

Clausing Drawbar Assembly

Fred Husher, 8-2009

I read through the various discussion threads regarding the draw bar assembly. Not caring for any of the designs I dug through my junk box and found some needle bearing sets that seemed just the ticket to handling the load seen when pulling up or unlocking a collet. The bearings were military surplus that had been stashed since the early 1970's waiting for an opportunity for use. With the mating washers the bearings have an ID of 0.754, OD of 1.233, and a height of 0.142. The design was tweaked in at the end such that 0.005" of total lock/unlock play was present. This approach keeps all binding from occurring and the collet grips and releases with ease. The dimensions are what I ended up with, but changing them to suit what you have or desire is part of the game.

There are four turned parts required. Outer housing, spindle interface, inner thrust carrier, and (2) locking set screws.

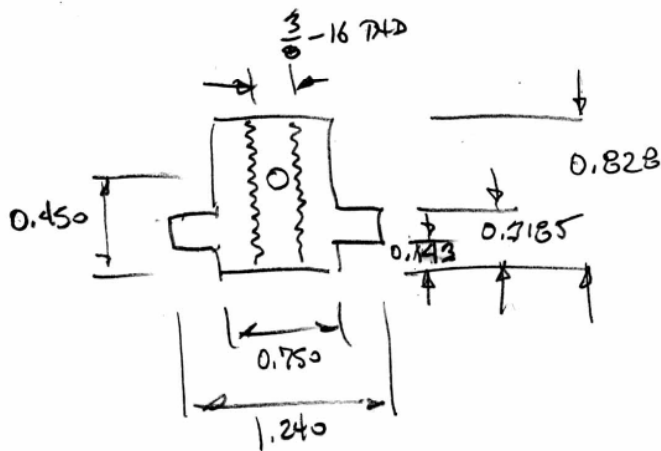
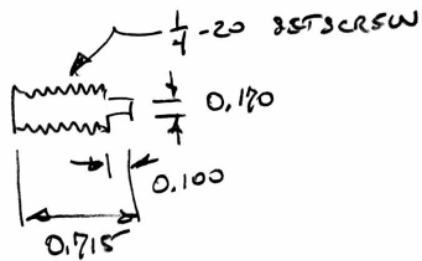
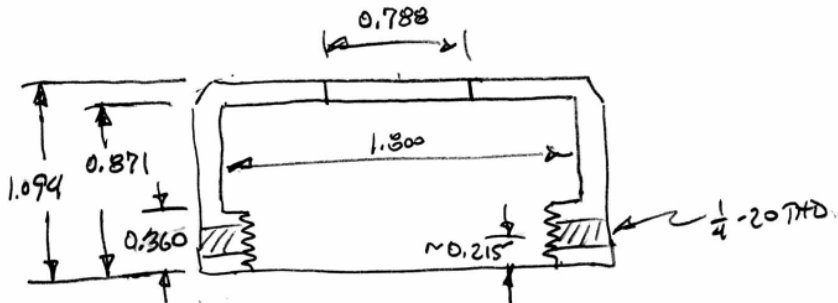
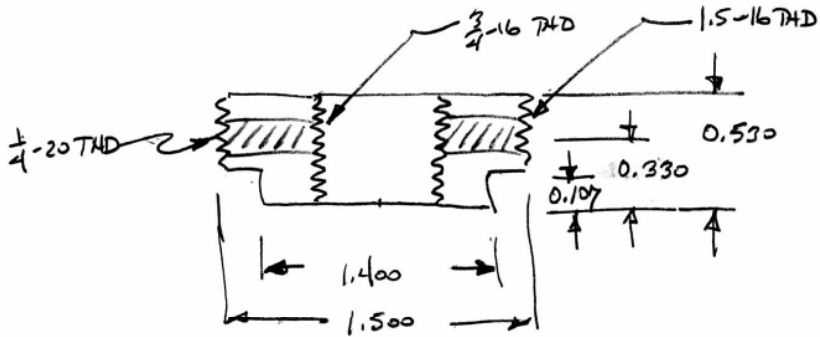
The inner thrust carrier has a 9/16 hex nut silver soldered to the top. Not shown in the drawing is a step shoulder I cut in both so that they would center together. I cut the pocket in the inner thrust carrier deeper than the shoulder on the nut to keep the solder from getting to the bolt threads. To align the threads of the nut and the inner thrust carrier I used a section of threaded rod and simply tightened them together. When done the threaded rod was removed. A 0.125 dia. cross pin hole was drilled between the inner thrust carrier and the actual drawbar.

The spindle interface was turned from a section of 1.5" dia. steel stock. I threaded the outside first. The inner threads were cut once the spindle interface was threaded into the outer housing with a spacer sleeve in between. This ensured that the inner threads were coaxial with the outer housing.

The outer housing was turned from a section of 2" steel stock. The threading was done until a tight fit was found between the spindle interface and the outer housing. Later the inner chamber was machined out. This was done to ensure that the bearings can sling off excess lubricant without any issue.

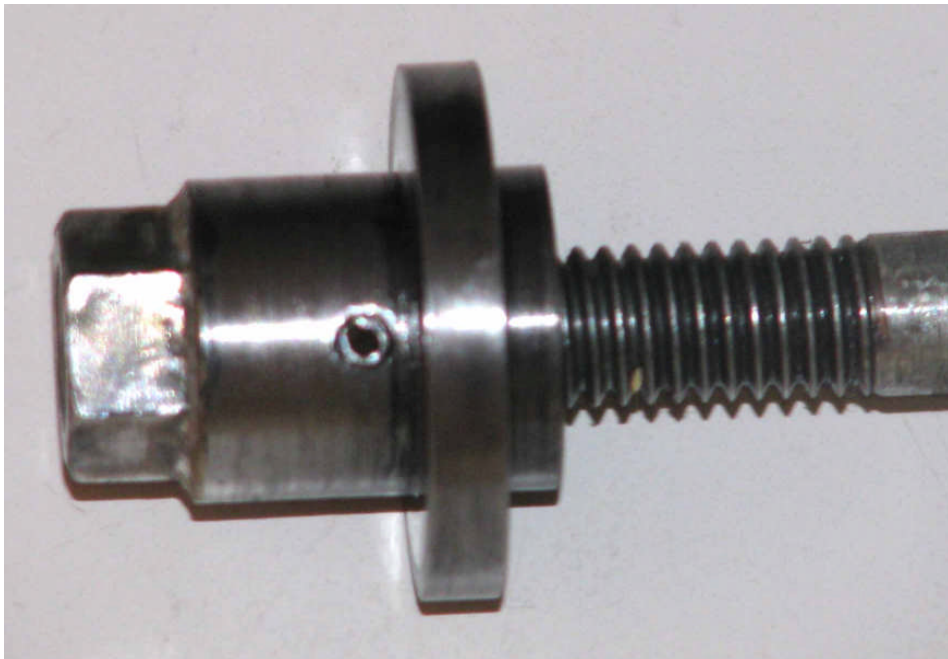
Final settings involve setting the 0.005" backlash. The inner thrust carrier (less drawbar rod) and its upper & lower needle bearings is put into the outer housing and the spindle interface is threaded until the desired backlash is found. The entire assembly is then put into the mill and a locking cross hole is drilled and threaded. The threaded holes serve two purposes: (!) locking the assembly together and (2) pinning the assembly to the spline slots on the mill's spindle. The setscrew has a nose section machined so that they just fit into the spline slots. The drawbar rod is threaded into the inner thrust carrier, cross drilled and a roll pin installed to lock all together. Overall length of the drawbar is 12.75".

The drawbar assembly is very smooth and operation is easy.





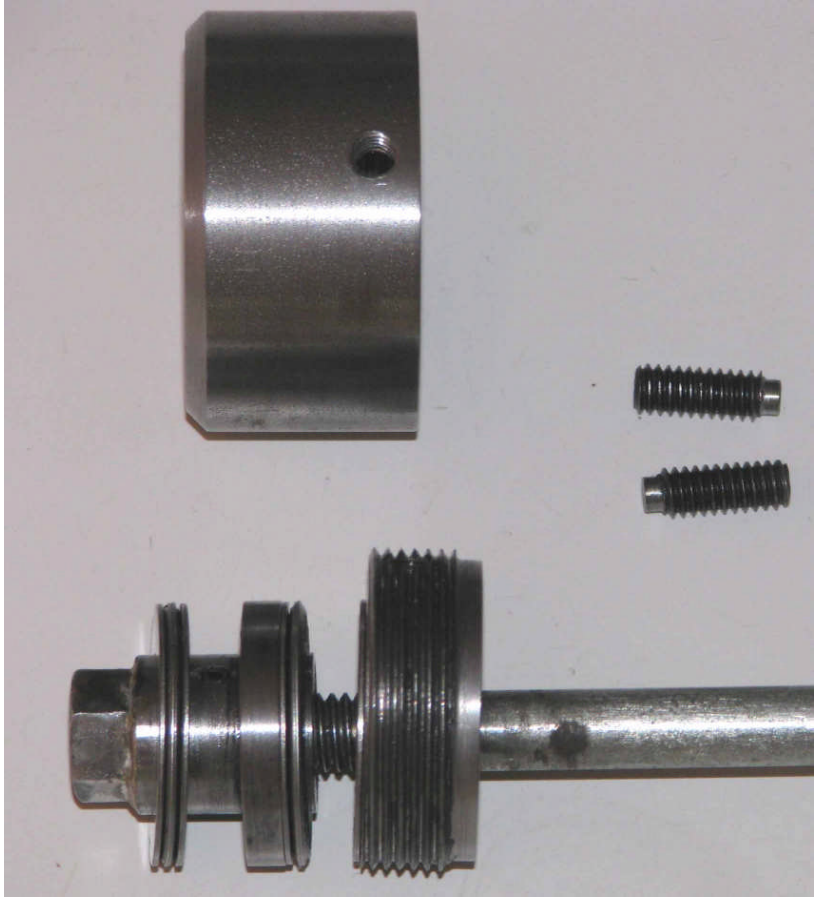
Outer housing and Spindle interface



Inner thrust carrier with nut and drawbar rod attached



One of two sets of needle bearings



Exploded view of the parts



Finished assembly