A Spindle Mounted Stop for a 12″ Atlas/Craftsman Lathe, version 2.1

By R. G. Sparber

This article is intended for those new to the metal working hobby.

If you are making more than one of a part, using "stops" can speed up the work ***and*** give you more consistent results. Here you see some round stock held in my 3 jaw chuck. It is being set at a specific distance from the headstock by that 5/16-18 ″ threaded rod.

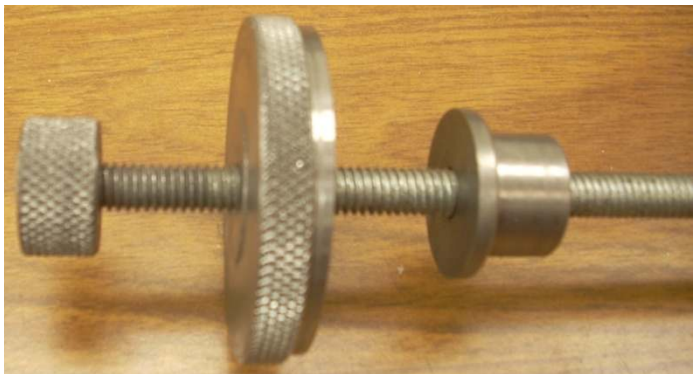
This rod is secured in the spindle so it can't move in or out.

Since each piece of round stock is centered by the 3 jaws of the chuck plus the stop sets its depth, we get a consistent position each time.

A side benefit of this attachment is that when not in use, it will prevent swarf from entering the spindle bore. I've always stuffed a small rag in there but this should be far more useful.

First I will show you how the stop works and then give you guidance on the design. There are no critical dimensions and only a few even need to be measured.

[1] You are free to copy and distribute this document but not change it.



These three parts threaded on a piece of 5/16-18 threaded rod are the feed and lock mechanism. The knob on the far left is secured to the threaded rod with Loctite® Red. The large knob in the middle is threaded to match the rod and is free to turn. The stepped washer on the right has been drilled with a clearance hole.

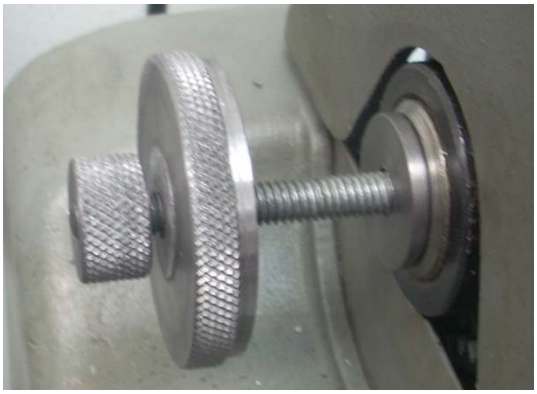
On the right end of the threaded rod is a second stepped washer but this one is threaded. The step presses on the end of the spindle.

To install, I first spun off the right threaded washer. Then the threaded rod was fed into the spindle from the left end.

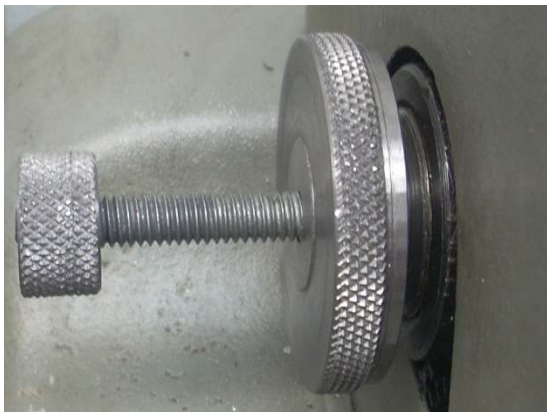
The stepped washer fits smoothly inside the spindle bore and centers the threaded rod. Note that the large knurled knob has been backed into the smaller end knob. A gentle twist and they are locked together.

Moving over the chuck side of the spindle, you can see that the threaded rod extends into the jaw area. I have opened the jaws up enough to let my threaded washer pass through. As I spun the large knurled knob on the left end of the spindle, the threaded washer engaged. A light touch with my finger was enough drag to draw it in a bit. Once the threaded rod engaged the threaded washer, I pulled on my large knurled knob to pull the threaded washer into contact with the end of the spindle.

The threaded washer was then contacting the chuck end of the spindle and my large knurled knob was still locked onto the threaded knob by the small knurled knob. I gave the large knob a spin that also pulled it away from the spindle. That causes the threaded rod to screw itself into the threaded washer.



One good spin and my stop was almost at the desired stick out from the right end of the spindle. I then held the small knob and rotate the large knob to unlock it.



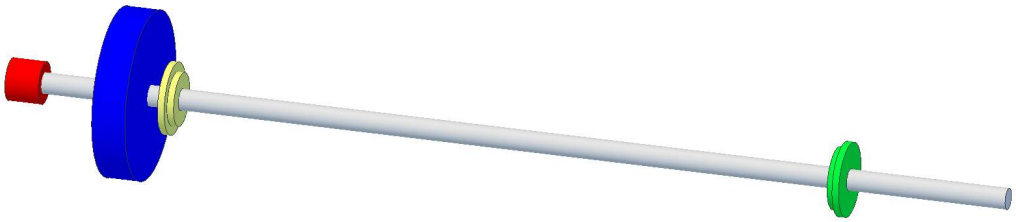
I then spun the large knob until it locked against the stepped washer. This secured the assembly.

If I needed to change the stick out of the stop, I would just loosen the large knob, turn the small knob in or out, and tighten the large knob again.

When not in use, the stop can be retracted enough to not interfere with the chuck jaws.

Shop Work

The knurling on the two knobs was left over from my adventure modifying my knurling tool. If you are not able to knurl, just skip it. You can hold the smooth surfaces well enough for this mechanism to work.

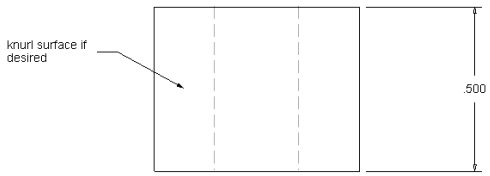


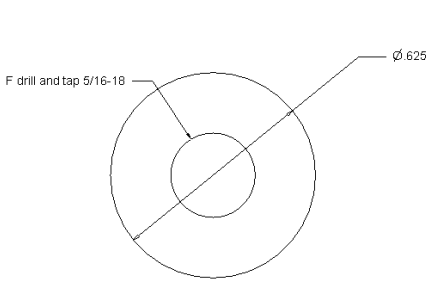
Here is a drawing of the assembly done in Alibre® Computer Aided Design. This program will automatically generate the shop drawings from the parts assembled here. This project barely needs shop drawings.

The step washers must be sized for the bore and outside diameter of your spindle so my dimensions might not be right for you. The large knob must be large enough to freely spin yet not so large as to rub on the gear cover. The small knob can be just about any scrap you have on hand.

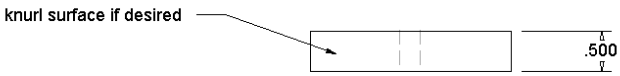
I will show you the shop drawing first and then walk you through a sample fabrication. If you plan to make this project, do measure the bore at each end of the spindle on your lathe. It may not be the same as mine.

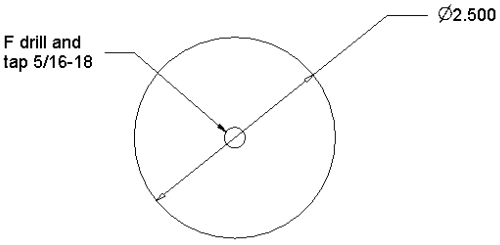
End Knob
material: steel or aluminum



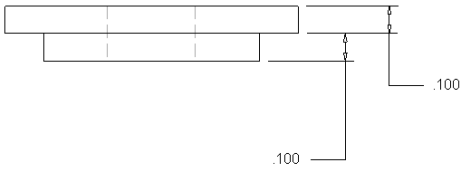


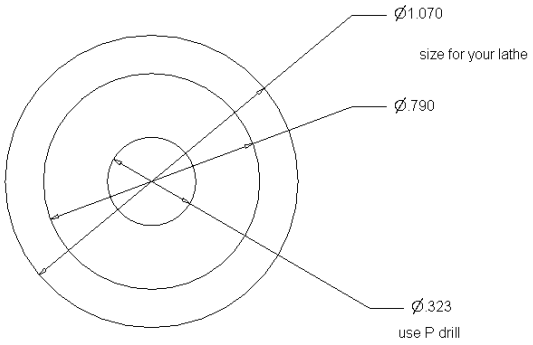
Large Knob
material: steel or aluminum



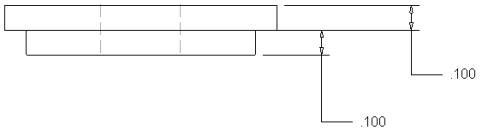


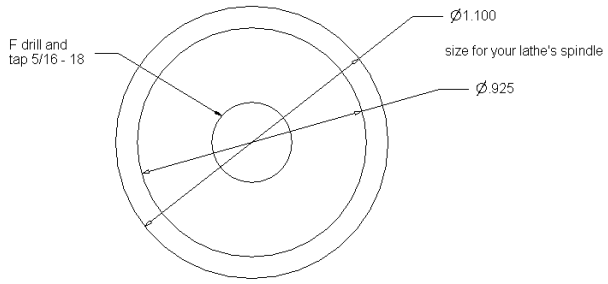
Left End Step Washer
material: steel



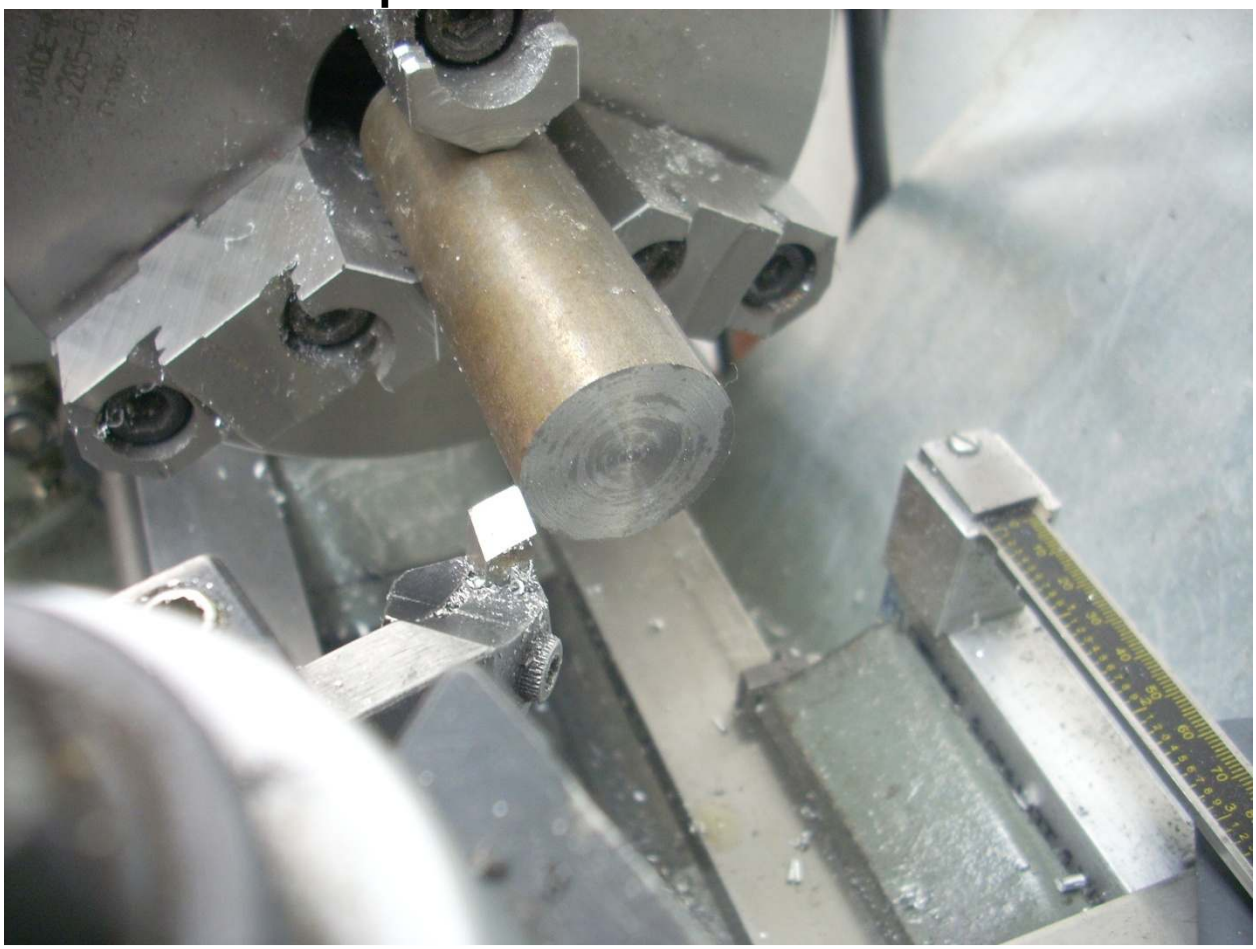


Chuck End Step Threaded Washer
material: steel





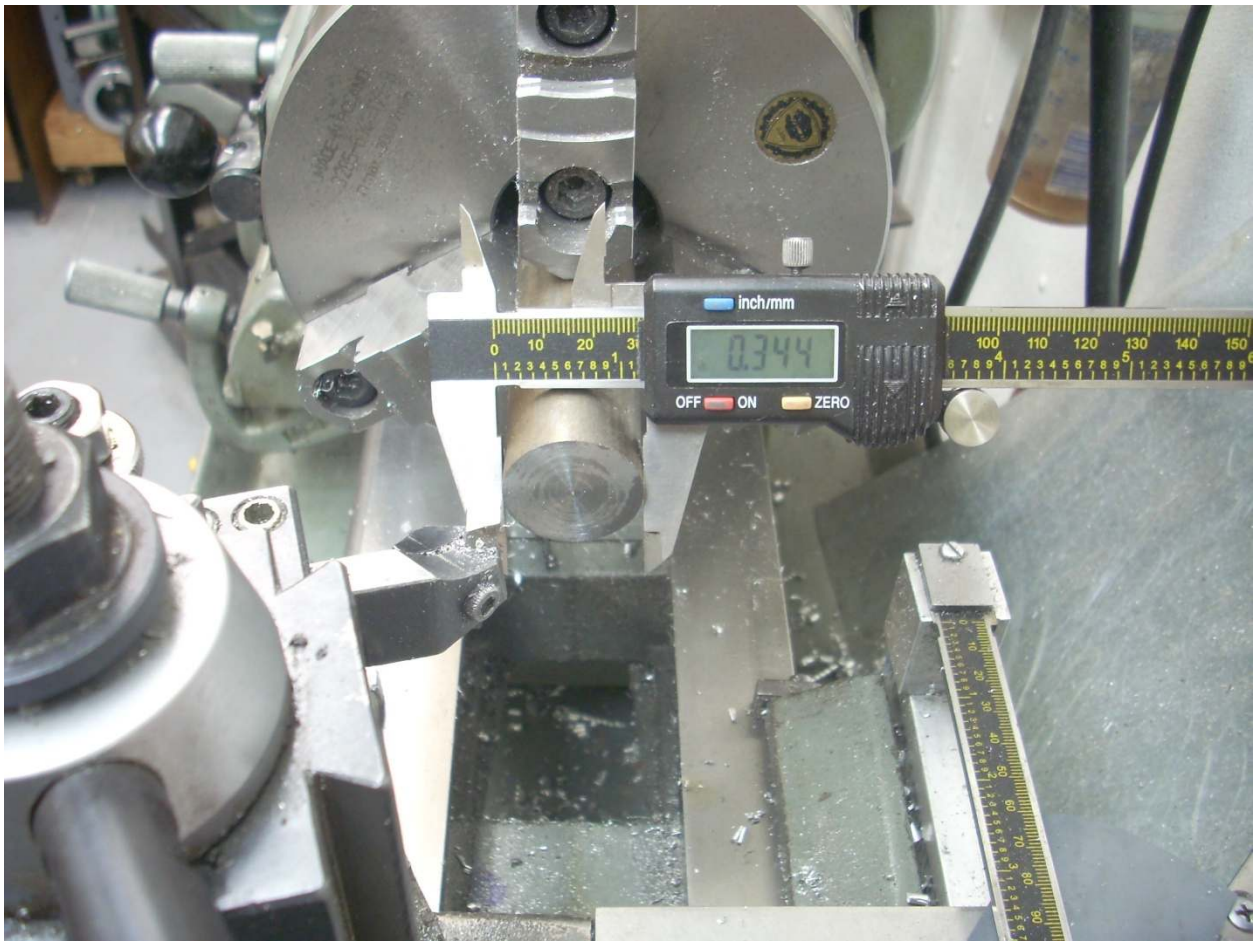
The Left End Step Washer



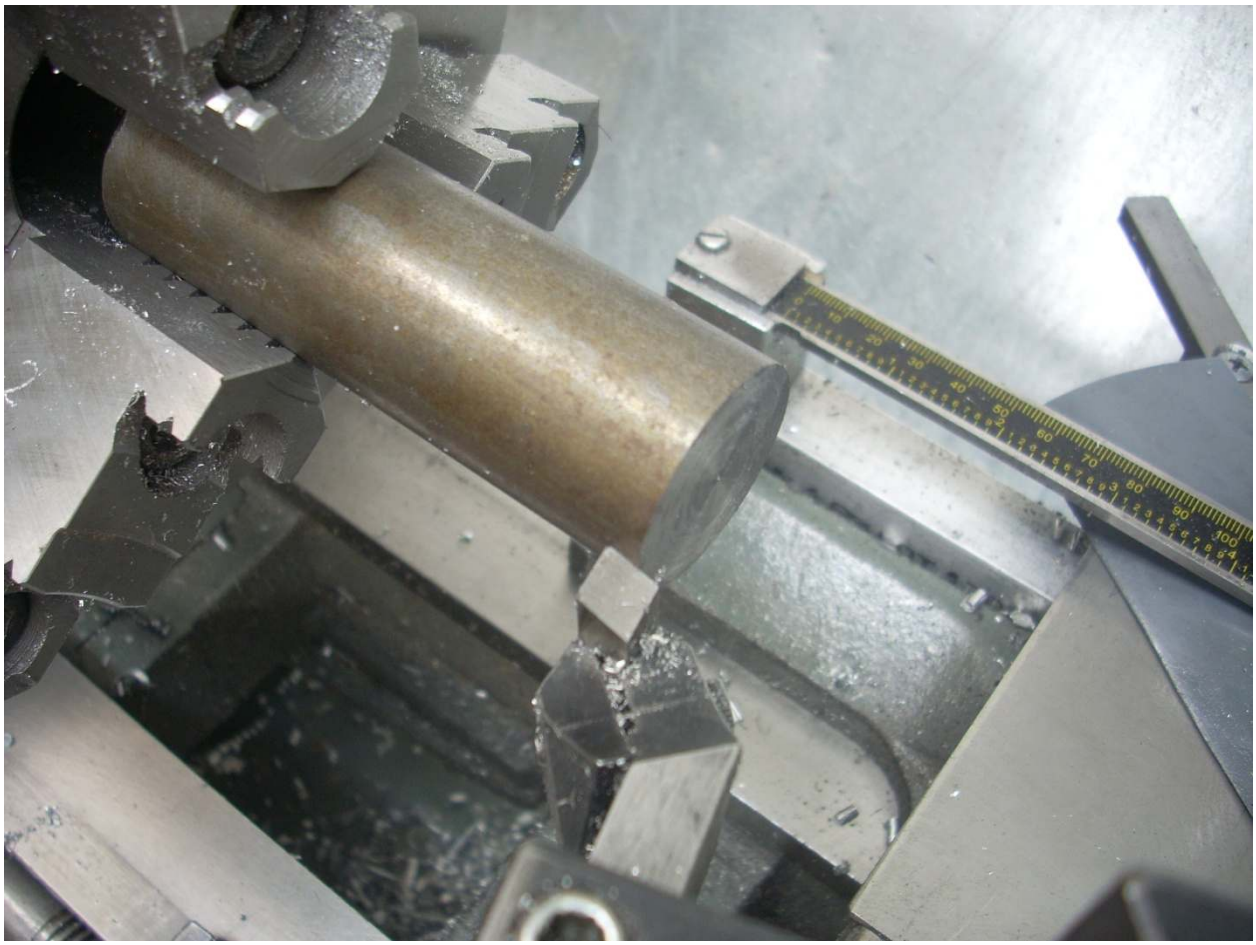
I happened to have some 1.125″ diameter cold rolled steel so sawed off about 4″ of it. I then put it in my 3 jaw chuck. After brushing the surface with cutting oil, I used my Diamond® cutter to face the end square.

I'm going to turn the 0.790″ diameter feature first because it is easier to go from smaller diameter to larger diameters with this cutter. I set my caliper to 0.790″ and then zero it by pushing the "ZERO" button.

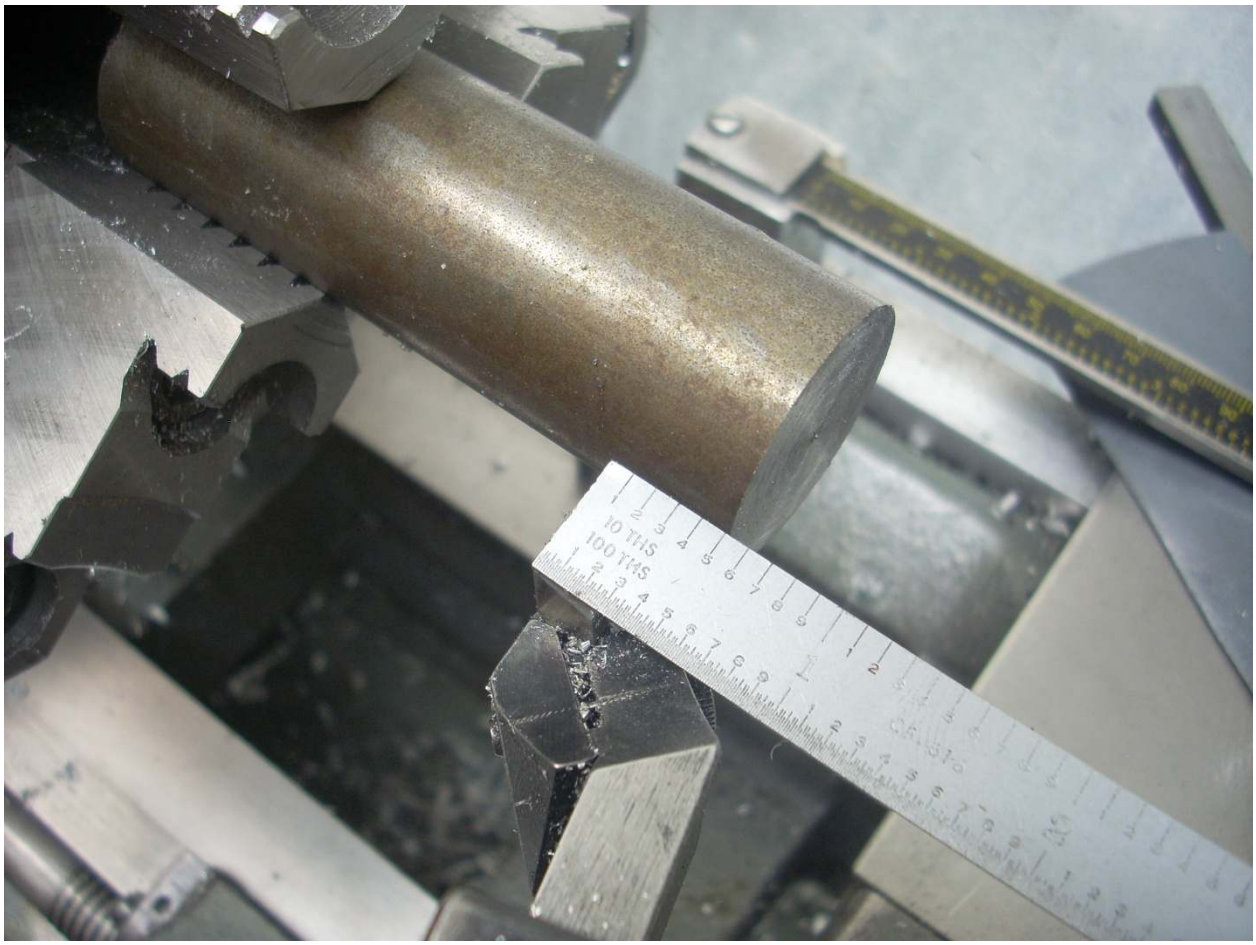
My caliper will now tell me how far I am from my finished diameter.



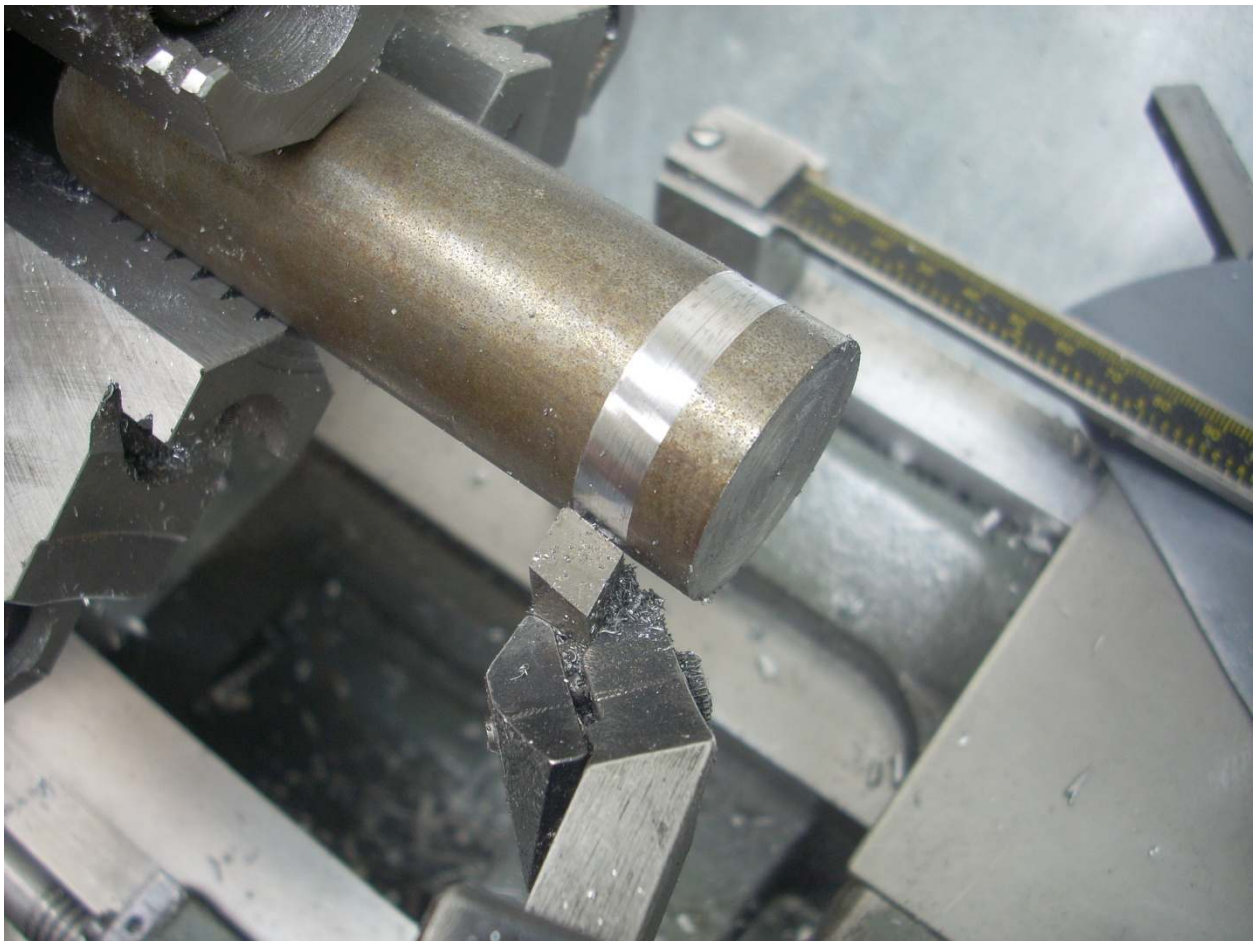
The stock is 0.344″ larger in diameter than my desired 0.790″. This means I need to remove $\frac{0.344''}{2} = 0.172''$ in radius.



I set cross slide zero with the cutter on the surface of the stock. I also move the cutter longitudinally about 0.2″ to mark my overall length for this diameter. This distance is not critical so I just used a steel ruler.



Here is where I got distracted and marked 0.4″ rather than 0.2″.

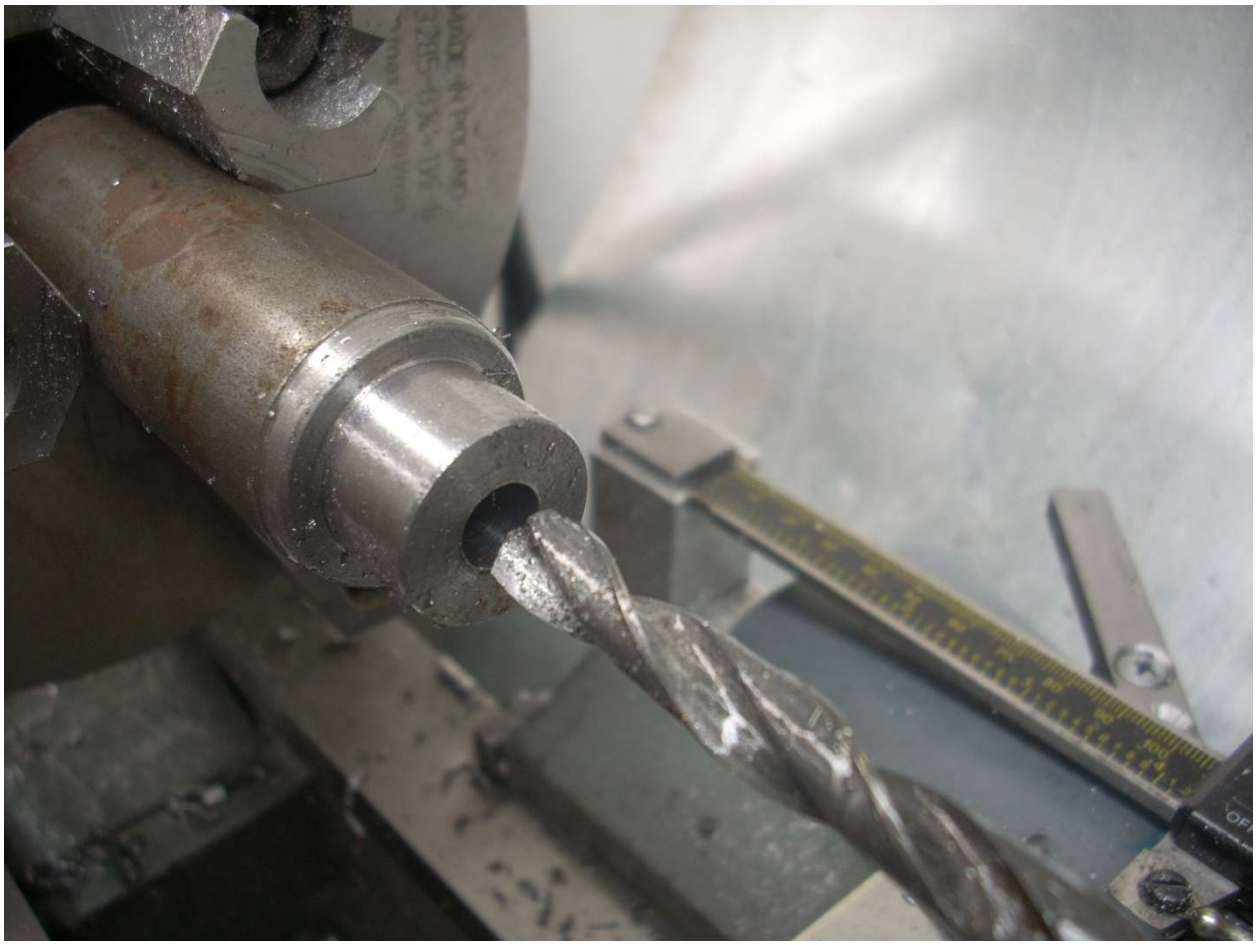


I fed in the cutter to mark the end of the 0.790″ diameter. This lets me concentrate on getting the diameter right and not worry about overall length. Of course, I should have worried about it a little bit more since I am off by 0.2″.

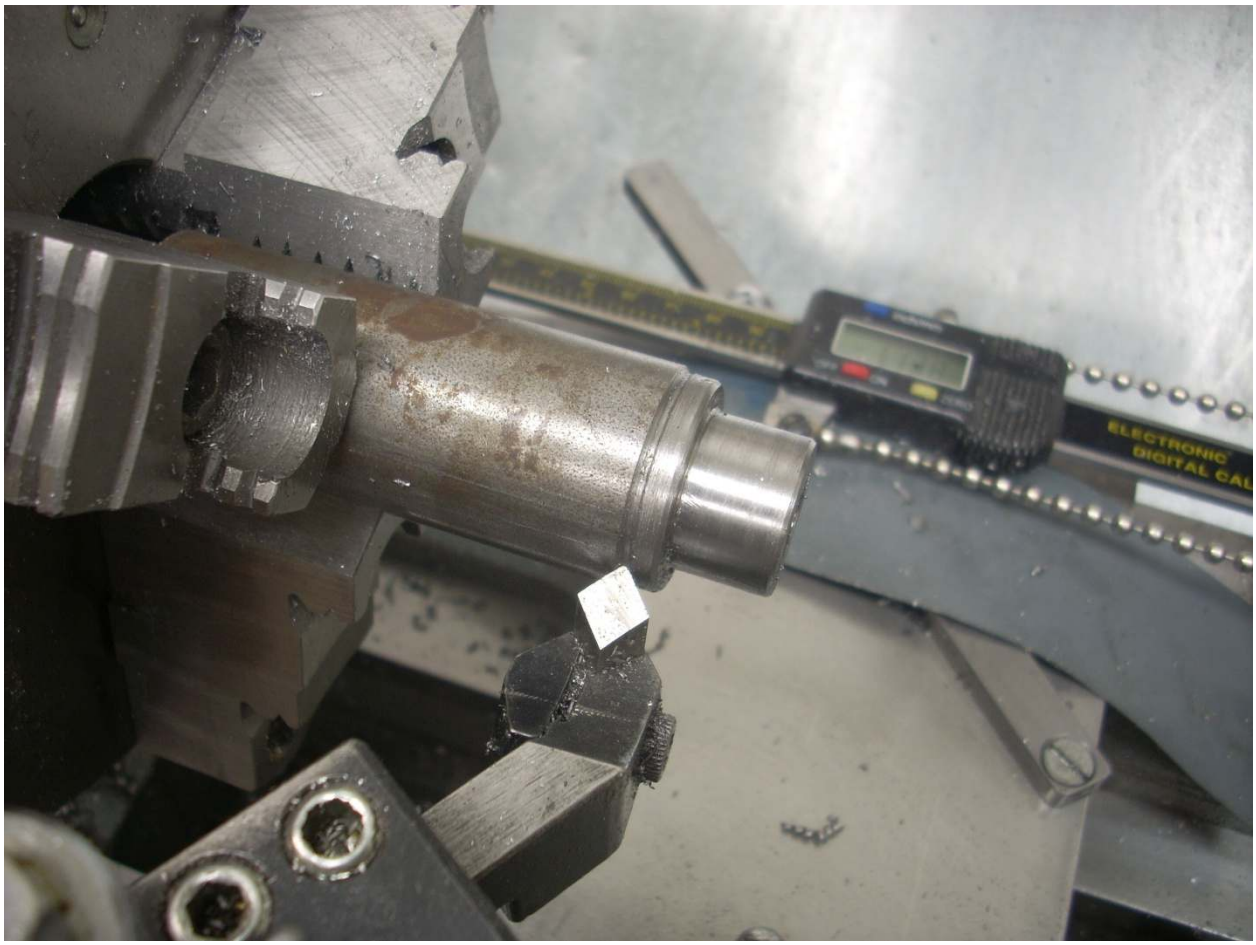
I took 3 passes of 0.050″ each and then did a cleanup cut to get me to 0.790″. I then turned the 1.07″ diameter. Before each pass I dabbed on some cutting oil.

Now I am drilling the center hole. I start with my spot drill. You can see my fancy oil brush dabbing on the cutting oil.

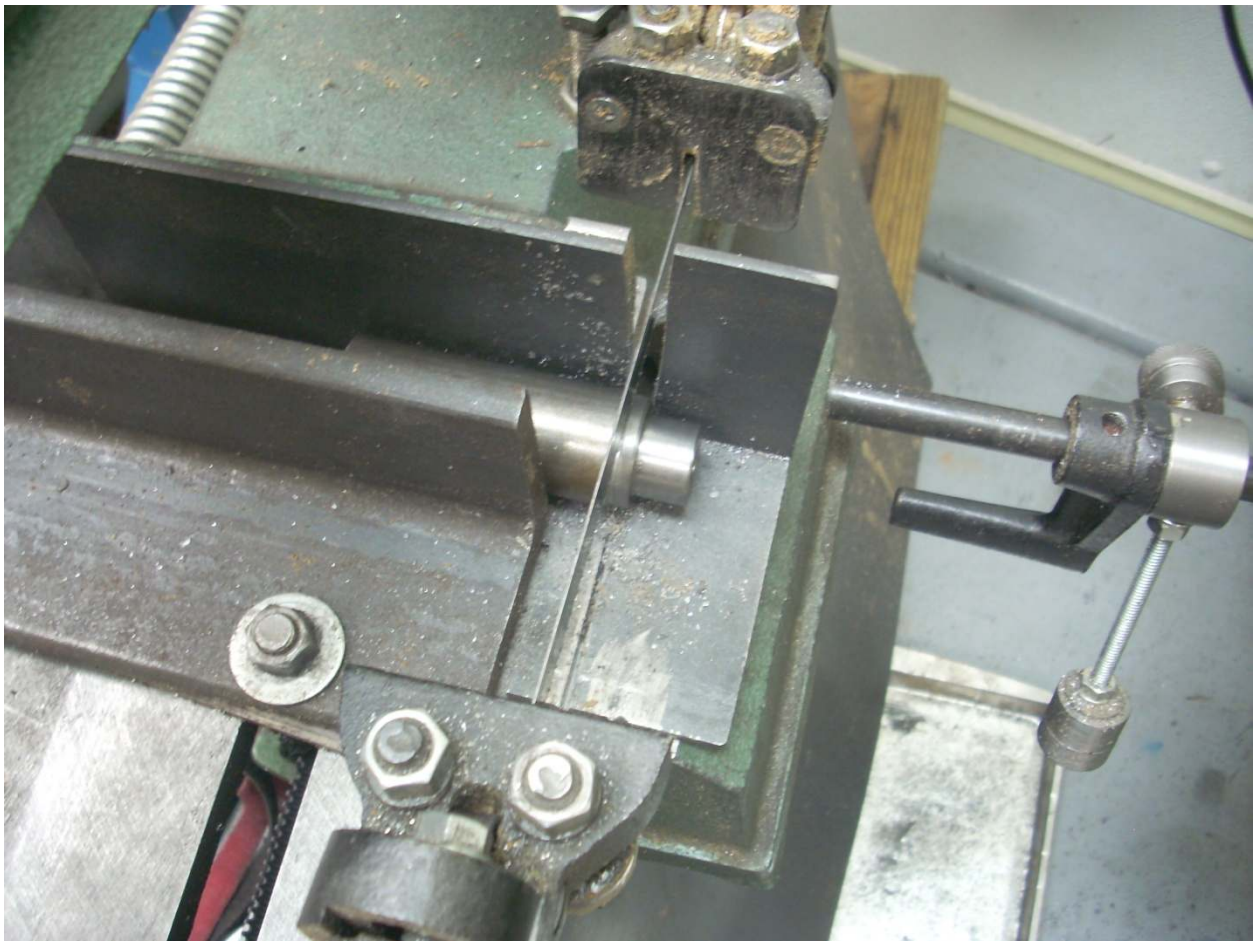
The spot drill cuts a nice cone shaped hole which will accurately guide the twist drill that comes next.



I started with a ¼″ drill and went in about ¾″. Then used my “P” drill to finish up. Some people will start with a 1/8″ drill, then go to ¼″ and “P”. This process, called step drilling, gives better results than trying to just go for the largest hole.

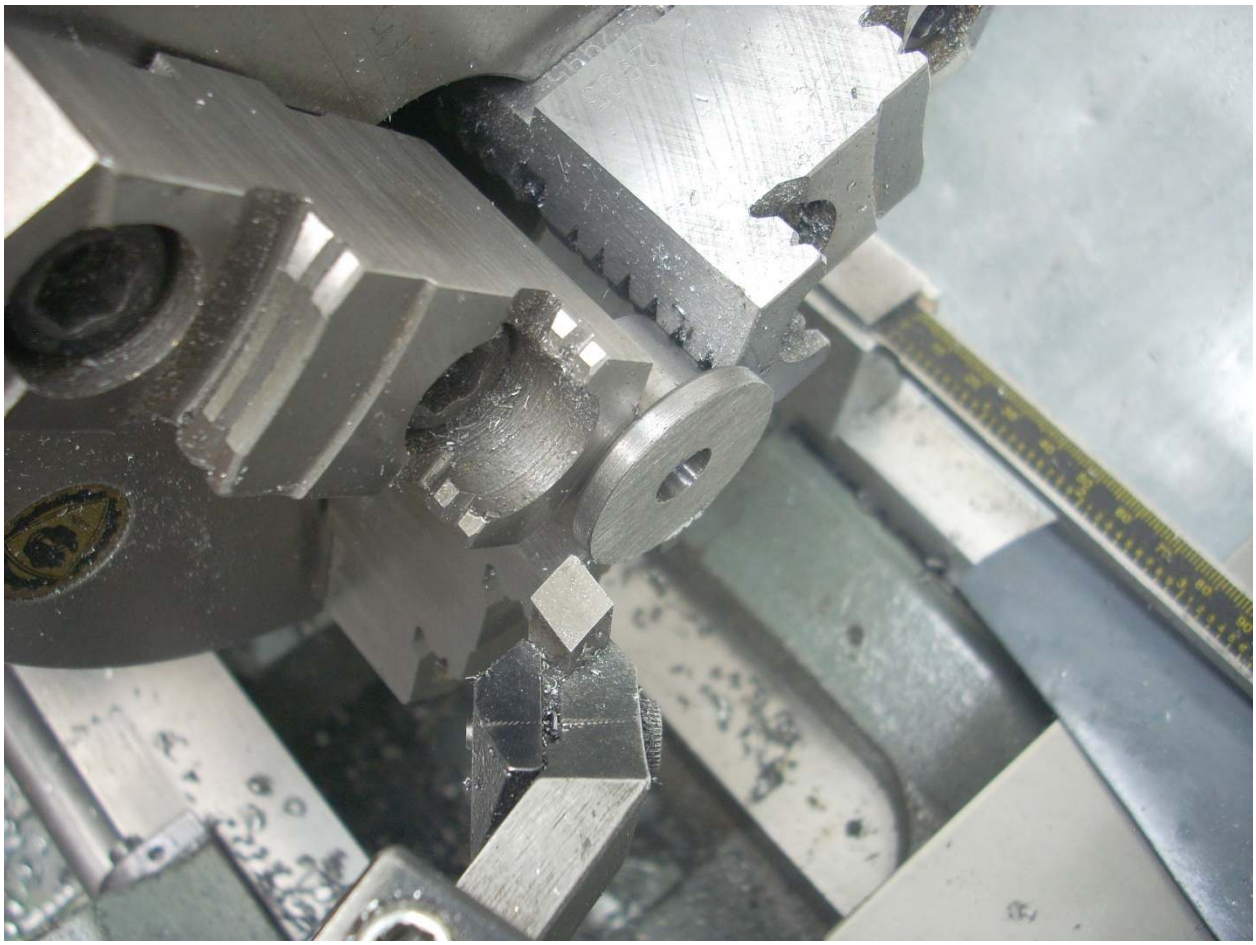


I like to help my saw blade find its mark so have cut a shallow V into the part.



The bandsaw makes quick work of separating the turned part from the bar stock.

All that is left is to face this end and deburr it.



The part goes back in the 3 jaw chuck and I take a cleanup cut. The edges are beveled with a file.

The other step washer goes through the same process except that I didn't screw up the overall length on that one. Note that the diameters are different.

With the stop installed, I clamped the threaded rod in my 3 jaw chuck and faced the end square. I also filed a bevel to make threading easier.

Acknowledgements

Thanks to Russ Kepler and Dan Buchanan for their invaluable advice on spindle mounted and collet mounted stops. Thanks to Glenn N of the atlas_craftsman Yahoo ground for general discussion about this design.

These generous people again demonstrate that “all of us are smarter than any one of us”.

I welcome your comments and questions.

Rick Sparber
Rgsparber@aol.com
Rick.Sparber.org