

There are three sets of instruction sheets here in this set. They all head in the same direction, but the language and directions vary somewhat – take your choice.

1. The first set is more complete with good pictures.
2. The second is the sheet from Lee Valley.
3. The last two pages are the instructions that Craft Supply provides with its virtually identical peppermill kit.

Lastly there are abundant videos on U-Tube. Just google “making a peppermill”, or “turning a peppermill” and you’ll find plenty.

Installing A Pepper Mill Mechanism

Including how to shorten the drive shaft

Note: This article describes how I install pepper mill mechanisms. While most mechanisms are very similar, I may not have installed the brand you have. If the instructions accompanying your mechanism differ, follow them to insure proper operation.

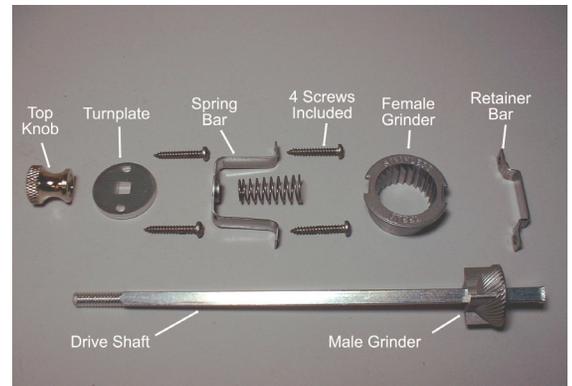
Pepper Mill mechanisms are very simple machines. A long drive shaft is secured to the head of the pepper mill so when turned, it rotates the grinding cutter within the female grinder at the bottom of the pepper mill.

While installing this hardware is simple, it is important to be sure it operates freely and that sufficient adjustment is available at the knob to allow the user to set it for a full range of particle sizes. This can involve shortening the drive shaft, a simple procedure we will cover later in this article. I buy my pepper mill mechanisms longer than needed and then tailor the shaft to fit the pepper mill rather than restrict turning the wood to a specific length to fit the drive shaft.

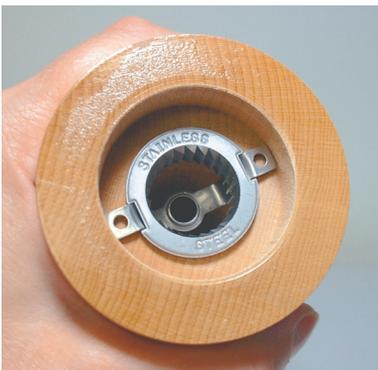
Check the Mechanism

Lay out the pepper mill mechanism to be sure all of the parts are present and that they fit together as designed. Though rare, finding a problem with the hardware now is much easier to deal with than after it has been installed. Be sure to screw the top knob onto the shaft fully as the threads can be a little rough. Usually, if the knob feels tight when screwing it onto the drive shaft, running it on and off a few times cleans up the threads and smooths operation. Be sure to use a wire brush to clean shavings from the threads as you do this to prevent future problems.

Mechanism package should include:
top knob, turnplate, spring bar, female grinder,
male grinder, retainer bar, drive shaft, and 4 screws.



Make sure all the parts are accounted for and fit together.



The female grinder and spring bar should be centered by eye

Start at the Bottom

Temporarily assemble the female grinder and the spring bar making sure the female grinder seats into the grooves in the outside of the spring bar. Also, the female grinder is oriented with the rounded inner edge facing downward.

Hold this assembly in its recess in the bottom of the pepper mill body. Center the assembly by eye and while holding it in this position, drill pilot holes for the screws that will secure it.

Install the Drive Plate

Fit the drive shaft through the square hole in the turnplate and through the 1/4"-diameter hole in the pepper mill head and slide the turnplate against the tenon on the bottom of the head. Center the turnplate and shaft on the tenon and drill pilot holes for the screws that secure it. Install the screws and then check to be sure that the drive shaft passes through the turnplate and head without excessive resistance. Some instructions call for drilling a 1/4"-diameter hole through the head for the drive shaft which can be a snug fit. Since the drive shaft does not turn within the head, as long as you can get it in and out, all is well. Remove the head from the drive shaft and set aside.



(Top) Male and female grinders on the drive shaft.
(Middle) Position of spring on drive shaft. Align the screw tabs to fit into the cutouts of the female grinder.
(Bottom) Retainer bar placed over mechanism with screw hole aligned.



The drive plate can be screwed to the face of the tenon or it can be recessed.

Assemble the Mechanism

Slide the male grinder down the drive shaft with the grinding teeth facing up. Place the male grinder over the drive shaft, with the rounded end of the internal teeth facing downwards and fit it over the grinder core. Slip the spring over the drive shaft, with the narrow end against the female grinder. Note: The spring will work either way but the wide end fits against the flange on the underside of the spring bar.

Next comes the spring bar. Slide it down the drive shaft, making sure its sides fit into the grooves in the female grinder. Place this assembly into the pepper mill body from the bottom. Center the screw tabs of the spring/drive shaft retainer over the holes drilled earlier.

Place the mechanism retainer over the assembly with the stepped side facing down and the mounting tabs also centered over the screw holes. Install the retaining screws and snug them down. These screws need not be overly tight but rather just snug enough to fully seat the two sets of mounting tabs to the pepper mill body.

Slip the pepper mill head over the threaded end of the drive shaft, turning it to match its square shaft to the square hole in the turnplate. Slide the head down, inserting the tenon into the body. Make sure the head is seated flush on the body. Screw the top knob onto the drive shaft, turning it down until it is snug against the top of the pepper mill head or until it bottoms out on the threads on the shaft. If the knob tightens against the pepper



Finished mechanism shown with screws in placed.

mill head before bottoming on the threads, back it off about 1 turn. Your pepper mill is complete.

If the top knob bottoms out on the threads before it contacts the pepper mill head, proceed to the next step to shorten the drive shaft.

Shortening the Drive Shaft

Reducing the length of the drive shaft to fit an already-made pepper mill is simple and requires few tools to accomplish. All of the drive shafts I have seen are made from aluminum, a rather soft, malleable metal that we can form in our shops. A good vice with wooden jaws, hacksaw, metal file and a ball peen hammer are all you need.

First, determine the amount of material to be removed from the drive shaft. With the adjusting knob screwed fully onto the threads, remove the mechanism retainer. Turn the pepper mill upside down and stand it on the top knob to push the excess drive shaft out through the bottom. Push the grinder down against the spring pressure so it is fully seated in the grinder housing.

Use a scratch awl (a sharp drywall screw works) to make a mark on the drive shaft even with the bottom surface of the grinder core. This marks where the cut will be made.

Cutting the excess drive shaft material away on this mark insures producing a perfect-length shaft. Making the cut flush with the bottom of the grinder core and then mushrooming the end effectively shortens the drive shaft approximately 1/8". That sinks the threaded end into the head just enough to insure being able to snug the top knob down against the wood but having plenty of adjustment available.

Remove the top knob from the drive shaft and then the grinding mechanism from the pepper mill body. Slide the parts off the drive shaft and set aside.

Clamp the drive shaft in the vise and cut the excess material off at the mark. Clamp the remaining drive shaft into the vise, the cut end up, with the end about 1/2" above the wooden jaws of the vise. Clamp the drive shaft tightly so it can resist moderate pounding action to come next.

Using the rounded face of the ball peen hammer pound the



(Top) While holding the pepper mill upside down, the adjusting knob pressed against the head and the grinder core fully in the housing, mark the shaft flush with the bottom of the grinder core. (Bottom) Cut off the extra material and peen the end over so it looks like the factory-prepared end cut off earlier.

cut end of the drive shaft, expanding the metal into a mushroom shape. The blows need not be hard but rather just forceful enough to begin distorting the metal. Continue shaping the new end until it appears similar to the factory-prepared end cut off earlier.

When satisfied with the newly formed drive shaft end, turn the hammer around and give the drive shaft a few blows with the flat face to smooth the surface a bit.

Remove the drive shaft from the vise and slip the grinder core down to the end to check the fit. Usually there is a square recess in the bottom of the grinder core into which the mushroomed end of the drive shaft fits. It may be necessary to file the outer edges of the mushroomed end slightly to fit this recess.

If desired, the hammered end of the drive shaft can be lightly

sanded to smooth its surface further, though this is not necessary.

Make sure all metal filings have been cleaned from the mechanism parts and pepper mill before continuing!

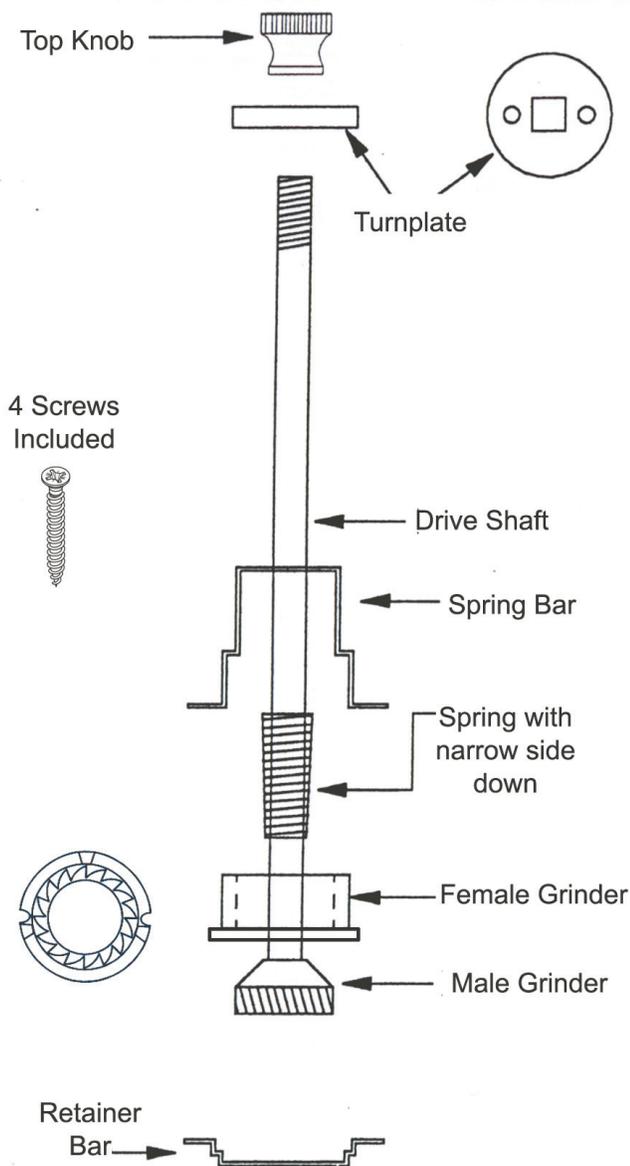
Reassemble the pepper mill mechanism into the body as described earlier.

Install the pepper mill head, screw the top knob onto the drive shaft and snug it down. It should contact the head of the pepper mill slightly before it bottoms out on the threads. This allows a full range of adjustment of the mechanism while maintaining plenty of threads in the top knob to secure the pepper mill head.

That's it. Your pepper mill is ready for use.



Top knob placed on the mill top, down, the adjusting knob.



A pepper mill is an excellent project for turners and carvers alike. Made by America's oldest pepper mill manufacturer, these high-quality pepper mill mechanism kits have all the internal components necessary to produce a top-load, adjustable grind (coarse through fine) pepper mill. Made of tempered stainless steel with an aluminum shaft. Kits include a salt top and plug to produce a matching shaker. Wood is not included.

Consult Figure 1 to make sure you have all the components. Figure 2 shows critical measurements that will influence your design. Figure 3 shows assembly of the mill only. It is **not** intended to be a plan for your turning.

Getting Started

The pepper mill housing itself consists of two turnings – a top and a base. For easiest assembly, bore holes as close as possible to the recommended sizes provided in Figure 2.

Top Assembly

Center the shaft guide over the hole located on the underside of the top. Use an awl or center punch to mark the two screw locations in the top for the two small holes in the guide. Drill pilot holes and secure the guide to the top with the two screws provided.

Base Assembly

Clamp the base upside down in a vise. Be sure to put padding on the vise jaws so the base does not get damaged.

Insert the spring bar into the inner bore, oriented as shown in Figure 3. Center it and use an awl or

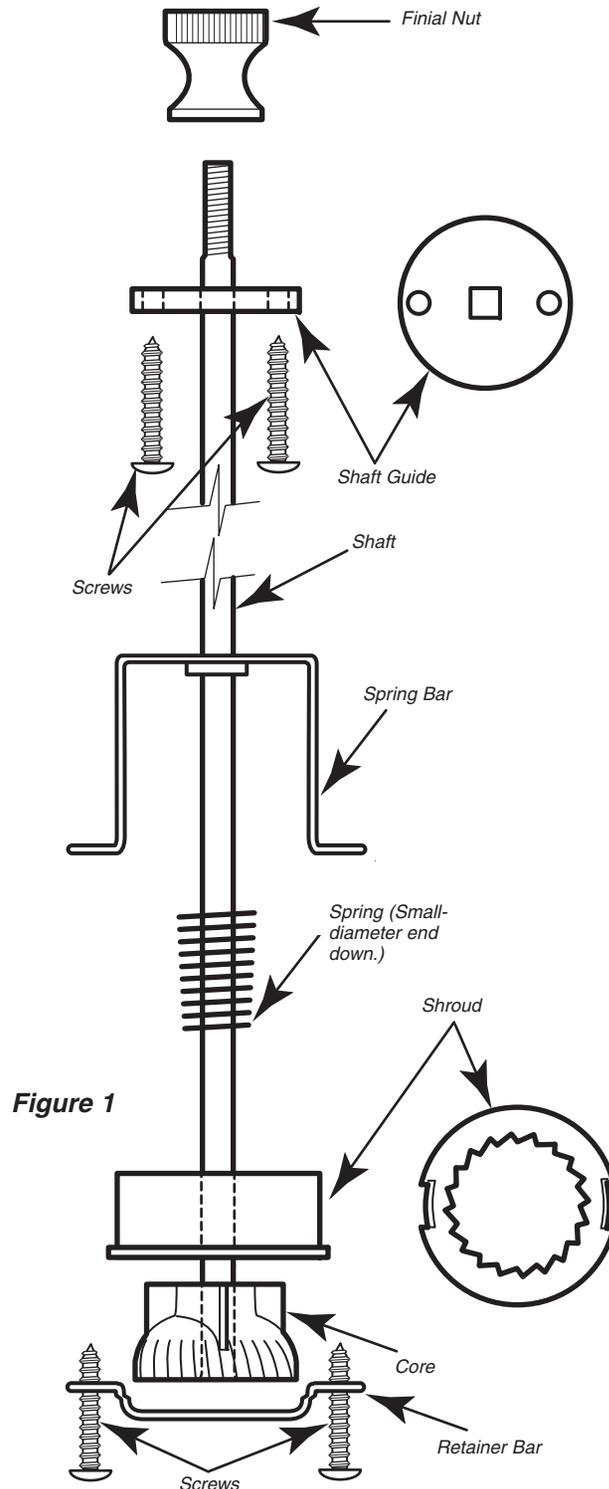


Figure 1

center punch to mark the two screw locations in the wood. Drill pilot holes, but do not install the screws at this time.

The two slots on the shroud are slightly chamfered at one end. Slide this end onto the spring bar, aligning the two slots with the spring bar.

Slide the core onto the threaded end of the shaft, making sure the four flutes on the core face the threaded end of the shaft.

Slide the spring (small-diameter end down) onto the threaded end of the shaft. The spring should slide down the shaft until it is against the core.

Insert the threaded end of the shaft (with spring and core mounted) down through the shroud and through the center hole of the spring bar. The large-diameter end of the spring fits over the lip of the center hole in the spring bar. The spring will prevent the core from meshing with the shroud.

Place the retainer bar over the mill assembly (oriented as shown in Figure 1), lining up the screw holes with those on the spring bar. Press and hold the retainer bar down with a finger and insert screws. Tighten both screws, being careful not to overtighten as this would strip out holes.

Joining the Top to the Base

Remove the base from the vise. Place the top (assembled with shaft guide) over the threaded shaft, lining up the square hole with the square shaft, and press down. Screw the finial nut onto the exposed portion of the threaded shaft, turning the finial nut until it makes contact with the top. As assembled, the pepper mill is set at the coarsest pepper grind setting.

To Fill with Pepper

Unscrew the finial nut and remove the top portion of the mill. Fill the base with pepper. Replace the top and finial nut.

To Adjust Grind

The finial nut has a grind indicator that shows which way to turn for adjustment. Turn clockwise for a finer grind, and counterclockwise for a coarser grind.

Note: This mill is not to be used as a salt mill. A salt plug and salt top are included to make a salt shaker to match your pepper mill.

To Make a Salt Shaker

1. Cut a wood blank to length.
2. Drill a 1 $\frac{3}{4}$ " dia. hole, 1/2" deep, in the bottom of the blank for the rubber stopper. This recess can also be turned on a lathe.
3. Drill a 1" dia. hole from the bottom of the blank to within 1" to 2" of the top.
4. Reverse the blank and drill a 3/4" dia. hole from the top through to the 1" hole.
5. Mount the blank on a lathe, turn to desired profile and apply a suitable finish.
6. Glue the stainless-steel shaker top into the 3/4" hole, using two or three small drops of epoxy or cyanoacrylate.

Once the glue has set, fill the cavity with salt and press the rubber stopper into the bottom of the shaker.

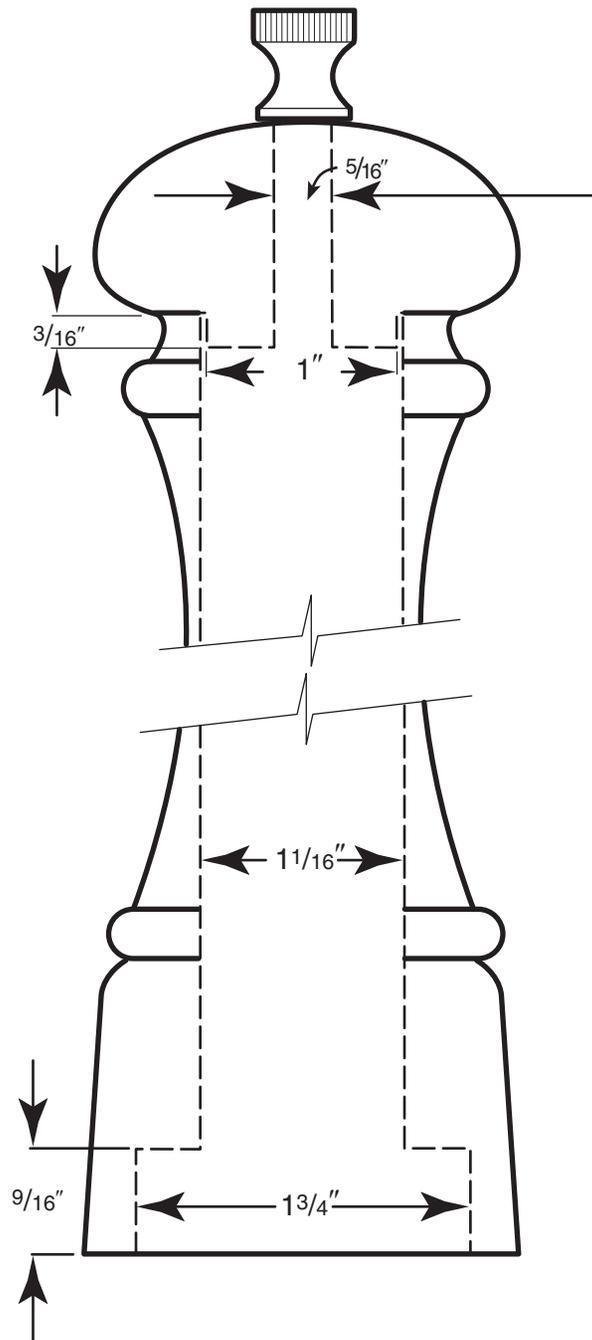


Figure 2

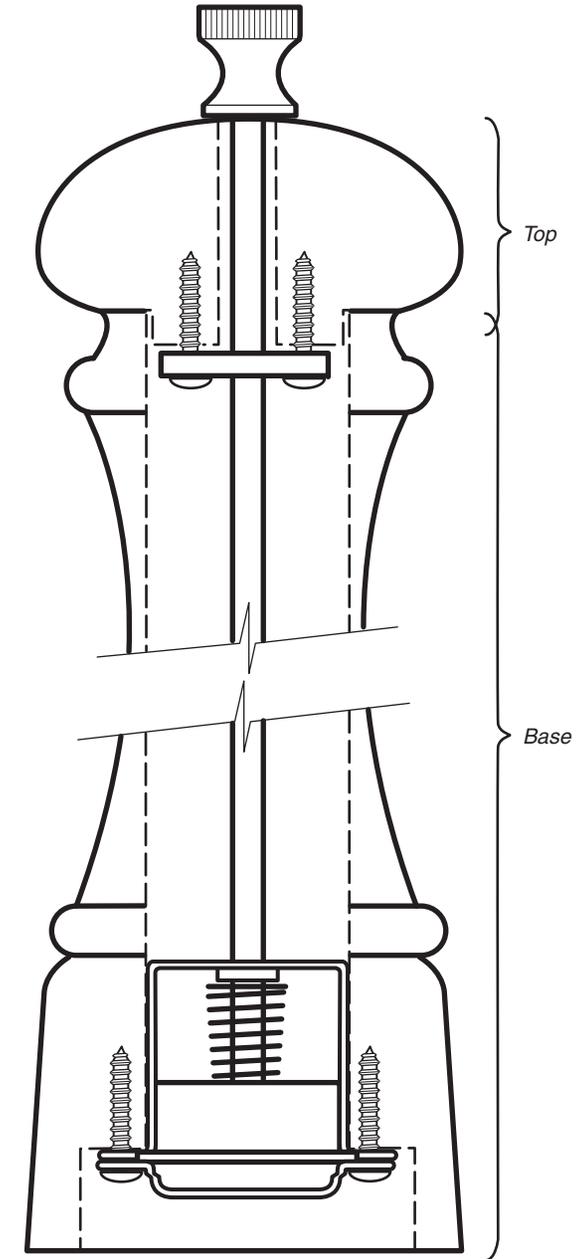


Figure 3

 Lee Valley TOOLS LTD.

www.leevalley.com

1090 Morrison Drive 814 Proctor Avenue
Ottawa, Ontario Ogdensburg, New York
K2H 1C2 Canada 13669-2205 USA
1-800-267-8761 1-800-267-8735

customerservice@leevalley.com

Turning a Deluxe Pepper Mill

Supplies Needed

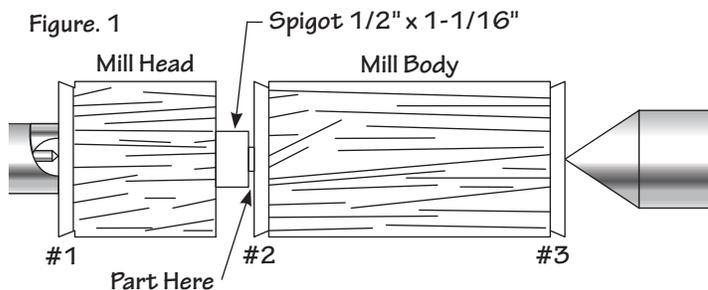
- Blank
- 1-5/8" Forstner Drill Bit
- 1-1/16" Forstner Drill Bit
- 9/32" Drill Bit
- Sandpaper/Finish
- Drill or Drill Press
- Eye and Ear Protection

Selecting the Blank

1. Select a 2-3/4" square blank that is 1" longer than the mechanism you have selected.

Mounting the Blank

1. Mount the blank between centers and rough turn the blank to round. Layout the Mill Head and Mill Body on the blank and turn a 1/2" wide spigot 1-1/16" in diameter. (See Figure. 1)
2. Cut tenons #1, #2, and #3 as shown in Figure 1.



3. Part the Mill Head from the Mill Body.

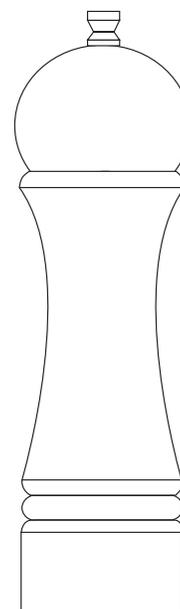
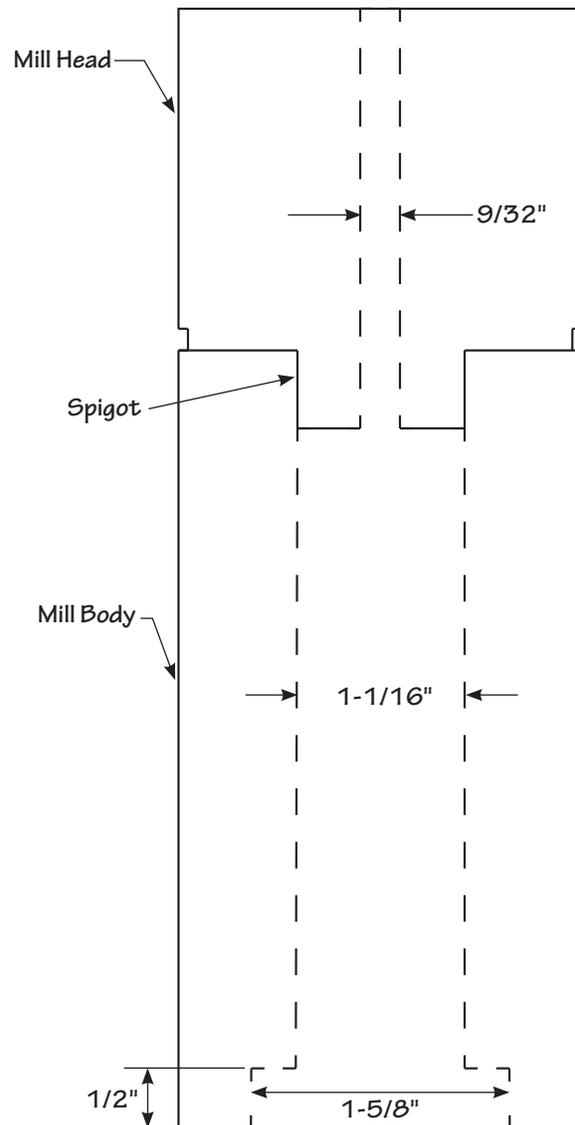
Drilling the Mill Head

1. Mount the Mill Head in a chuck using Tenon #1 and square the end of the spigot.
2. Drill a 9/32" dia. hole through the Mill Head.
3. Remove the Mill Head from the chuck.

Drilling the Mill Body

1. Mount the Mill Body in a chuck using Tenon #2 and square the end of the blank.
2. Drill a 1-5/8" dia. hole 1/2" deep. (See Figure 2.)
3. Drill a 1-1/16" dia. hole half way through the Mill Body.
4. Remove the Mill Body from the chuck and remount the Mill Body using tenon #3
5. Finish drilling the 1-1/16" dia. hole completely through the rest of the Mill Body.
6. Remove the Mill Body from the lathe.

Figure. 2



Adjustment Knob
Top View



Turning The Mill Head And Mill Body

1. Mount a 2" to 3" diameter by 2" thick waste block on the lathe with a chuck or faceplate.
2. Turn a 3/4" long tenon to fit very snugly into the 1-5/8" dia. hole in the Mill Body. Leave a small shoulder around the tenon. Test the fit of the tenon to the hole until you have the right fit.
3. Put the Mill Head spigot into the Mill Body and mount the Mill onto the drive tenon and bring the revolving center into the 9/32" dia. hole for support. (See Figure. 3)
4. Turn the body to shape making sure not to turn the wall too thin. Sand and finish the blank.
5. Assemble the Pepper Mill according to Figure 4.

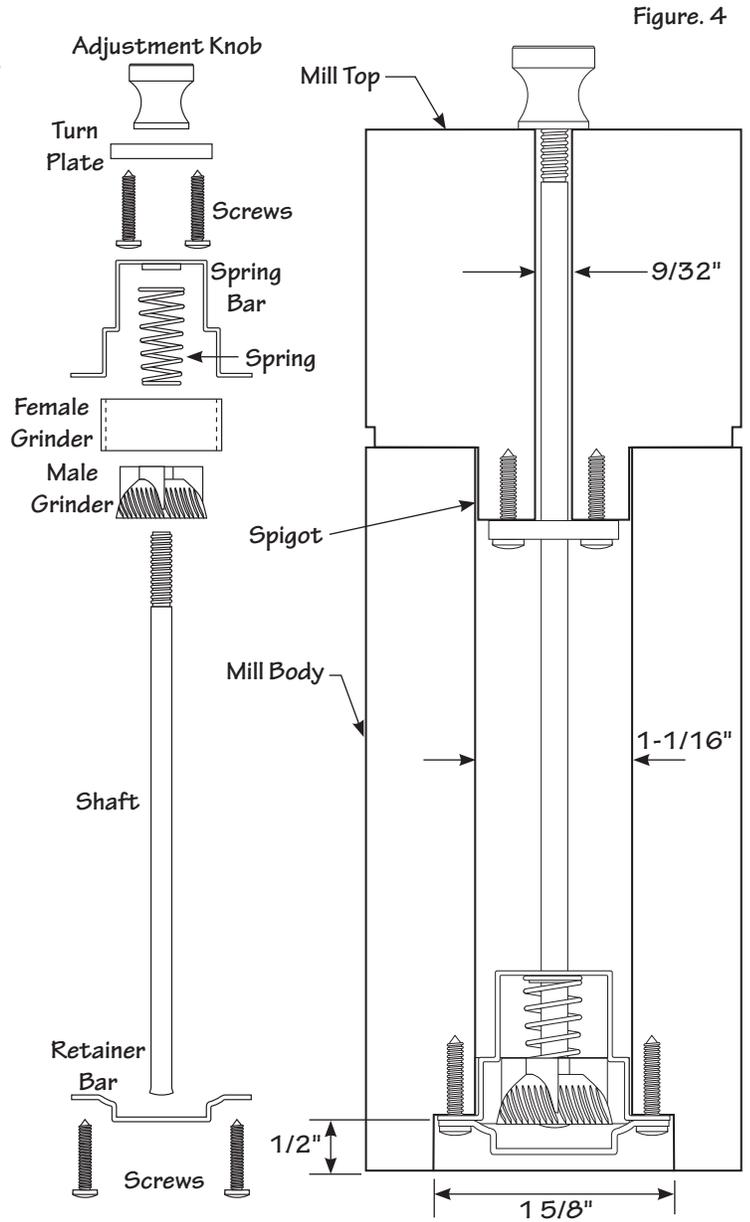


Figure. 4

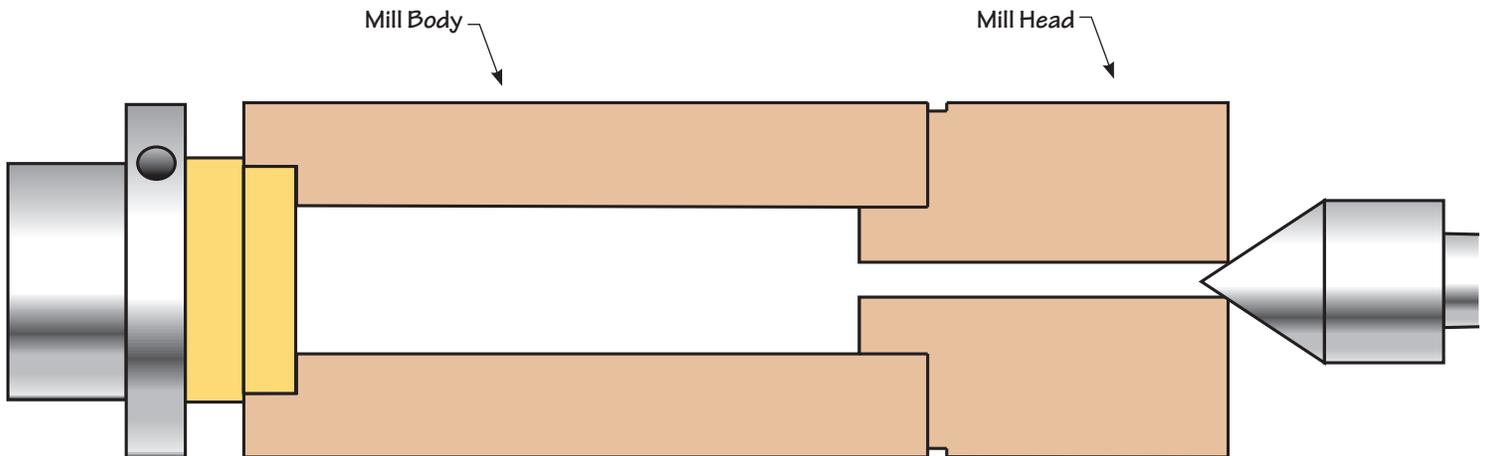


Figure. 3