

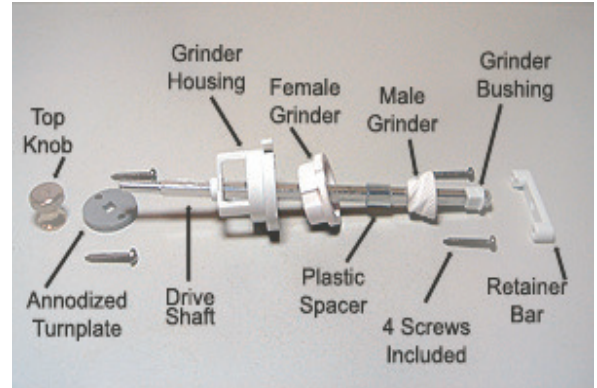
Installing A Salt Mill Mechanism

Including how to shorten the drive shaft

Note: IT IS VERY IMPORTANT TO READ ALL DIRECTIONS BEFORE STARTING YOUR MILL PROJECT.

This article describes how to install salt mill mechanisms. While most mechanisms are very similar, there may be slight differences. If the instructions accompanying your mechanism differ, follow them to insure proper operation.

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



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

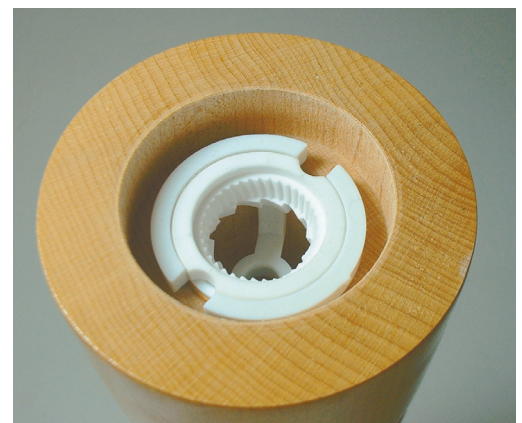
While installing this hardware is simple, it is important to be sure it operates freely. This can involve shortening the drive shaft, a simple procedure we will cover later in this article. It is possible to buy your salt mill shafts longer than needed and then tailor the them to fit the mill rather than restrict turning the wood to a specific length to fit the drive shaft.

Check the Mechanism

Lay out the salt 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.

A complete unit includes:

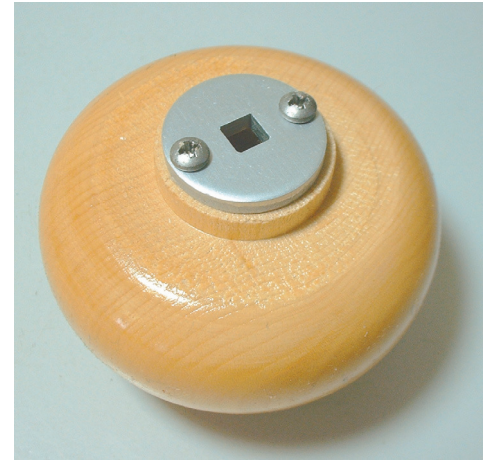
- 4 screws
- top knob
- anodized turn plate
- drive shaft
- grinder housing
- female grinder
- plastic spacer
- male grinder
- grinder busing
- and retainer bar



The grinder housing and should be centered by eye before drilling the pilot holes.

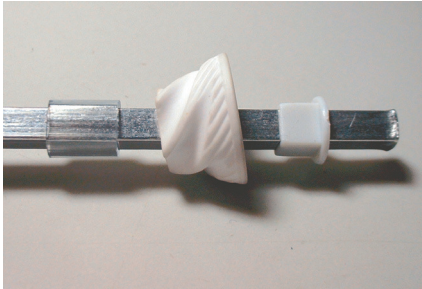
Start at the Bottom

Temporarily assemble the grinder housing and female grinder together making sure the female grinder seats into the grooves in the grinder housing. Also, make sure that the grinder housing is oriented with the open end facing downward. Hold this assembly in the recess (counterbore) in the bottom of the salt mill body. Center the assembly by eye and while holding it in this position, drill pilot holes for the screws that will secure it.

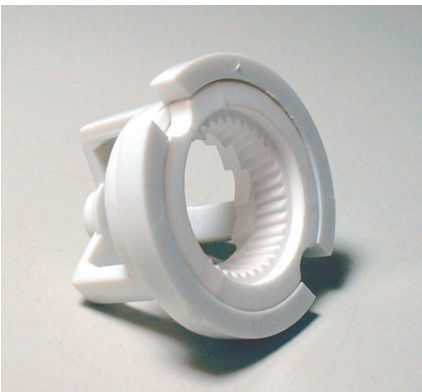


The drive plate can be screwed to the face of the tenon or recessed into the top.

Install the Turn Plate at the Top

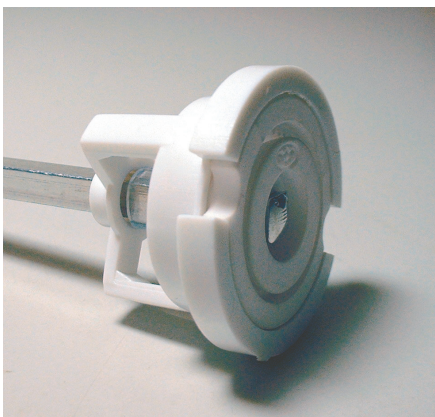


Next, go to the mill top and install the turn plate. Fit the drive shaft through the square hole in the turn plate and through the $\frac{1}{4}$ "-diameter hole in the salt mill top, and slide the turn plate against the tenon on the bottom of the mill top. Center the turn plate and shaft on the tenon 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 drive plate and head without excessive resistance.



Some instructions call for drilling a $\frac{1}{4}$ "-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 mill top from the drive shaft and set aside.

Assemble the Mechanism



First, slide the grinder bushing down the shaft with the flared end facing the bottom. Next slide the male grinder down the drive shaft, grinding teeth facing up. Slip the plastic sleeve onto the shaft. The plastic sleeve will prevent the male grinder from riding up too high in the housing.

After the plastic sleeve is in place, slide the female grinder into the grinder housing making sure its sides fit into the grooves in the female grinder. Slide the combined female assemble and grinder housing down the drive shaft with the rounded end of the internal teeth facing downwards and fit it over the male grinder.



Mechanism is shown placed in the body and ready for retaining screws.

(Top) Slip bushing, male grinder, then plastic spacer onto the drive shaft.

(Middle) Female grinder fits into the grinder housing.

(Bottom) Assemble grinding mechanism on drive shaft.

Place this assembly into the salt

mill body from the bottom. Center the screw cutouts of the assembled grinder and housing over the holes drilled earlier. Place the retainer bar over the assembly with the stepped side facing down and the mounting tabs also centered over the screw holes. **Install the retaining screws keeping tension equal between the two screws when assembling. Be careful not to overtighten these screws or cracking of the ceramic may occur. These screws need ONLY TO BE SNUG ENOUGH to fully seat the two sets of mounting tabs of the retainer bar to the salt mill body.**

Slip the salt mill top over the threaded end of the drive shaft, turning it to match its square shaft to the square hole in the drive plate. Slide the top of the mill down, inserting the tenon into the body. Make sure the head is seated flush on the body.

Screw the adjusting top knob onto the drive shaft, turning it down until it is snug against the top of the salt mill top or until it bottoms out on the threads on the shaft. If the knob tightens against the salt mill top before bottoming on the threads, back it off about 1 turn. Your salt mill is complete.

This salt mill mechanism is not designed to be adjustable. When the salt mill is complete, do not overtighten the tighten the top knob without filling the spice chamber.

If the top knob bottoms out on the threads before it contacts the salt 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 salt 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 top knob screwed fully onto the threads, remove the mechanism retainer. Turn the salt mill upside down and stand it on the top knob to push the excess drive shaft out through the bottom. Push the male 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 male



Top knob placed on salt mill top, and tightened down until it contacts top.



(Top) While holding the salt 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.

grinder. 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 male grinder 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 salt 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 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 male grinder down to the end to check the fit. Usually there is a square recess in the bottom of the male grinder 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.

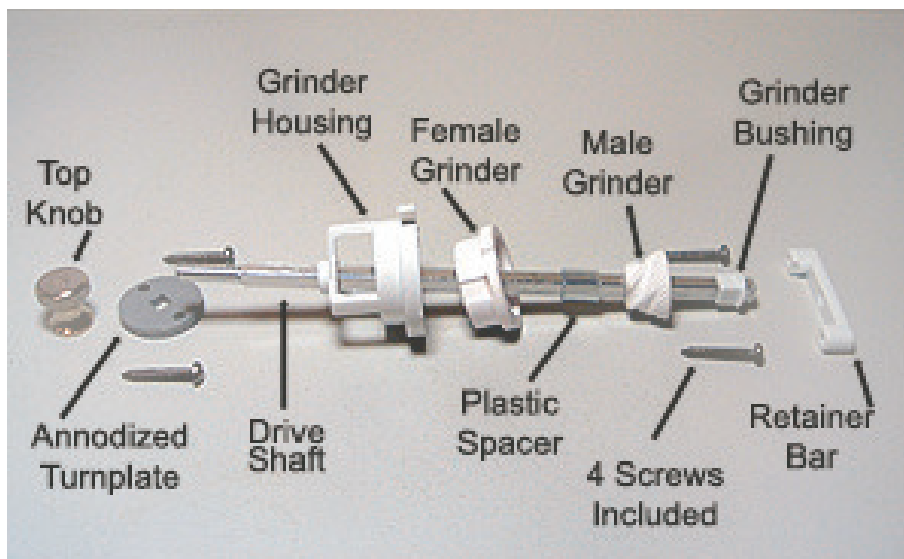
If desired, the hammered end of the drive shaft can be lightly sanded to smooth its surface further, though this is not necessary.

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

Reassemble the salt mill mechanism into the body as described earlier. Install the salt mill top, screw the top knob onto and snug it contact the head slightly before it the threads. This range of the mechanism maintaining threads in the top the salt mill

the drive shaft down. It should of the salt mill bottoms out on allows a full adjustment of while plenty of knob to secure head.

That's it. Your for use.



salt mill is ready