry.

Still another option for the inside of the PVC only:

Again this should be done early on before cutting the groves for the top and bottoms and gluing on any fabric.

The inside of the PVC may be painted with “Rust-Oleum Painters touch 2X Ultra Cover Paint+Primer that says (Also bonds to Plastic”. It is best to do this on a warm day to help and avoid any runs in the paint.

Clean the inside with Alcohol to remove any oils. And any other chemicals that could have been used making the PVC pipe.

Spray from one side rotating the PVC, then turn around and spray from the other side to get a good coat of paint. No need to paint the outside, and if some over spray happens it is no big deal as the fabric will cover it.

So now everything is ready to assemble:

Use RTV, place a bead of sealant into the grove on the top. Of course if the PVC and fabric has a unique pattern keep that in mind when gluing together.

Place the PVC and fabric onto the grove and turn the pieces to set the RTV evenly. I have been allowing the RTV to cure, then put another bead of RTV inside next to the top and allow the RTV to cure.

Next do the same for the bottom of the box.

You should now have a completed Beads of Courage box.

Be creative and make a square Beads of Courage box. This one is Walnut top and bottom.

Top of the Square Beads of Courage Box.

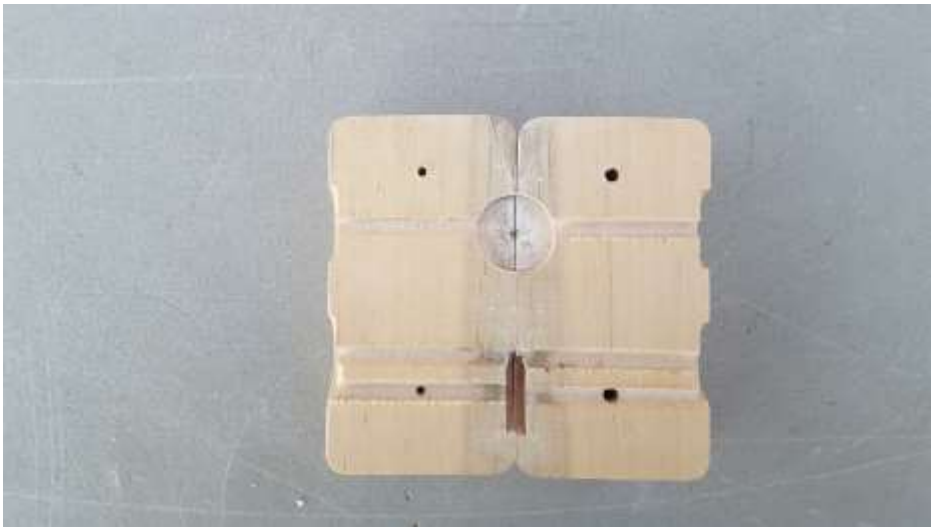
The Beads of Courage beads can be purchased from the Beads of Courage web site. See the source at the bottom.

Recently some of the BOC beads do not have the LOGO on both sides so if you get those beads, then you need not worry about cutting the beads in half. They are 20 beads for $25.00.

As I inset the half BOC bead into the top of the knob I cut the beads in half so I can get two half beads. I use a Dermal tool and a ceramic cutting wheel. To do this, I made a bead cutting fixture.

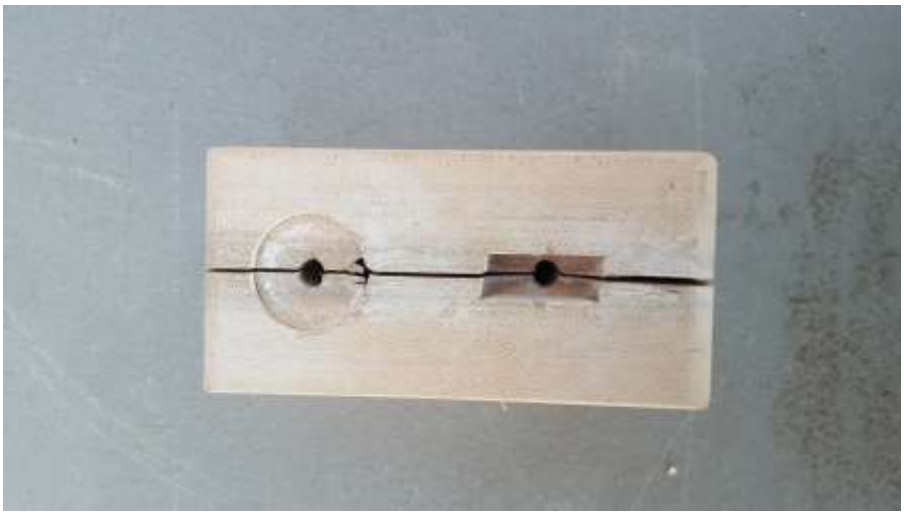
Cutting the Beads of Courage beads in half:

Cut two pieces of wood about 2 inches X 4 inches. Place them side by side, clamp and use a forstner bit, drill about half the thickness of the BOC bead.



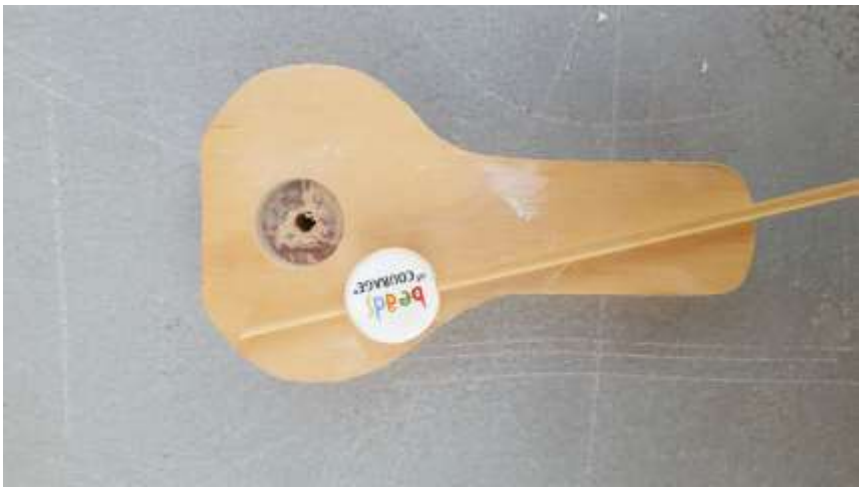
Place the two halves together as shown below. Clamp together and drill two 3/16 inch holes through the wood to assist with removing stuck beads when cutting.

Lay this on the side and pilot drill two holes and install two screws to clamp the two pieces together.



This is the completed Bead cutting Jig. Use a 1/8inch dowel or a skewer used for BBQing to hold the bead while cutting. Cut one side, turn the bead over and cut the other side. You will then need to smooth out the cut area. I use RTV to glue the bead into the top of the knob.

Below is a go-no-go gauge to insure that the beads will fit into the top of the knob. Note the 3/16inch hole through the wood to remove a stuck bead.



After making several BOC boxes you may have some left over disks from the top opening. Being frugal I decided to put those to use making coasters. Supplier for the cork is listed below.

Making coasters from the lid cut out:

Place the wooden disc between the tail stock and the friction drive at the headstock. Trim the outer diameter for several disks down to the same size. The wood may be thinned down using a thin parting tool, or left the nominal thickness that you have.

Never attempt to cut a round disk with the bandsaw.

Thinner coasters may be more pleasing, say about 3/8” to 1/2” inch. You may need to make a spacer from 1/4 inch or 3/8-inch plywood for thinner coasters. See the picture below.

Set your compass to 3&1/2 inches. Mark each disk that you will be making coasters from, cut out using the band saw. Place between the friction drive and tailstock and turn away the saw marks.

Place a disk into the chuck as pictured below with the plywood spacer behind the disk. Use a thin parting tool and cut the disk in half. See the picture below.

True up the face of the disk

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Mark with dividers for the size of cork.

Turn the recess in the face of the disk, make sure that the cork fits and then sand the face smooth.

See the picture below.

Turn the disk around and true up the bottom, sand smooth and if desired put a couple signature grove into the bottom.

Picture below of the top for 2-inch cork coasters.

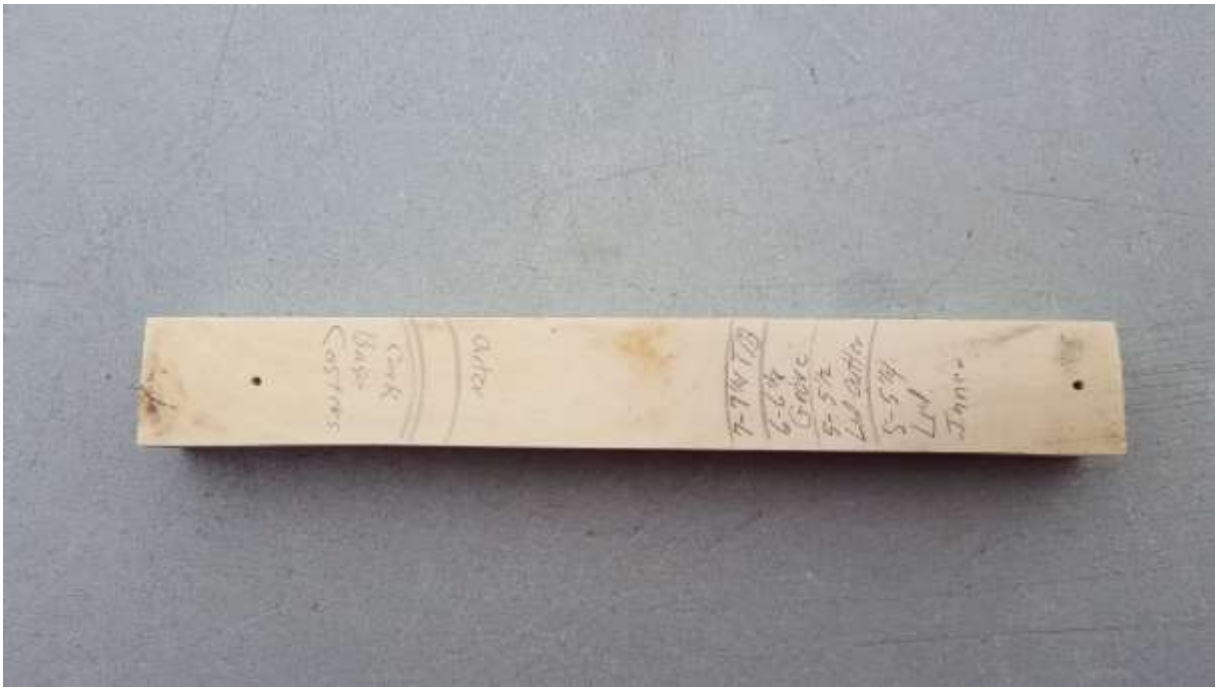
Bottom of the 2-inch cork coasters.

Top of 3-inch cork coasters.

Bottom of 3-inch cork coasters.

Story stick:

If you plan to make several BOC boxes it my suit you to make a story stick for the compass and dividers. See the picture below for my story stick. It doesn't need to be fancy to work very well. On one side I have marks for the BOC boxes and one size for the coaster. The other side has the other coaster size.



Acknowledgments:

Please note that this was not my idea from the start. My good friend Jim Spano from our Central Texas Wood tuners club wanted to do this with water type PVC pipe which like schedule 80 and is way too heavy. So the thin walled white sewer PVC pipe was located. I just took the idea and run with it.

I wish to also thank my lovely wife Marcia and best help mate in the world for putting up with me and all of the clutter that I seem to bring into the house to assemble the Beads of Courage boxes. Normally on the dining room table.

Supplies and such:

Purchase 1/8-inch-thick, either 2 inch or 3&1/2-inch diameter cork from Blank Cork roblol1423@gmail.com Cost is for a package of 40 corks, $21.80 plus the shipping.

Beads of Courage beads:

20 beads of $25.00

http://www.beadsofcourage.org/pages/woodturners.html

Sanding supplies:

VincesWoodNWonders.com

Vince@vincewoodNwonders.com

Toll free 1-877-284-8969

Hunter tools for turning:

www.hunterwoodturningtol.com

Ph, 612-718-7926

Fabric:

Any of the local stores that carry fabric materials.