

Rod Clamp, version 2

By R. G. Sparber with essential design suggestions from Brian Lamb

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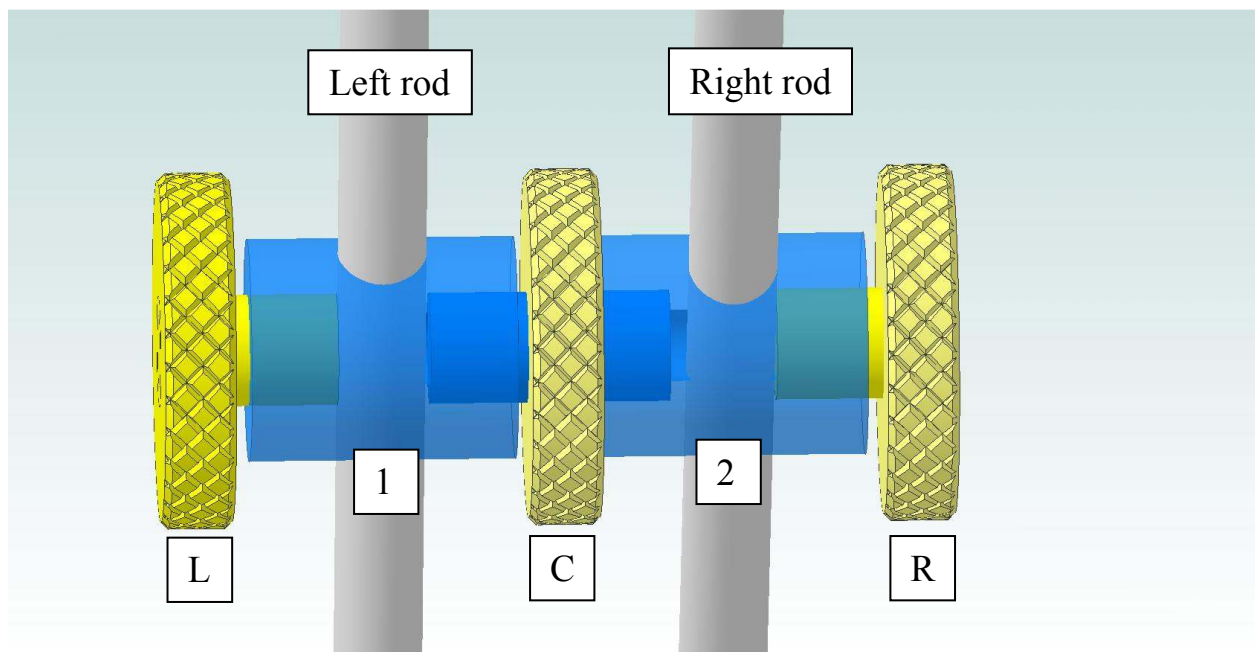
All of the rod clamps I own are handy because one twist of the lock and both rods freeze in place. But when unlocked, they are floppy and 3 hands are needed to control it. The rod clamp shown here solves this problem by having one lock for each rod plus one lock for rotation.



The outer knobs lock the 1/4" rod next to it. To change the angle formed between the rods, I loosen the knob in the middle.

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Here is a rendering of the final design generated by Alibre[®] PE, my CAD program.



I set the program to make parts 1 and 2 translucent so you can see how the rod lock fits together and works. Yellow is for brass while blue is for steel.

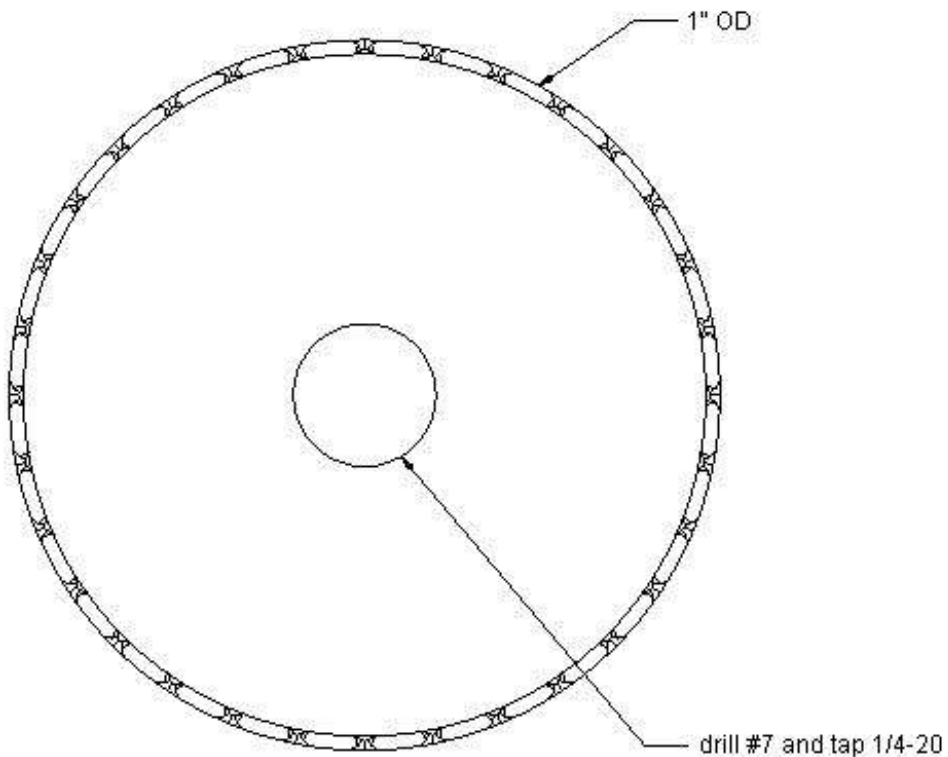
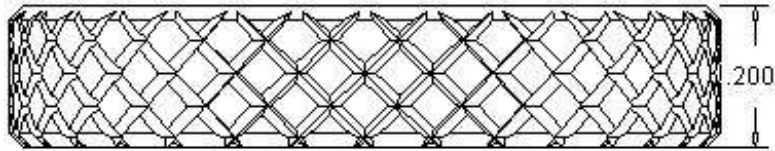
I have labeled the three brass knobs L, C, and R. Each knob has been drilled and tapped. For knobs L and R, brass threaded rods are screwed in and glued with Loctite[®] Red. Knob C is free to turn on the steel threaded rod.

The steel cross drilled cylinder on the left is body 1 and the one on the right is body 2. They are drilled and tapped all the way through. The steel threaded rod's left end is about 0.01" from the Left rod and is secured with Loctite Red. The other end of this threaded rod is nominally 0.05" from the Right rod and is free to screw in and out inside body 2 as the Right rod rotates end for end.

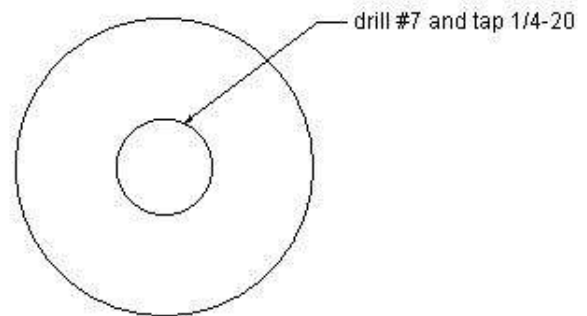
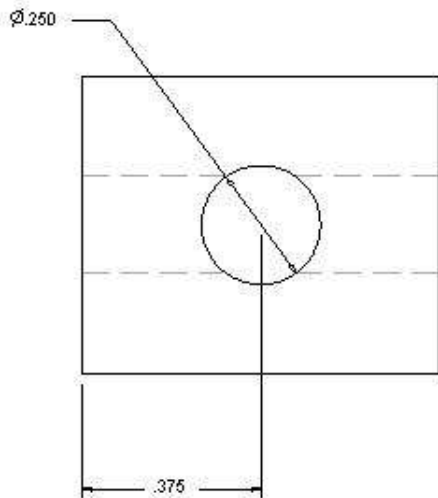
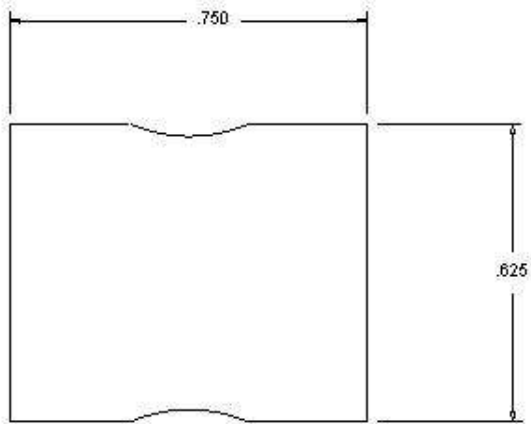
When brass knob C is turned counterclockwise, it locks against the end of body 2 and prevents it from rotating.

Locking the left rod entails tightening knob L which causes the associated brass threaded rod to press against the left rod. The right side works the same way.

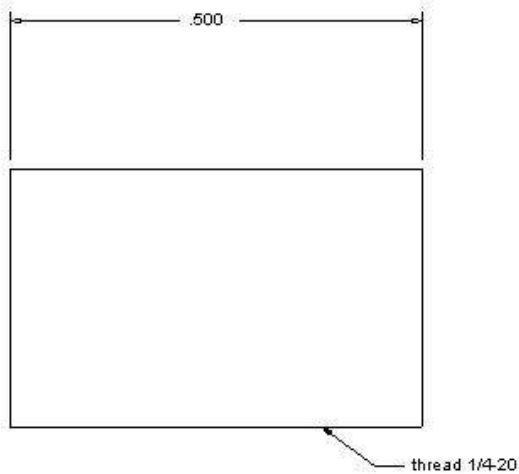
Knob
material: brass or aluminum
quantity: 3



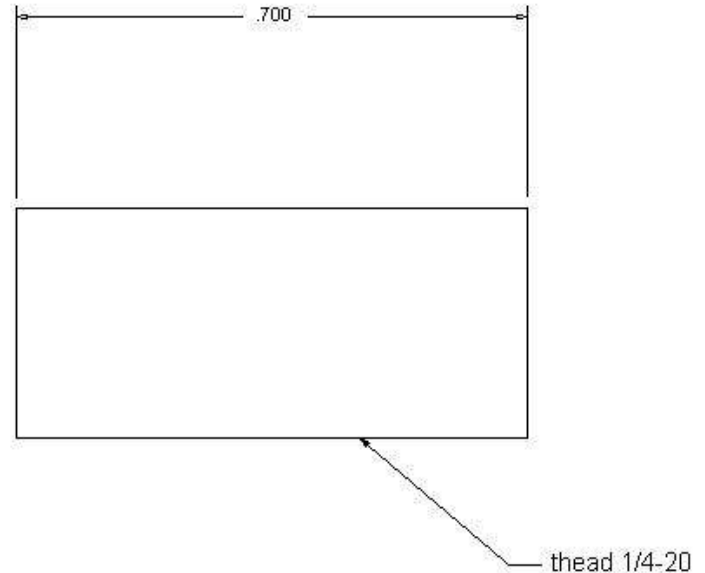
Body
material: steel
quantity: 2



Clamp Rod
material: brass
quantity: 2



Rotation Clamp Rod
material: steel
quantity: 1

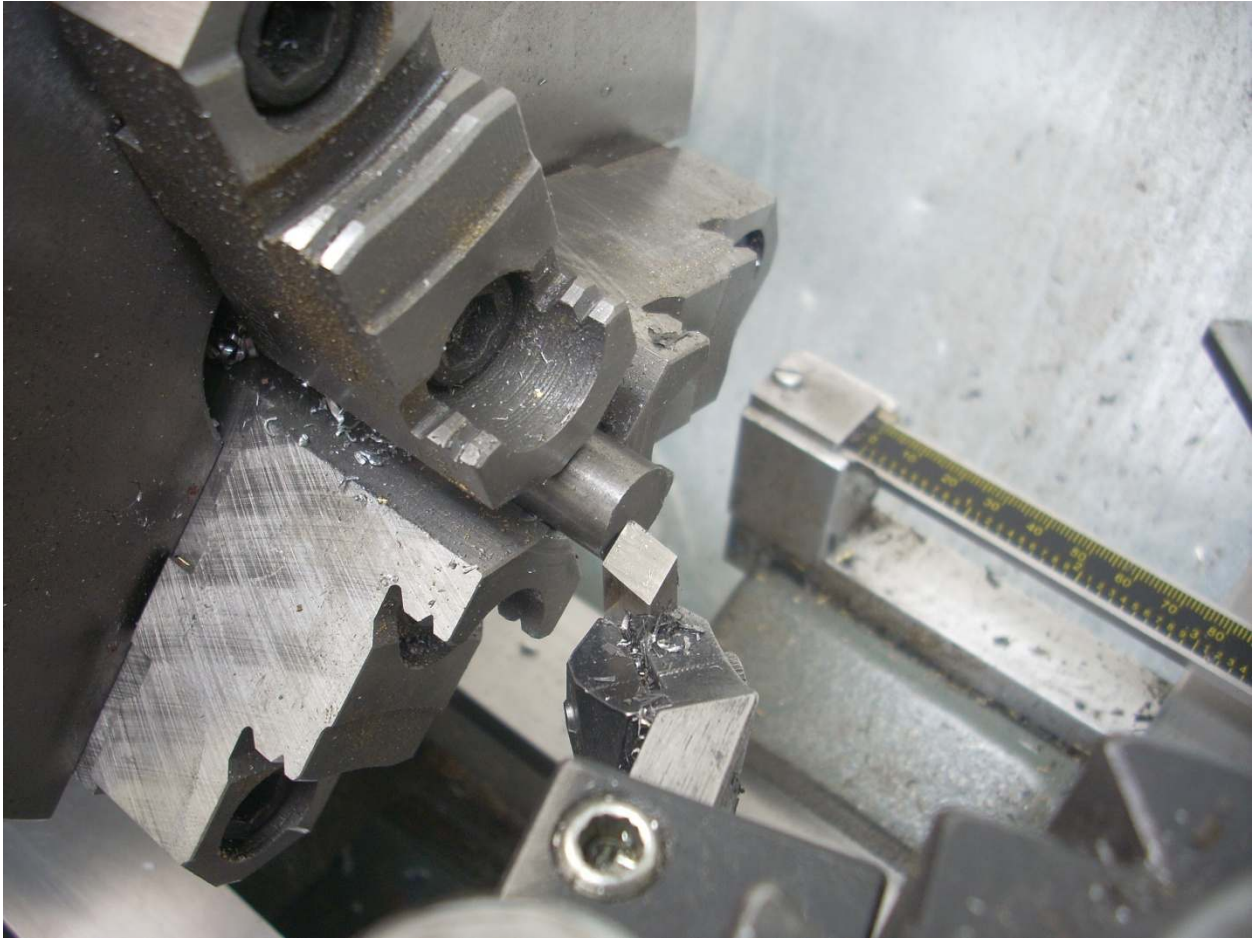


Bob Sanders suggested that I could use steel for the Clamp Rod if I first file one end bright, put on some silver solder flux, and then flow on some silver solder with a torch. The resulting pad presses against the 1/4" rod being clamped and will not mar it.

J. Vreede wrote:

"...drop a single lead shot down the hole (or a U-shaped strip cut from a sheet or even a lump of lead from a wheel weight pounded until it goes in!) and tighten onto that, the lead deforms around the rod and the screw flattens the back, so you get a curved bearing surface against the rod and the flat surface against the screw. When you use the right sized piece and give it the right amount of initial squeezing, the lump of lead locks into the threads on the hole and doesn't come out even when you pull out the rod, yet relaxes so the rod slides easily. Once its shaped you don't have to turn the thumb-wheels anywhere near as hard to get a positive lock. "

Shop Work



After sawing off a piece of 5/8" round stock about 0.8" long, I faced the end on my lathe. I also used a file to put a small bevel on the end. Then I turned the rod end for end and faced the other end. I used a file to deburr the end before removing it.



I used my caliper to measure the part's Over All Length to determine how much had to be removed to get down to 0.750". I then put the work piece back in the lathe, set my cutter to the end, and fed over the needed distance.



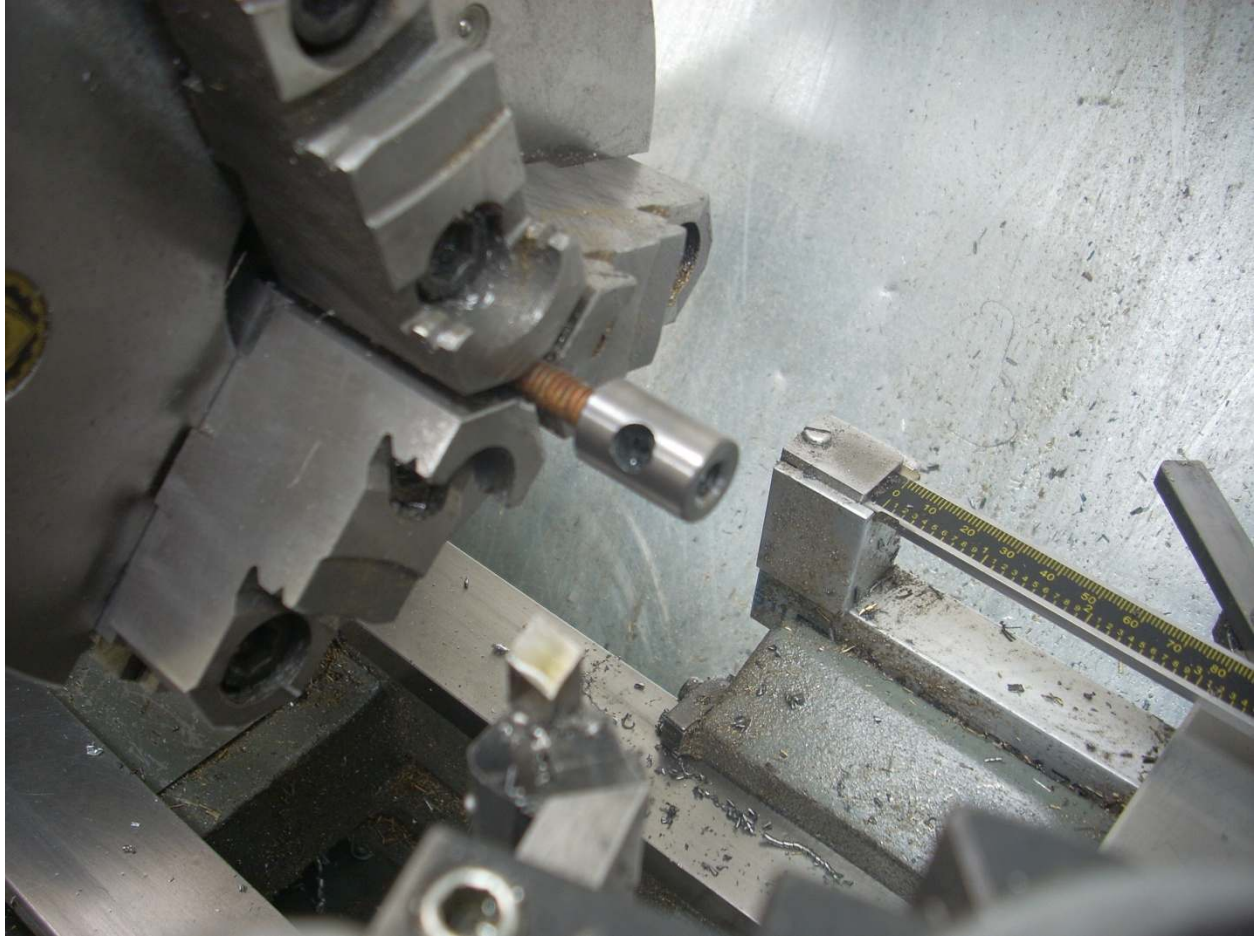
After cutting to the desired OAL, I used my 1/4" spot drill. It was followed by my #7 drill in preparation for tapping.



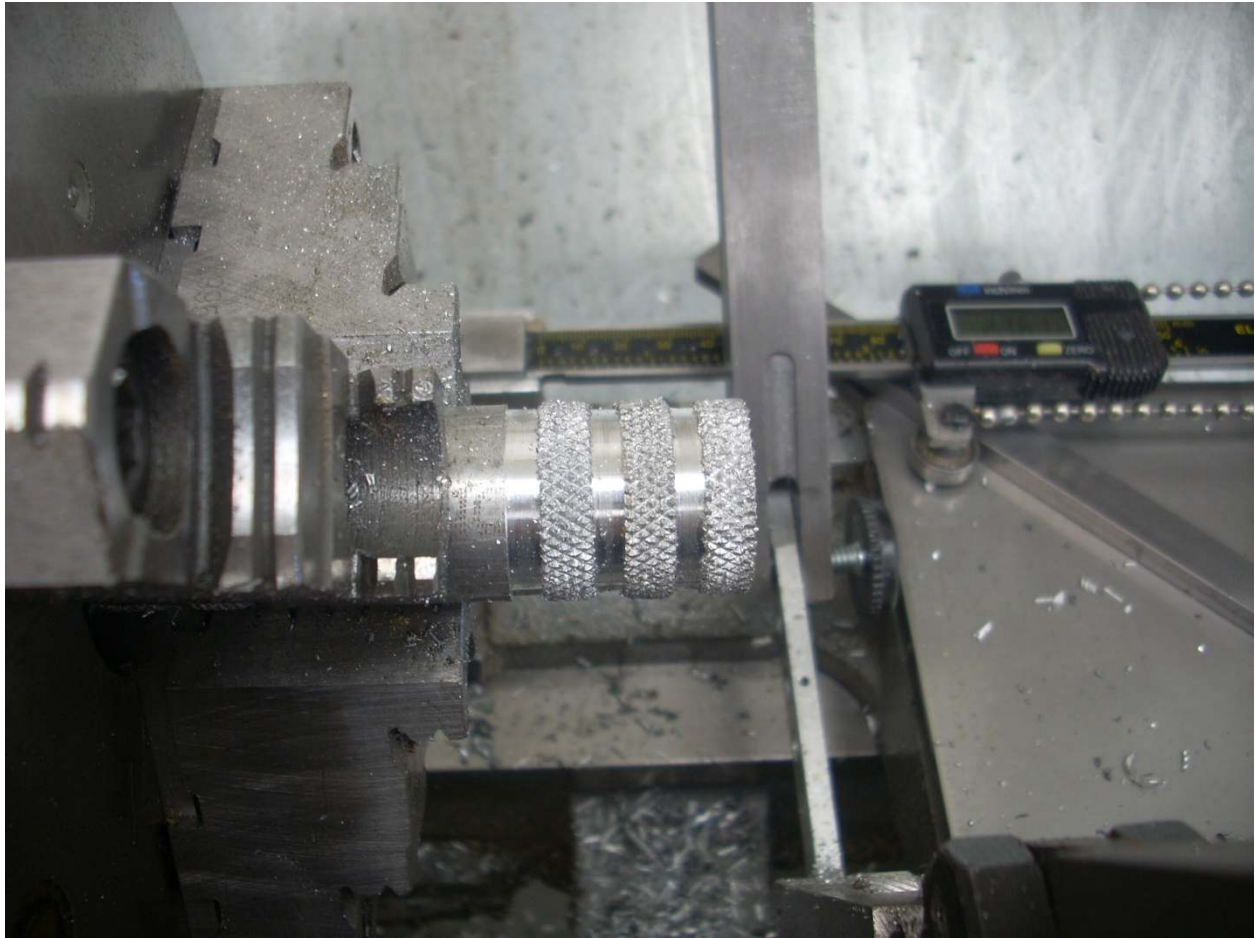
I locked the spindle, spread cutting oil on my spiral tap, and ran it through the part. The back end of my tap was supported by a sliding rod which in turn was supported by my tail stock.



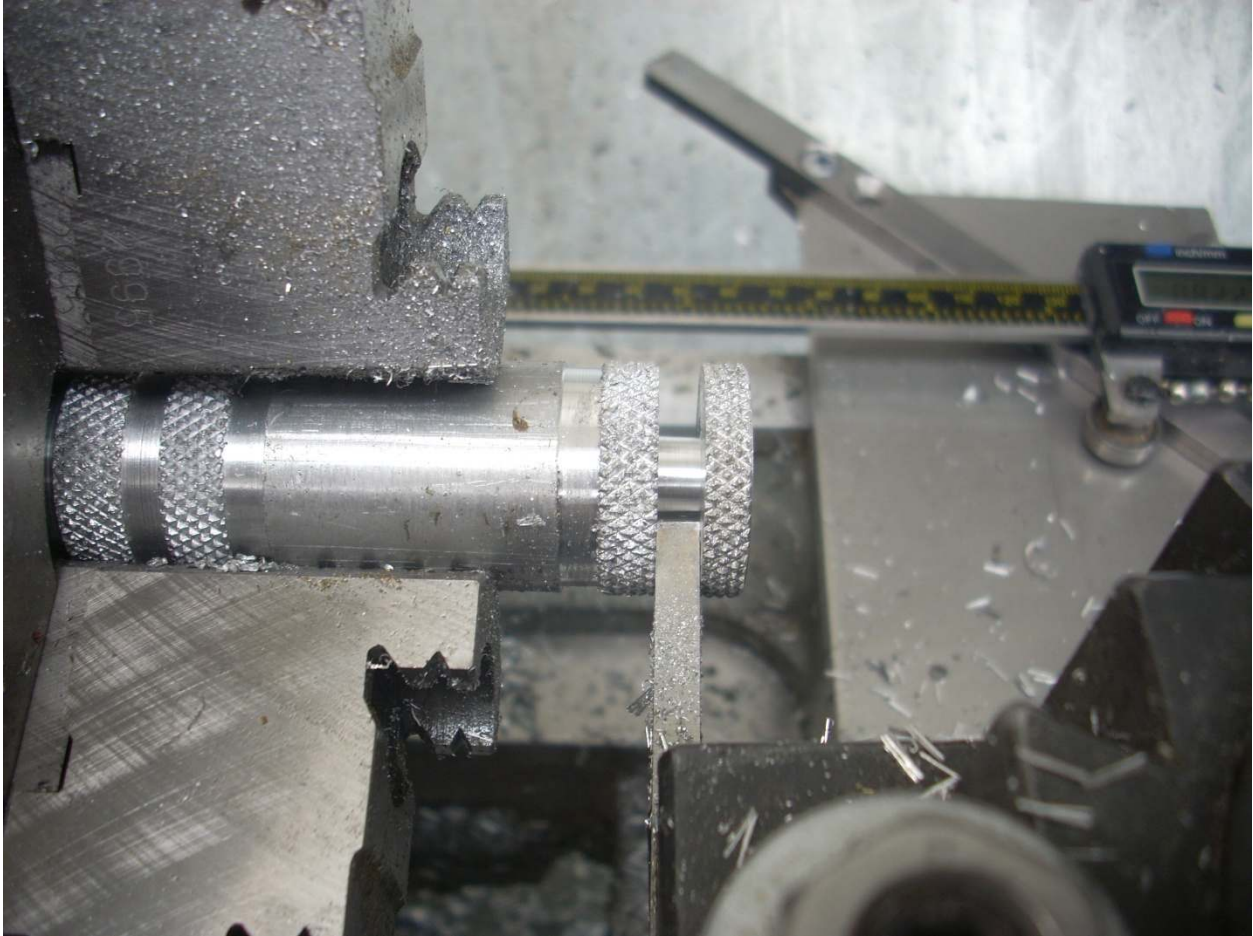
Since I was making more than one of these parts, it was worth my time to set up a stop on my mill. I then used my Digital Read-Out to locate the center of the part. I then drilled my cone shaped hole with my $\frac{1}{4}$ " spot drill and followed with a $\frac{1}{4}$ " drill. Then the second part was done with no further setup.



I polished the part by threading it onto a piece of $\frac{1}{4}$ -20 rod which acted as a mandrel.



The next step was to make all three knobs at the same time. I first cut recesses in order to expose rings 0.2” wide. Then I used my scissor style knurling tool to knurl all three rings. I then drilled and tapped through all of them.



The final step was to part off each knob. Before cutting all the way through, I used my file to put a bevel on each edge.



I screwed in my two brass bolts into the end knobs using Loctite Red. One of the bodies received the threaded steel rod and it too was glued in place. To get the spacing correct, I put a $\frac{1}{4}$ " rod through the cross drilled hole, fed in until I hit it, and then backed out a little. Then came the hard part; leaving it alone for 2 hours while the glue set up.



My initial tests indicate that this rod clamp will be useful. I plan to make a second one before I tear down my mill set up. If I was making a lot more of these clamps, I would set up a work piece stop in my lathe too.

Acknowledgements

Thanks to Brian Lamb for suggesting key design changes to my first prototype. Thanks to GreggK for suggesting the addition of brass pads on the ends of the clamping rod and to Bob Sanders for his technique of adding a non-marring pad using silver solder. All are members of the Valley Metal Club. Thanks to L. Garlinghouse of atlas_craftsman for improving the clarity of this article.

Thanks to J. Vreede for the design improvement.

I welcome your comments and questions. All of us are smarter than any one of us.

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