Swaging Rings **3/17/21** **Mike (Penultimate) W.**

While making a pen body for the Birthday Bash I realized I couldn't make a finial with a tenon to slip a ring on and assemble to the body as two pieces. I decided to try swaging.

Swaging is defined as:

noun

1. a shaped tool or die for giving a desired form to metal by hammering or pressure.
2. a groove, ridge, or other molding on an object.

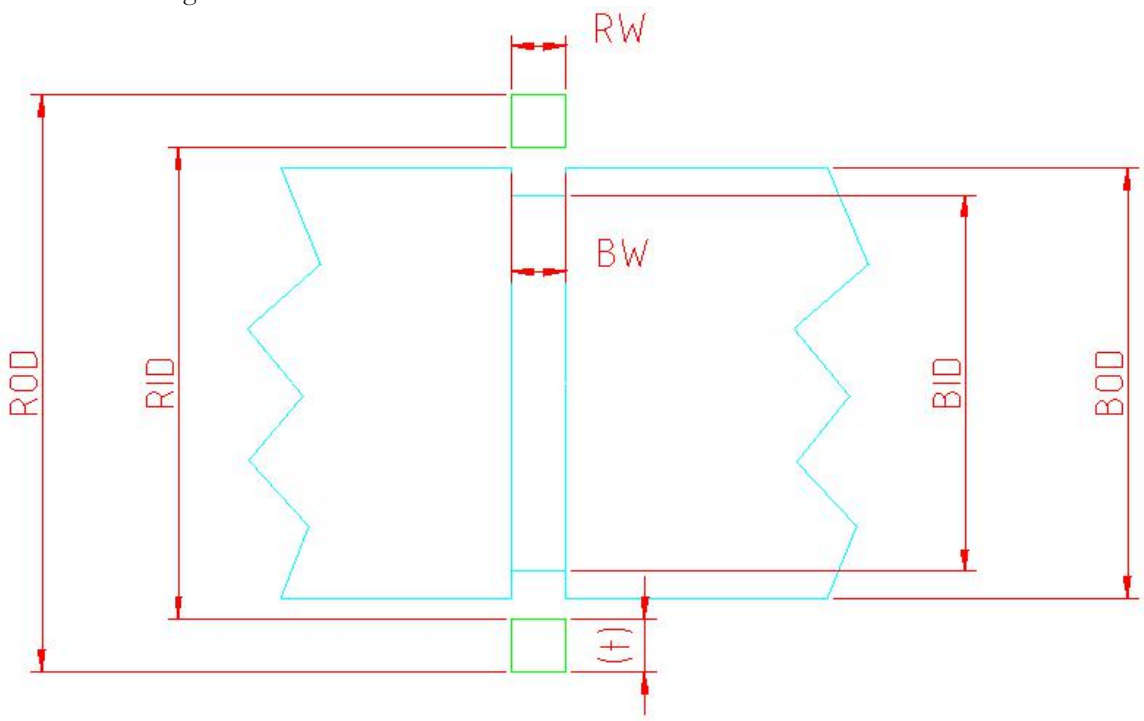
verb

1. shape (metal) using a swage, especially in order to reduce its cross section.

"the instrument has a swaging head and a pulsed action which flattens the rivet in a series of rolling motions"

I have a collet chuck for my lathe so I thought I could use that as the die to collapse the ring into a groove. I experimented and developed a set of dimensions that seem to work. My intention was to make a ring small enough that the material would fill the groove and without it folding or distorting.

Here is a drawing:



Where:
BOD=Body OD
BID= Groove ID
ROD=Ring OD

RID=Ring ID
RW = Ring width
(t)=ring thickness (reference dimension)

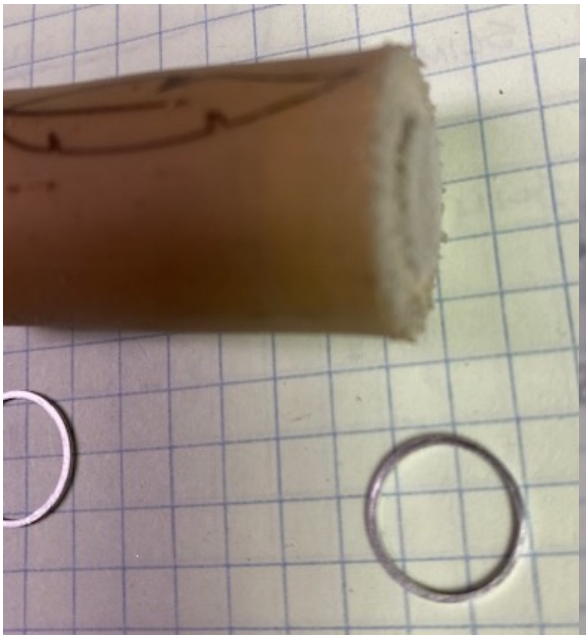
I turn the blank down to a few thousandths over the finished diameter, just enough to finish sanding the body to final size. The ring will be proud of the body and has to be sanded or filed to the body diameter.

Then the body can be final sanded and polished as normal.

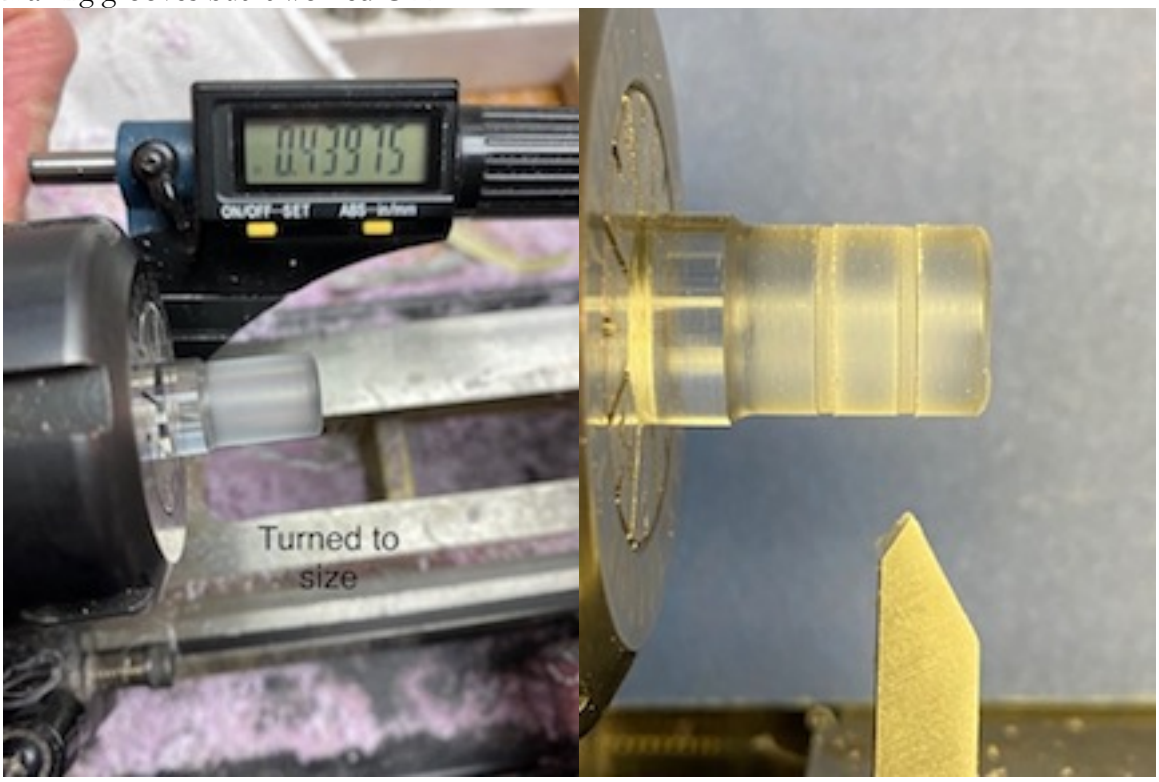
Here are the dimension rules I followed (all dimensions in inches)
RID=BOD+0.002
BID=BOD-0.008
ROD=RID+0.063+/-0.015

Here are a couple Aluminum rings. ROD=0.49, RID=0.4415, RW=0.031, to swage on a mandrel. For demonstrations I did not use make a pen body or cap.

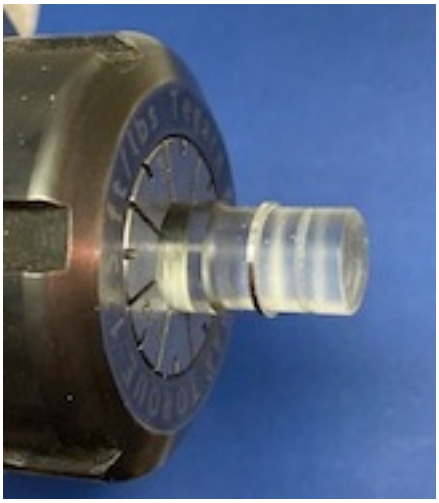
I use a bottle cork with a turn down to hold the rings while deburring on sandpaper.



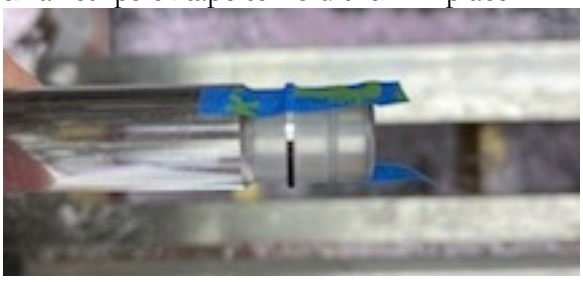
Given the ring sizes, the mandrel is sized: BOD=0.4395, BID=0.4315, grove width 0.032/0.034ish. Turn to size and then make the grooves. This wasn't the best tool for making grooves but it worked OK.



The rings fit over the outside diameter!



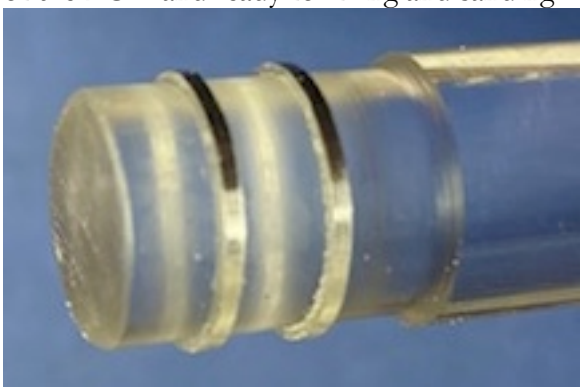
Now it's time to prepare for swaging. Center the ring over the groove and place a couple small strips of tape to hold them in place.



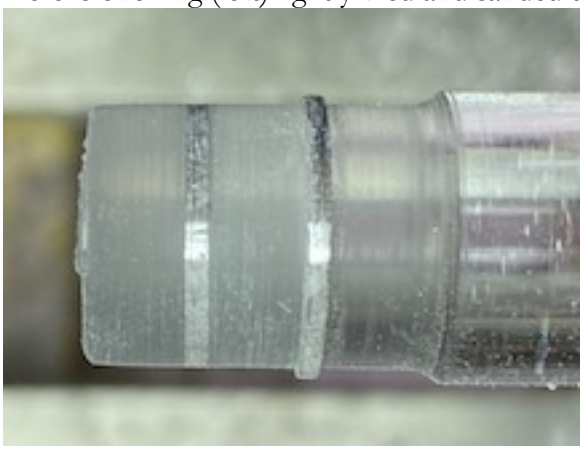
Select the closest sized collet that allows the assembly to slip in without moving the ring out of the groove. Mount in the collet chuck. Gently slip the assembly into the collet. Make sure the ring stays aligned with the groove. It might take a couple tries.

The collet nut is tightened down firmly. For a hollow part like a pen body or cap I recommend supporting the ID with mandrel or a transfer punch.

If everything stays aligned the rings should be swaged into the grooves. They will be proud of the BOD and ready for filing and sanding.



Here is one ring (left) lightly filed and sanded to size.



This is a cross section of one ring showing how it filled the groove. The ring filled the groove nicely with no gaps or distortions

I hope that this helps explain ring swaging enough to get you going and developing your own superior method. Good luck.
Please contact me with any questions or comments.