Turning a Peppermill

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You will need:

- 2 3/8'' X 2 3/8'' X 10'' blank
- 8 inch Pepper grinder mechanism kit (Craft Supplies USA -- Item # 365-0008 $10.95; Packard Woodworks item # 154008 $10.95)
- 1/16 inch drill bit
- 1 5/8 inch Forstner bit
- 1 ¼ inch Forstner bit
- 1 1/16 inch Forstner bit
- ¼ inch Forstner bit
- Forstner bit extender (5 inch minimum)

- Diamond parting tool
- Skew
- Roughing gouge
- Spindle gouge
- 90 degree edge scraper
- Jacobs chuck mounted with a #2 Morse taper
- Calipers
- Live-center with cone attachment
- A “drive cone” (which you can make)

- Sandpaper (180, 240, 320, 400 grits)
- Ruler
- Masking tape
- Hand drill
- #1 Philips head screwdriver

Preparing the blank

1. Measure blank to insure that its rounded dimension will be sufficient for the diameter of the peppermill. For this project, I need 2 ¼ inches.
2. Mount the blank between centers and rough round it.
3. Using a diamond parting tool, cut a tenon to the dimension that fits your chuck.
4. Mount the rough rounded blank into your chuck and bring up the tail-stock to provide stability. Lightly cut away the slight wobble that emerged as you moved the stock.
5. Face off the tail end with a skew (a skew works best for this cut since it slices and does not tear the end-grain). Since this is the ultimate bottom of your project, you will want to put a 2-3 degree concavity on this cut so that the grinder will stand steadily.
6. Sand the bottom through all grits to 400.

Drilling center hole

7. Re-check the tightness of your chuck.
8. Put a 1 5/8 inch forstner bit into a Jacobs chuck in the tail stock.
9. Reduce the speed of your lathe to approximately 500 rpm.
10. Drill a hole to a depth of ½ inch.
11. Remove that bit and insert 1 1/16 inch forstner bit. Although this will be a deep hole, you should start with the bit alone. When you have drilled as deeply as you can reach with that bit, add the extension shaft.
12. Continue drilling to a depth of 7 inches deep (measuring from the bottom edge of the blank).

Cutting tenon and centering the hole

13. Place a mark around the cylinder 6 ½ inches from the bottom edge of the blank. Place another mark around the cylinder 6 7/8 inches from the bottom of the blank.
14. Using a diamond parting tool, cut just above the 6 7/8 inch mark and part off the bottom of the peppermill. Cut slowly as you approach the 1 1/16 inch hole in the middle so as to reduce the tear out.
15. Remove the chuck and insert a “drive cone” into the headstock. This cone should begin at a diameter larger than 1 ½ inches and taper down to at least 1 inch diameter. (There are several ways to make this drive cone.)
16. Place the base of the peppermill between this headstock drive-cone and a live-center cone that is inserted in the tailstock. (Since it is being held between two cones, the hole that you drilled will now necessarily be centered in the stock.)
17. Set your calipers to 1 5/16 inches and use a diamond parting tool to cut a 3/8 inch high tenon on the head stock end of the peppermill’s lower part. Make sure that this tenon is parallel to the ways of your lathe.
18. Using a parting tool or skew, cut a 2-3 degree taper on shoulder of this tenon. (This will eliminate the possibility of a gap between the base and the top of the pepper mill.)

Cutting holes in the cap

19. Remove the "drive cone" from the headstock and replace it with the original chuck—which still has the top portion of the peppermill in its teeth.
20. Using a skew, face off the leading edge of the cap. Once again, put a 2-3 degree concavity on this cut. Sand this edge to 400.
21. Put your Jacobs chuck in the tailstock and install a 1 ¼ inch forstner bit.
22. Reduce speed to 500 rpm, and drill a hole that is ½ inch deep.
23. Switch to a ¼ inch forstner bit and cut a hole that is 1 ¾ inches deep. (This depth is not crucial. It only needs to go beyond what will ultimately be the top of the peppermill. You will find that when you use a ¼ forstner bit, you will need to clean it quite frequently. If you prefer, once the hole is started, you can switch to a ¼ inch brad point bit.)
24. Using a 90 degree edge scraping tool, slowly expand the hole in the top until it just accepts the tenon that you cut on the lower portion of the peppermilll. (This fit should be snug but loose enough to permit free rotation.)

Shaping

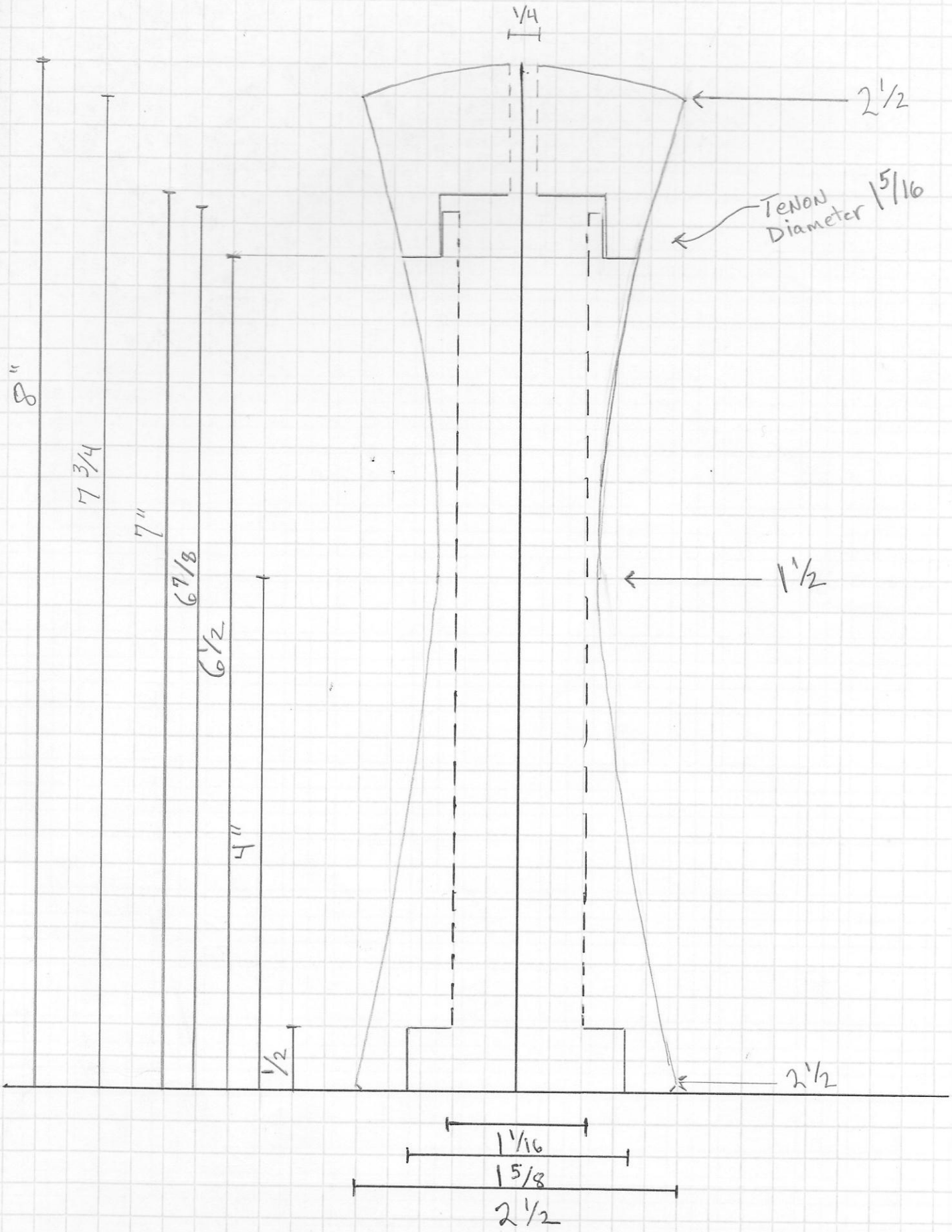
25. Insert the tenon into its receptacle in the cap. Using the live-center cone on the tailstock, press the base up snug against the cap.
26. Mark a line around the cylinder 7 ¾ inches from the bottom of the base. (This will be the deflection point where you will begin the cut to form the top of the peppermill.
27. Mark a line around the cylinder 4 inches from the bottom (this is the low point of the tapered arc shape.
28. Set calipers to 1 ½ diameter.
29. Using a diamond parting tool and a light touch with the calipers, cut away the 4 inch line and continue down to a diameter of 1 ½ inches. (I say "light touch", because if you press too hard, you will crush the wood fibers in a way that makes your sanding task far more difficult.)
30. Verify that the diameter at the bottom edge of the peppermill is equal to the diameter at the upper deflection point.
31. Using a skew or a spindle gouge, cut a smooth and pleasing arc between the base edge and the upper deflection point. (Since the joint between the base and the cap is sensitive to chipping, you should be especially careful here to use sharp tools and good technique over this joint. Best results are obtained with a skew).
32. Using your skew as a scraper, put a slight bevel on the bottom corner of the peppermill.
33. Sand the pepper mill down to your preferred level (I typically go to 400 grit. I also stop the lathe and sand longitudinally before I move on to the next grit.)

Shaping the cap

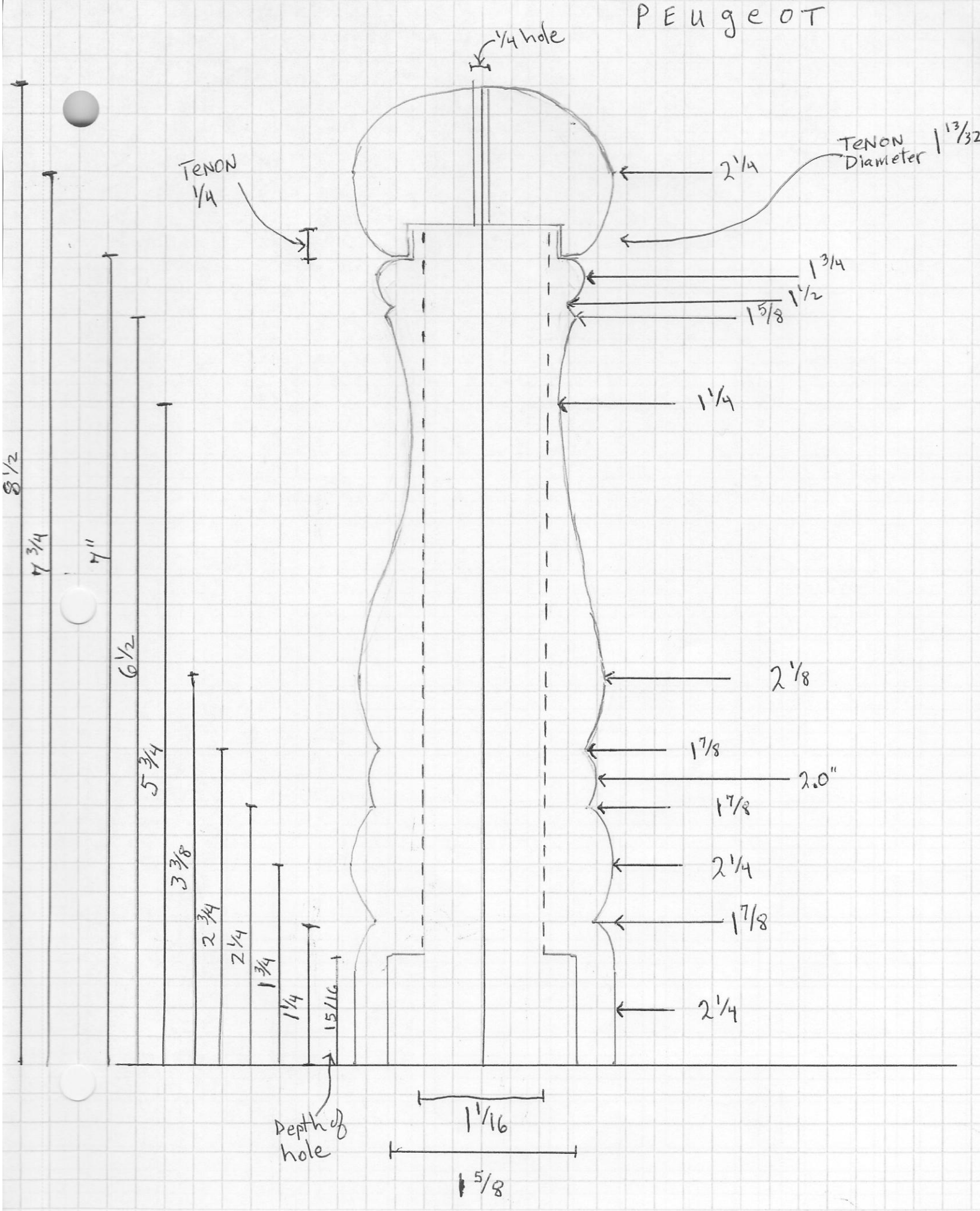
34. Remove the base and install the pepper grinding mechanism.
35. Holding the bottom section up above the cap, use the shaft to verify the ultimate height of the peppermill. Mark this ultimate length on the cap.
36. Using a diamond parting tool, part off the cap at the ultimate height line. Remember, you will encounter the ¼ inch hole that you drilled earlier.
37. Reverse the cap and use the last remnant of the blank to cut a male jamb-chuck that can hold the cap.
38. If you need or want to, you should secure the cap on the jamb-chuck with masking tape. Bring up the tail stock as well for the initial cuts.
39. Using a spindle gouge, start at the inflection point and make the final arc cut across the top of the cap. (Be sure that your spindle gouge is fully closed and is well supported at the start of this cut. Otherwise, you can get a catch.)

Final touches

40. Remove the cap from the jamb-chuck and check to see that the shaft of the mechanism extends ¼ to 3/8 of an inch beyond the top the arc. If it does not, then return the cap to the jamb-chuck and lower the entire arc cut until it fits properly.
41. Sand the cap to 400 grit.
42. Install the remaining hardware in the cap.
43. Apply your preferred finish. I typically use raw walnut oil. (available from Soapgoods http://www.soapgoods.com/Walnut-Oil-p-586.html or Mahoney's oil available from Highlands http://www.highlandwoodworking.com/mahoney16ozwalnutoilfinish.aspx).
44. Set aside for 1 week to cure and then buff with the Beal Buffing system.
45. Sign your work.


1/4
2 1/2
TENON
Diameter 1 5/16
8"
7 3/4
7"
6 7/8
6 1/2
4"
1/2
1 1/2
2 1/2
1 1/16
1 5/8
2 1/2

PEUGEOT


1/4 hole
TENON 1/4
TENON Diameter 1 13/32
2 1/4
1 3/4
1 1/2
1 5/8
1 1/4
2 1/8
1 7/8
2.0"
1 7/8
2 1/4
1 7/8
2 1/4
8 1/2
7 3/4
7"
6 1/2
5 3/4
3 3/8
2 3/4
2 1/4
1 3/4
1 1/4
15/16
Depth of hole
1 1/16
1 5/8