FIVE PIECE RING BOX

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This project describes my method in making a ring box that is made up of five separately turned pieces.

The general shape and method was inspired by boxes made by Cindy Drozda.
https://www.cindydrozda.com/

This project requires intermediate turning skills.

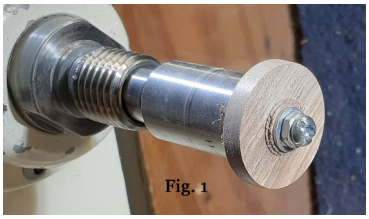
BEFORE YOU START!
Read through this article thoroughly. Make sure you understand ALL of the steps and are very familiar with the drawing on the last page and how the box is put together. This is a fairly complex box and you must understand all of the steps to prevent mistakes that you cannot recover from.

Materials:
Wood: This article uses Hard Maple and Walnut
Box and cap:
2.3" x 2.3" x 4" (58mm x 58mm x 100mm or longer)
light colour, grain along length

Finial and Foot:
1" x 1" x 4" (25mm x 25mm x 100mm or longer)
dark colour, grain along length
Ring:
1.6" round x 1/4" thick (40mm round x 6mm thick, dark colour. Grain can be in either direction.
Glue: Titebond III recommended (short set time).
Finish: There are many good choices. My go-to is penetrating Tung oil, 2 – 4 coats, polished after full cure.
Recommended Tools:
- Roughing gouge, 3/4" (19mm)
- Parting tool, 1/8" and 1/16" (3mm and 1.5mm)
- Spindle gouge, 1/2" (13mm)
- Square scraper, 1/2" – 3/4" (13 - 19mm)
- Round scraper, 1/2" – 3/4" (13 - 19mm)
- Skew chisel, 3/4" (19mm) (Optional)
- Hollowing tool (optional)

1. Blank Preparation:

1.1. Ring, Fig.1: Drill a hole in the centre of the ring blank for a #8 or #10 wood screw. Put a 3/4" (19mm) waste block in a chuck, flatten the face, drill a hole in the centre for the wood screw and mount the ring blank – include a washer under the screw head. Turn the exposed face of the ring blank flat. Turn the outside diameter of the ring blank to 1.44" (36.5mm).



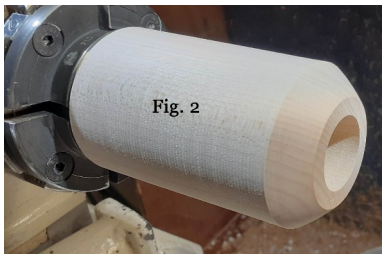
Outside diameter and face must not show any major tool marks. Do not use sandpaper.
Fig. 1. shows the ring blank attached to an internally threaded screw chuck.

1.2. Box and Cap: Turn the 4" (100mm) long blank round between centres, add tenon for #2 jaws at end that will be the 'bottom' of the box. Note: Use a longer blank if you prefer to make parting gaps wider than 1/4" (5mm).

1.3. Finial and Foot: No preliminary preparation req'd.

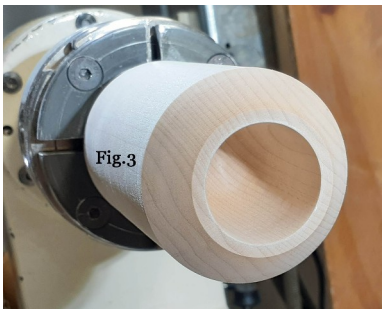
2.0. Turning the box:

2.1. Initial hollowing. Fig.2.



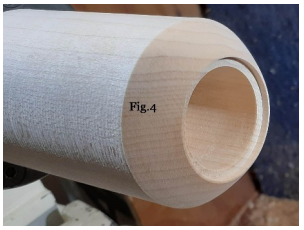
Mount box & cap blank in chuck with #2 jaws.
Drill or hollow out a hole 1" (25mm) diameter, 1.25" (30mm) deep.
Turn top section to approximate final shape as shown in Fig.2, Fig.3. Leave at least a 1.6" (40mm) wide face on the blank's end to be turned later.

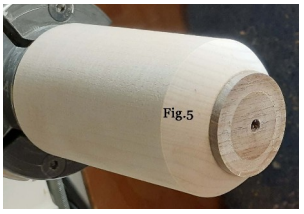
2.2. Hollowing the box interior. Fig.3.



Hollow out the interior of the box to the shape shown in the drawing on the last page.
Ensure that the entry from the face is an accurate 1.25" (30mm) at least 1/4" (5mm) deep, with parallel sides as the finial bottom will slip into this portion of the box.
The shape of the interior shown in the drawing must be followed as it is designed for one ring to be easily extracted by placing the 'ring' finger into the ring to take it out.
The walls should be thick, as shown in the drawing. This is to add weight to the box so that it does not tip over easily when the finial is lifted off. Sand the interior.

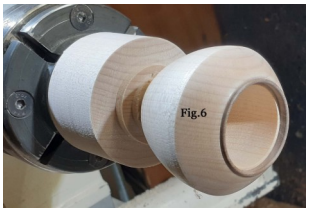
2.3. Attaching the ring. Fig.4, Fig.5.





Turn recess for ring blank. Diameter 1.44" (36.5mm) x 0.06" (1.4mm) deep. Adjust diameter for a tight fit of the ring blank. DO NOT SAND the recess. Glue the ring blank in place. The ring blank should protrude from the face of the box. For appearance, line up the grain pattern between the box and the ring blank. Time for a 60 min. break to let the Titebond III glue set.

2.4. Turning the ring. Fig.6.

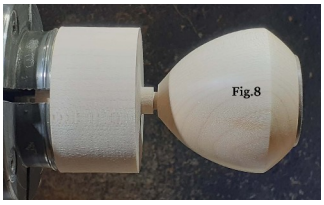


After the glue has set, hollow out the ring blank.
Inside dimension; 1.26" (32mm).
Leave a 'ledge' showing at the bottom of the ring for the finial bottom to rest on. Round the 'top' of the ring. A tiny groove between the box and ring will accentuate the appearance.

2.5. Refining the box shape. Fig.7.

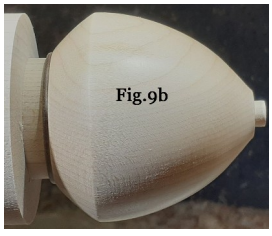
Turn the outside of the box to the final shape, leaving at least 5/8" (16mm) diameter at the base. It is best that the finish off your tools is good. Sand the outside. For best appearance, leave the transition between the two curves 'crisp'.

2.6. Final box turning. Fig.8



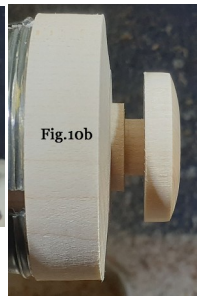
Turn the final portion of the box, making a tenon 0.2" (5mm) diameter x 0.08" (2.1mm) wide. Make a 3/8" (10mm) diameter flat at the box base for the foot to be glued to. Part off the box on the outside of the tenon. Clean up any sharp edges of the tenon. The lower parts of the box will be sanded later.

2.7. Initial turning of Cap. Fig.9a, Fig.9b



Turn a 5/8" (15mm) long (minimum) tenon on the remainder of the box blank. Tenon must be a slip fit into the ring and rest against the 'ledge' inside the 'ring' that is glued to the top of the box.

2.8. Final turning of cap. Fig.10a, Fig.10b



Curve the face of the tenon (Fig.10a) to the shape of the cap top shown on the drawing. Sand this surface.
Cut a mortise in the end of the tenon 5/8" (16mm) in diameter, 3/32" (2.2mm) deep. Break any sharp edges on the mortise.
The finial will be glued to this mortise.
Using a parting tool, set the overall length of the tenon to 3/8" (9.5mm) (Fig.10b). Lightly sand the rim and 'soften' the corner using your 'final finish' grit. Part the cap off.
Make a jam chuck for the 'top' of the cap from the remaining wood left in the chuck. Press the cap on the jam chuck. Very light pressure from your live centre should hold it in place.
Turn a 1/8" (3mm) wide 'tenon' on the face. The tenon must fit smoothly past the lip (ledge) in the top of the box. The shoulder of the tenon must rest on the lip. Lightly sand with your 'final finish' grit. Finish turning the bottom, or sand the bottom on a flat surface. Cap is now completed.

2.9. Attaching the foot to the box Fig.11a.

Mount the finial / foot blank fully into #1 jaws, turn exposed portion round.
Turn the end flat and make a divot in the centre with a pointed tool (e.g. tip of a skew) as a starting point for drilling.
Drill a 3/16" (4.7mm or smaller) diameter, 1/8" (3mm) deep hole in the end of the blank.
Adjust the diameter of the hole to make a snug fit between the box bottom tenon and the hole, see Fig.11a.
Apply glue to the inside of the hole, on the box tenon and the flat portion on the box base. Glue the box and tenon together. Use a cone tip on the live centre, use light pressure to hold them together and to line up the box with the lathe axis. Take a break for 60 minutes to allow the Titebond III glue to set before continuing. If using any other type of glue, check the manufacturer's recommendations about that type of glue's set or cure time.

2.10. Turning the foot. Fig.11b

Turn the foot, blending the joint between the foot and the box.
Remember that there is a tenon inside.
To prevent exposing the tenon, do not turn any portion of the foot smaller than 5/16" (8mm).
A very small diameter foot will make the box easy to tip. Recommended minimum diameter is 3/4" (19mm).
Using a parting tool, define the end of the foot (Fig.11b).
Sand the lower part of the box and the foot.
Part off the assembly.
Before removing the remainder of your blank from the chuck – turn the exposed face flat and using a pointed tool, make a divot in the centre. You will use this to help centre the blank later.

2.11. Finishing the foot. Fig.12

Set #1 jaws to a diameter slightly smaller than the box opening. Apply two layers of masking tape over the jaws to prevent marking or denting the inside of the box. Place the box over the jaws, see Fig.12.
Gently expand the chuck jaws to hold the box in place – do not over tighten, you are only going to make very gentle cuts.
Carefully finish the foot with a concave surface. Sand.
Note: making a slightly concave surface on the foot will ensure that the box will not 'wobble' when standing.
Hooray!, the box portion is now complete.

3.0. Turning the finial

3.1. Setting up to turn the finial. Fig.13

Mount the remainder of the finial/foot blank in #1 jaws and bring up the live centre, into the divot you made in paragraph 2.9. It's only necessary to put 3/16" (5mm) of length into the jaws.
Turn the right end as shown, defining the finial tip end.
Mark off all the finial transition points.
Make a story stick by printing a separate "actual size" copy of the drawing shown on page 4, cut out the finial portion, and attach it to stiff card or metal sheet.
My story stick for this is shown in the appendix (Fig.17).

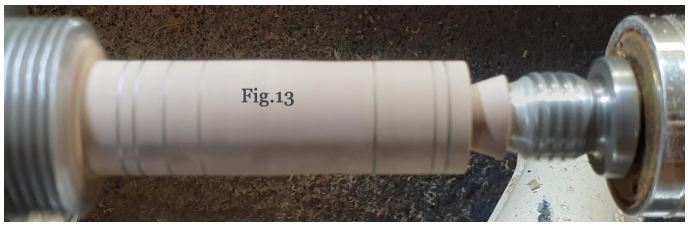


Fig.13

3.2. Defining the transition points. Fig.14.

Using a 1/16" (1.5mm) parting tool, define all the transition point diameters. Make the diameters slightly oversized. For the small diameters near the tip, widen the slots as shown to prevent your parting tool from binding.
Note: The last transition point at the tip end has not been done on this piece (pencil line showing) as it is too close to the previous point. It is easy to remember where it's located when turning that section of the finial.


Fig.14

3.3. Rough turning the finial. Fig.15.

Turn away all wood up to, but not including the marks left by the parting tool in making the grooves for the transition points. This makes it easier to make the final 'clean' cuts when completing the finial curves.
At the live centre end, leave enough wood (like in Fig.15) to keep the blank solid enough not to break while turning the rest of the finial in the next step.


Fig.15

3.4. Finial, final turning. Fig.16.

Start by finalizing the mid portion of the finial.
Follow this up by turning the concave portion at the left side.
Next, trim the tenon to size – this requires some care as it must be a close, but not an overly tight fit into the mortise made in the cap. Measure the cap mortise with a set of calipers, then make the tenon fit this measurement.
Remember to angle the cut from the left side of the concave cut to the tenon. This has two purposes; It makes an attractive interface between the finial and the cap and totally hides the joint between them.
Define the end of the tenon as shown in Fig.16.
Sand all surfaces of the finial, except the tenon and the unfinished tip.
Before finishing the tip, ensure that the live centre is holding only with just enough pressure to spin the live centre tip.


Fig.16

Now, finish turning the tip – as shown in Fig.16.
Continue turning the tip point into the waste at the tip until the waste stops rotating.
Pull back the live centre and sand the tip.
Before you part off the finial, measure the length of the tenon, it should be just slightly less than the depth of the mortise made in the cap.
Part off the finial, sand the bottom just enough to smooth out some tool marks. Break any sharp edges on the tenon.

3.5. Assembling the finial to the cap.

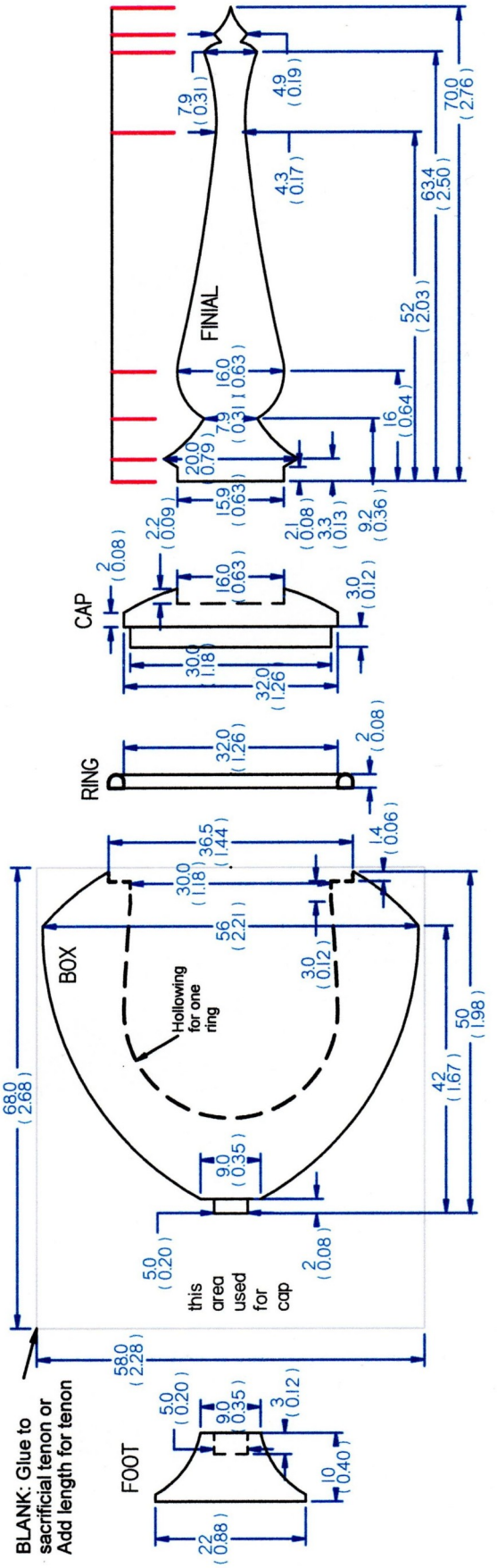
First, check to make sure that the finial tenon fits smoothly into the mortise on the cap and that the joint virtually disappears when they are put together.
Apply minimal glue to the edges of the mortise in the cap and a little to the bottom of the finial.
Align the grain pattern between them and press them both together, the joint should disappear.
Ensure that the finial stands straight when the cap / finial assembly sits on your workbench.
Let the glue cure overnight.
Great!, all the box parts are completed and you are ready to apply your favourite finish!

4.0. Applying the finish.

The step that can make or break a project. . .
There are quite a number of good ways to apply a finish to this ring box.
If you have a favourite that results in a surface that can be polished to a high shine – or satin shine if preferred – then use it.
My method is listed in the appendix.

The drawing below is to 'scale'.
When printing, set Adobe Acrobat settings to "actual size" for an actual size copy.

To make a finial story stick cut out the finial portion of the drawing and attach it to a stiff card, wood or metal sheet.



Appendix:

NOTES:
1. Sanding: all exposed parts of this box requires sanding that is suitable for the chosen finish.
When buying sandpaper, chose types that are 'P' grade. These are made with more consistent particle sizes and even distribution of abrasive particles.
Sand with light pressure, for an easier scratch free finish.

2. My finishing method for this project:
- Sand all exposed surfaces to P800 grit.
- Apply penetrating Tung oil finish
- Apply generously, add more to any 'dry' spots and let it 'soak' for 15 – 20 minutes.
- Wipe off ALL excess with paper towel.
- Cure the finish for 48hrs at room temperature.
- Lightly sand with 600 grit, avoid all sharp transitions.
- Repeat above oil application,
  except change sandpaper to P800 grit
  Once for general purpose items,
  Twice or more times for display items.
- Initial polish with 1500 grit abrasive pad
- Polish with white diamond compound.

3. Products that I used:
Sandpaper:
P180 grit and coarser; Norton Prosand
P220 grit – P800 grit; Mirka Gold
Finish: Watco, Tung oil, one step finish
Glue: Titebond III
Abrasive pad: Mirka Mirlon, 1500 grit abrasive pad

4. My 'story stick' for the finial. This is my 'go to' method for most projects. Notice the 'lip' on the right hand side. This is used to position the story stick reliably against the end of the blank being marked.

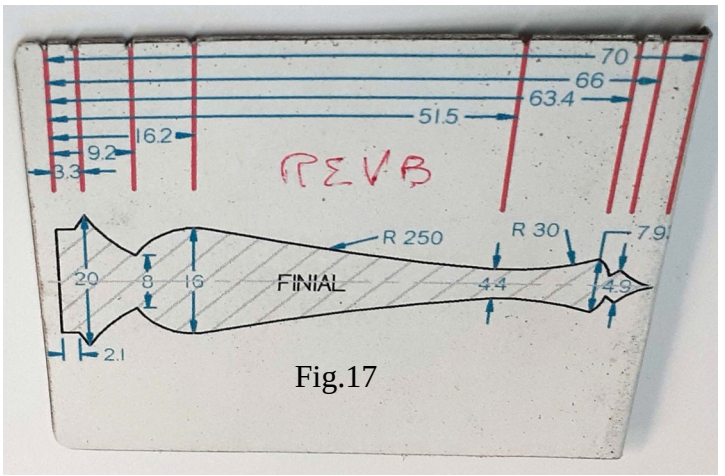


Fig.17

Acknowledgements:
1. Box shape was inspired by shapes made by Cindy Drozda. For inspiration, products and learning opportunities, visit her web site: https://www.cindydrozda.com/