

## Turning a Peppermill

### Wood Selection

- Need at least a 2.5" square blank, 3" gives you more wiggle room and more design options
- Length should be 1" longer than the length of your peppermill hardware kit
  - Kits are usually sold in 2" increments (6", 8", 10", 12" etc.)
  - If the kit is too long there are ways to fix that – but not if it's too short!
- "Hard" hardwoods are best
  - peppermills can be high-use items and need durability
- Be careful about woods with aroma
  - most people will store the peppercorns in the mill
  - aromatic woods can affect the flavor of the peppercorns over time
- Feel free to get creative!
  - Laminations, contrasting top/body colors, etc.

### Hardware Kits

- There are really only a couple of different kit manufacturers, as far as I can tell
- The US made kits seem to be much higher quality
- I buy most of my hardware kits from Craft Supplies but have also used kits from Woodcraft with satisfactory results

### Rough Turning

- Round the blank
  - Turn between centers
  - Easier and faster process if you cut off the corners using a tablesaw first
  - Make sure the ends are roughly perpendicular to the axis of rotation
- Layout your marks and turn your tenons
  - Lay out and create 3/8" wide x 2.5" diameter tenons on both ends of the blank
    - Make sure you use a diameter for these tenons that is as large as possible but will still fit in your chuck jaws and provide a good "shoulder" to register the jaw faces against
  - Determine where you want the break between the top and body to be and mark it
    - It helps to have some kind of idea of the final shape you're shooting for
  - Now create a 1/2" wide x 1 1/16" diameter tenon on the side of your mark that corresponds with the top of the mill
    - You may want to leave the tenon diameter a little bit larger (0.020-0.030") and fine tune the fit later
  - Now create a 3/8" wide x 2.5" tenon on the mill body side of your mark
  - Part the blank between these two tenons with either a parting tool or a bandsaw

## Drilling the Mill Top

- Grab the larger tenon of the mill top in a chuck
- Make sure the face of the smaller tenon is perpendicular and flat
- Measure the outer diameter and thickness of the drive plate in your hardware kit
  - This is the metal disc with a square hole in the middle
- Use a forstner bit close to (but smaller than) the outer diameter of the drive plate to create a counterbore in the end of the smaller tenon that will allow the disc to sit flush with (or slightly recessed into) the counterbore. You can use a square scraper to adjust the diameter of the counterbore to give a close fit.
  - This is really an optional step, but it doesn't take much time and helps to create a more finished looking piece
- Use a center drill to make a dimple in the center of the counterbore to help with drilling on-center
- Drill a 9/32" hole all the way through the mill top
  - Accurate centering of the hole throughout the drilling procedure is very important to the correction functioning of the mill
  - You may be better off using a jobber-length drill bit and/or drilling from both sides to help keep the hole on-center
- Make sure the large face around the small tenon is perfectly flat and smooth

## Drilling the Mill Body

- The single most difficult part of the whole process
- All holes need to be drilled on-center
  - Not an easy task when drilling 12 inches deep!
  - Most wood lathes have a small amount of "slop" in the tailstock/bed ways interface and the tailstock depth adjustment – which makes the process more challenging!
  - You can also do the drilling on a drill press – but I find it easier on the lathe
  - Use a 1 5/8" forstner bit to make a 1/2" deep counterbore in the bottom of the mill body
  - Then use a 1" forstner bit to begin drilling out the center cavity
    - Drill slowly and clear chips FREQUENTLY to avoid overheating your bit
  - Then use a longer spade bit or a forstner bit extension
  - You may need to drill from both sides depending on the lengths of the mill and your drill bits
    - You just hope the holes meet in the middle!
- A steady rest is highly recommended!
  - Really highly encouraged for mills 8" and up
- Once you have a 1" hole through the entire mill body, grab the tenon at the top of the mill body in your chuck again and, using a scraper, widen the 1" hole in the bottom to 1 1/16" x 1" deep

- Now grab the tenon on the bottom of the mill body and use the same process to expand the 1" hole in the top of the mill body to 1 1/16" x 3/4" deep . Adjust it slowly, frequently inserting the small tenon of the mill top to check for appropriate fit
  - You want the top to turn easily, but with no slop
  - While the mill body is mounted this way sand the top face of the mill body to be perfectly flat and smooth
- Now grab the tenon on the top of the mill body again and remove the tenon from the bottom. Then sand the bottom face to be smooth and slightly concave.
  - Alternatively, you can remove this tenon during the final shaping step below

### Final Shaping

- Create a jam chuck by putting a square piece of hardwood into your chuck and turning a tenon that tapers from slightly below 1" diameter to about 1 1/4" diameter over 1" or so of length.
- Put the jam chuck into the bottom of the mill body, put the small tenon of the mill top into the top of the mill body, then use the tailstock to put the live center into the 9/32" hole in the top of the mill top.
  - Apply enough pressure with the tailstock feed to press the two pieces together with sufficient force to make them rotate in unison, but don't overdo it. You could damage your headstock bearings.
- Have fun being creative!

### Design Considerations

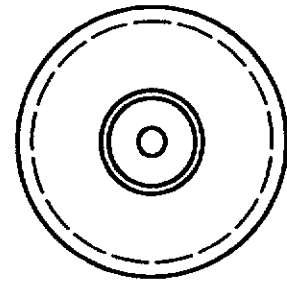
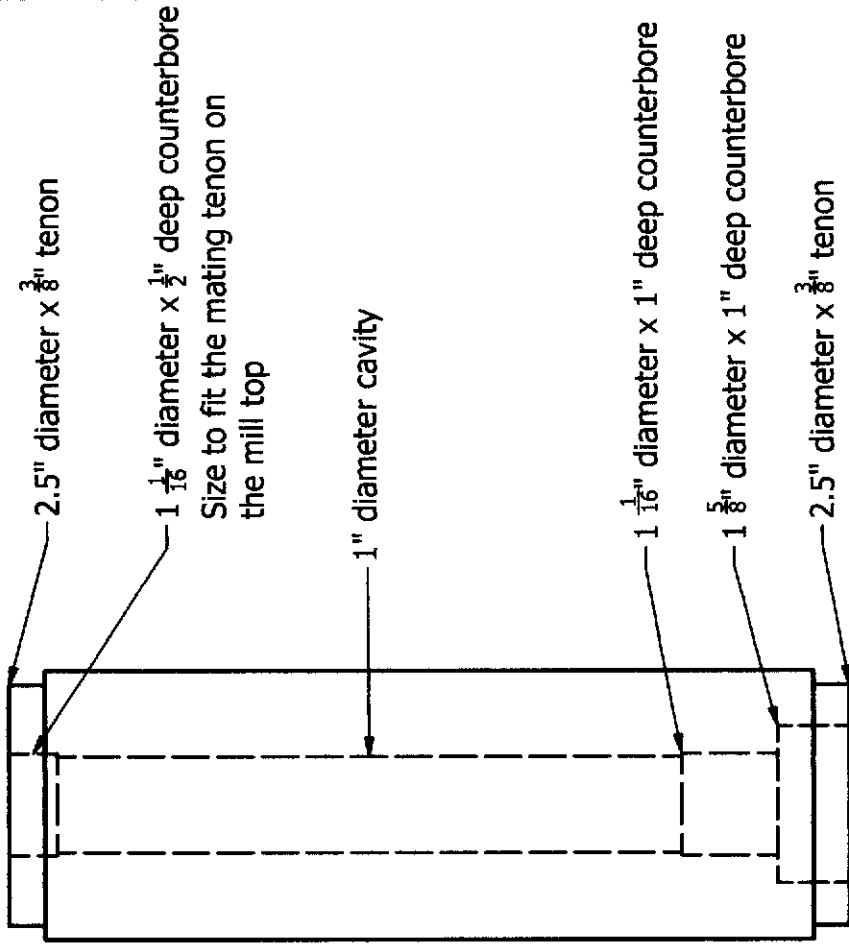
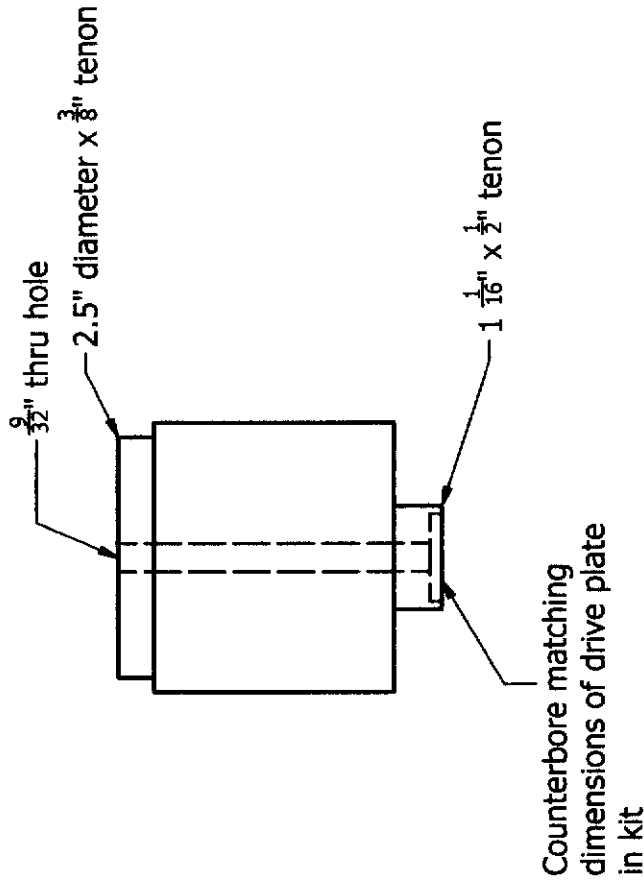
- Most important – Don't forget there is a 1" hole through the middle! Don't get too crazy!
- Avoid top-heavy designs
- Take into account that the mill needs to fit comfortably in the hands and design accordingly
- Taking off the tenon at the top of the mill body will interrupt grain matching between the top and the body – so include it in the design if you can and if the grain is worth it
- Consider making an accompanying dish to set the peppermill in when not in use

### Finishing

- Sand to whatever grit you want – 320 is probably plenty
- As a high-use item you want a finish that is either:
  - Very high durability or very easy to renew
- High-gloss finishes will show wear readily
- Since it will touch food, you want a non-toxic finish
  - All cured finishes are non-toxic unless you start breaking chips off and eating them
- With aromatic woods you may want to consider finishing the inside of the cavity to prevent the wood from affecting the peppercorns
  - In extreme cases a thin-walled plastic tube can be epoxied into the cavity

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