

INTRODUCTION

This set of instructions shows one method to turn mills. There are many other possible variations and techniques.

NOTE: These instructions are specific to 'Chef Specialties' mechanism. For other makes or lengths of peppermill mechanisms, adjust dimensions, recesses and hole sizes to fit.

Before you make something really tall, consider that peppermills taller than 8-10 inches (200 – 250 mm) will tend to dominate a table setting.

Before you start turning, read and understand this entire procedure.

Photos used in this article are from peppermills made by WGO members Richard Pikul and Brian Campbell. The shapes used are original, but reflect the traditional shape shown in Fig. 1. Ensure that your design is easy to hold, comfortable to grind and a pleasing shape.

The drawing in Fig. 1. is the traditional shape for pepper or salt mills. It also shows how the grinding mechanism is mounted. I suggest that you use this or a similar shape for your first mill as designing a pleasing shape is not an easy task.

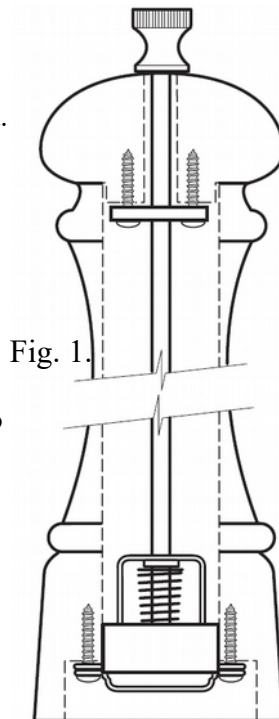
Fig. 1.

Split in drawing indicates that the mill body can be longer than indicated. Remember to adjust the body curve to blend the curve.

Avoid sharp corners on mill top. Sharp corners make the mill uncomfortable to use.

Mounting screws and mechanism shown is typical of most standard types

Drawing from: Lee Valley Tools Ltd; 2008 mill instruction booklet.



Use hardwoods like maple, walnut or cherry or 'dry' exotic wood species. Cocobolo, ebony, cedar or other species containing toxins are not recommended. Before you start turning, draw the design to fit within the constraints of the wood blank chosen and the mechanism you will be using.

MATERIALS & TOOLS REQUIRED

WOOD:

- 3" x 3" x (1" longer than mill mechanism shaft)
- 76mm x 76mm x (25mm longer than mill shaft)

SUGGESTED TURNING TOOLS:

- 3/4" spindle roughing gouge (or 1/2" bowl gouge)
- 1/8" parting tool
- 1/16" parting tool (optional)
- 3/8" or 1/2" spindle gouge
- 3/4" skew chisel (optional)
- Bedan (optional)

OTHER TOOLS:

- Dividers, ruler or vernier calipers
- Morse taper drive centre for headstock
- Morse taper live centre for tailstock
- Cone for live centre

Four Jaw Chuck with:

- #2 jaws
- Spigot jaws: 1" (25mm) or less outer diameter.

Drill chuck or Jacobs chuck

- 1 5/8" forstner drill bit
- 1 1/16" forstner drill bit
- Drill bit extension for forstner bit (if making a mill body longer than 6" (150mm))

- 5/16" drill bit
- 1/16" drill bit for mechanism mounting screws
- Power drill for 1/16" drill bit

Small saw, for completing parting off cuts

Hacksaw for cutting aluminum shaft

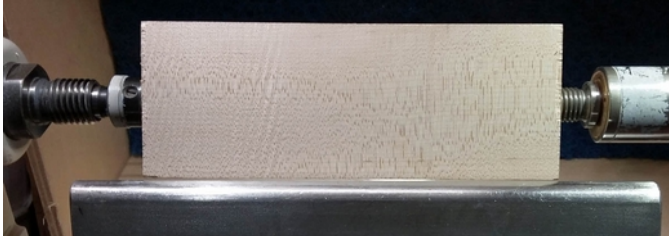
Small hammer for reforming end of shaft

Phillips screwdriver for mechanism's screws

Sandpaper: 80, 120, 200, 300, 400 grits

STEP 1.

Take your square stock, mark the centre of each end, make a small hole with an awl.
Chose the 'best' end of your blank for the 'top' of the mill and fit it to the headstock end between centres.



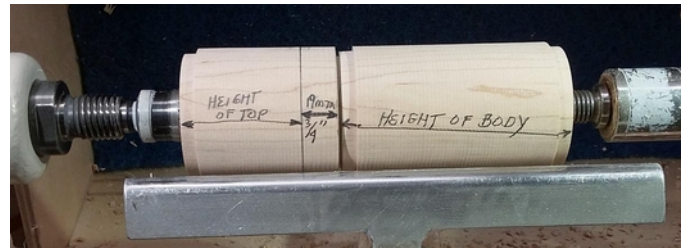
Turn into a cylinder using a spindle roughing gouge or bowl gouge.
Do not limit your design possibilities, cylinder diameter should be maximized. Flat spots are acceptable as they can be removed when turning the final shape.

**STEP 2.**

Mark a line around the blank that will be the height of the top. Take your time – keep looking at the piece to see that the proportions are to your liking. This is where a making a drawing first would be helpful . . .
After this point the size of the top and body are fixed and cannot be changed. Make sure your decisions are what you want before continuing.
It's easy to erase pencil marks, hard to put wood back.
Mark a second line around the blank 3/4" (19mm) to the right of the mark made above. Using a parting tool, on the right of the mark, make a groove about 1/2" (13mm) deep.

**STEP 3.**

Using a parting tool (or bedan) turn a tenon on both ends of the blank. Make sure it's not less than 2.5" (63mm) in diameter. This will ensure you have the maximum available material to turn your mill.
Turn a third tenon, the same size as above, on the right hand side of the parting groove made in STEP 2.
Make all the tenons 3/8" (9.5mm) wide. This will ensure a reliable grip with #2 jaws.
NOTE: If using dovetail jaws, shape the tenons to suit.

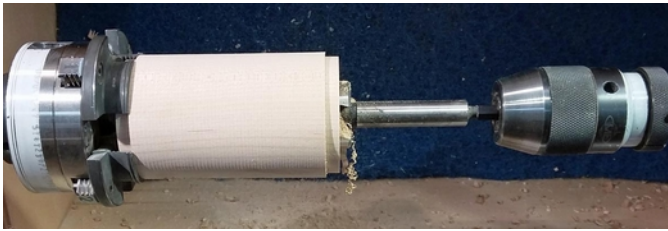
**STEP 4.**

With the same parting tool used in STEP 2, part off the blank at the groove made in STEP 2.
Regardless of the width of parting tool you use, do not try to go in all the way in one cut. Make the parting cut a little wider than your tool to prevent binding, burning the wood or damaging the blank.
For safety, part off only to about 1/2" (13mm) diameter, then cut the rest of the way with a saw. Nubs and unfinished faces will be trimmed later.

STEP 5.

Set the top aside and mount a four jaw chuck with #2 jaws on the lathe. Mount the drill chuck in the tailstock with a 1 1/16" (27mm) forstner bit.
Mount the BOTTOM end of the body of the mill in the chuck. Centre tailstock end accurately so drilling the through hole will line up with the outside diameter.
With lathe speed about 200 rpm (slow), drill a hole past the mid point of the body. CLEAR CHIPS OFTEN!
Bore the hole slowly, removing the bit frequently to clear the hole and drill bit. Hold on to the Jacob's chuck. This is for safety and to minimize vibration and 'drifting' of the drill bit.
Clean up the face and sand to 400 grit.



STEP 6.

Remove the body from the chuck, turn it around and now mount the TOP end of the body of the mill in the chuck. Centre tailstock end accurately so drilling the through hole will line up accurately with the hole drilled from the other end.

NOTE: #2 jaws shown holding the body. Alternately, you can use a set of spigot jaws that close to less than 1.0625" (27mm) and hold the piece using the drilled hole made in STEP 5.

Mount a 1 5/8" forstner bit in the tailstock chuck.

Using a lathe speed about 200 rpm (slow), drill a hole in the bottom of the body, must be a minimum of 1/2" (13mm) deep.

This hole can be deeper to suit particular designs. Just remember that if it is made deeper, peppercorn capacity will be reduced.

STEP 7.

Mount a 1 1/16" forstner bit into the tailstock chuck.

Bring the drill bit up to the end of the body, set it into the centre point from the hole made in STEP 6 and finish boring a hole through the entire body.

Bore the hole slowly, removing the bit frequently to clear the hole and drill bit. Hold on to the Jacob's chuck. This is for safety and minimizing vibration and 'drifting' of the drill bit.

A drill bit extension is necessary if the half the length of the mill body is longer than the exposed drill bit shaft.

Note: When finished, there will be a plug remaining in the centre. Push it out before going to the next step.

STEP 8.

When drilling is done, this is how the body will look.

STEP 9.

Bring up the live centre with a cone attached to that will engage the 1 1/16" hole inside the end of the body to hold and support the end of the body.

Shape the outside of the body to your design. Note that you will not be able to finish to the end as the chuck is in the way. This will be done later.

Pull back the tailstock and remove the live centre.

Clean up the end and shape the inside of the wider part of the hole to suit your design. Sand the bottom and the wider portion of the drilled hole.

If spigot jaws are used to hold the piece by the drilled hole, more of the body can be turned to final shape.

DO NOT TURN ANY PART OF THE BODY TO LESS THAN 1.4" (35.5MM). THIS IS TO ENSURE ADEQUATE WALL THICKNESS.

The shape of the peppermill is entirely up to you. Look at other turners' designs for ideas. A few photos have been included at the end of this article.

STEP 10.

If your design allows finish turning of the body as a separate piece:

Turn the body around and use a spigot jaw to hold the piece by the 'bottom'. Ensure that the jaws engage the smaller diameter hole reliably.

For safety and accuracy, use the tailstock with a cone or shop made accessory to hold the open end.

Now you can turn the remainder of the body to the final shape. You did finish the face of the 'top' in step 5 so it is not necessary to work too close to the cone live centre.

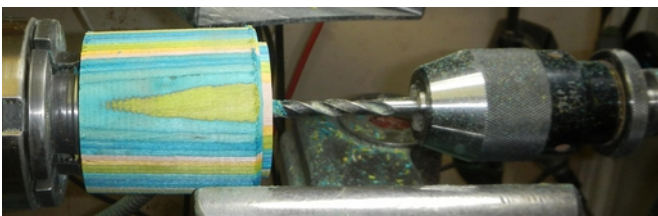
Sand the completed body to 400 grit.

Remove the body from the lathe and lightly sand the inside of the through hole.

**STEP 11.**

Mount the peppermill's top tenon into chuck with #2 jaws. Make sure that the end that mates with the body faces the tailstock.

Drill a 5/16" hole completely through the top, using a drill chuck mounted in the tailstock. Drill slowly, removing the bit often to clear chips. Hold on to the drill chuck. This is for safety and minimizing vibration and 'drifting' of the drill bit.

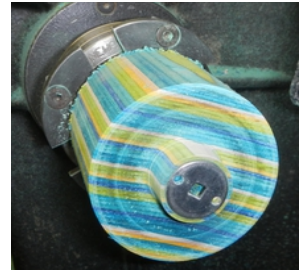
**STEP 12.**

Make a 3/4" long spigot that is a tight fit, but moving smoothly in the peppermill's 1^{1/16} inch body hole.

Test the fit before removing the top from the chuck.

**STEP 13.**

Using a parting tool, square scraper or bedan, cut a recess in the end of the top's tenon to tightly fit the drive plate. The recess should be as deep as the drive plate is thick.



Mark the positions for the two mounting screws, drill pilot holes with a 1/16" drill. Holes must be at least as deep as the length of the screws.

Mount the drive plate with the kit's supplied screws.

STEP 14. For:**Mill design for top to be turned separately**

Hold the top with spigot or #1 jaws, by the tenon cut in step 12 and bring up the tailstock with a cone centre to stabilize the top.

Turn the peppermill top you designed.

When turning is at the point in the photo below, move the tailstock back and finish turning the top.

**STEP 15. For:****Mill design for top & body to be turned together**

Mate the body with the top. There must be a very tight fit. If the fit is loose, use thin paper or paper towel to make the fit tight enough to turn the two pieces together.

Lightly tighten the chuck, align the assembly with mild pressure with the cone tipped live centre, then tighten the chuck. If the two pieces are not aligned properly, there will be a 'wobble' at the tailstock end and the live centre may 'burn' the wood.



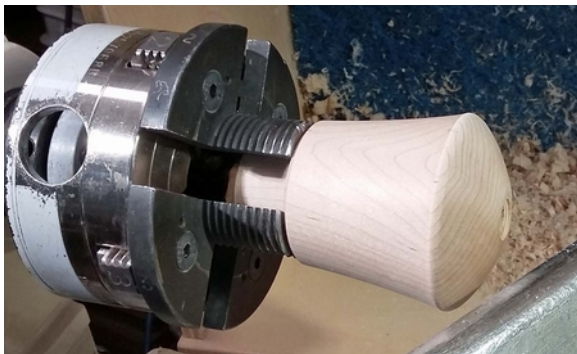
STEP 16. For:**Mill design for top & body to be turned together**

Turn the two pieces together, finishing off the top as far as practicable. Sand work done during this step to 400 grit.

**STEP 16a. For:****Mill design for top & body to be turned together**

Separate the two pieces, grip the top's tenon/spigot with spigot or #1 jaws, finish turning the portion not accessible when turning the two pieces together. Sand the remainder to 400 grit.

Note that in this case, a recess for the mechanism's knob is included at the top hole.

**STEP 17.**

Assemble the mechanism AFTER READING THE MANUFACTURER'S INSTRUCTIONS!

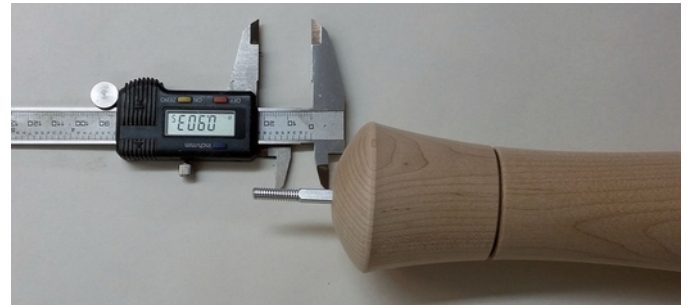
Connect the top and body together. The excess rod length will protrude from the top. Ignore this for the moment.

Mark positions for the two mounting screws for the grinding end of the mechanism.

Drill pilot holes with a 1/16" drill. Holes must be at least as deep as the length of the screws.

STEP 18.

Measure from the top of the hole to the middle of the rod threads. Two methods shown. You could also use a ruler.

**STEP 19.**

Remove the rod from the mill.

At the **non-threaded** end of the rod, mark off the dimension measured in STEP 18.



Holding the rod in a vise, remember to protect the rod from metal vise jaws.

Cut the excess length with a hack saw. **DO NOT CUT OFF ANYTHING AT THE THREADED END.**

Smooth the cut end with sandpaper or file.

STEP 20.

With the rod in a vise, protected from vise jaws, use a small hammer to mushroom the four sides of the rod (at the non-threaded end).



The burrs must be large enough to keep the rod from slipping through the square hole in the mechanism. Be careful not to bend the rod during this step.

STEP 21.

Apply your finish of choice to the outside of the mill, allow to dry or cure, then reassemble the mechanism to the peppermill.

It is better NOT to apply any finish to the inside of the mill. This avoids the possibility of contamination of the peppercorns or salt crystals.

STEP 22.

Fill the peppermill, and start grinding!

TIPS

- Mating surfaces should have a very slight bevel toward centre for a gap free fit.
- Finishing the bottom of the pepper mill with a bevel creates a more professional look.
- Applying beeswax between the top and body and on the top's spigot makes for a smooth, squeak free pepper mill.
- Pick attractive woods. It should reflect your one of a kind, custom made design.
- Plain looking wood can also be attractive, let the shape do the talking!
- Dyes, stains, paints and other colouring can be used for a unique look.
- Other methods of decoration such as burning or carving can also be added.



Photos in this article are from making the above two peppermills.



A traditional shape



How about a paint job?