

TIP 87 — Custom Tooling for Sherline Lathe/Joe Saylor

Custom Solutions for Small Machines

Recently, I was planning for a project in which I will need to machine 1.5" OD and 2" OD 6061 T6 aluminum tubing, with .125" wall thickness, on my Sherline 4400 lathe. This is somewhat larger than “normal” material for these machines. Can it be done?

Problem #1: The project involved squaring, facing the ends and making the wall thickness consistent, inside to outside (Figures 1-4).



FIGURE 1

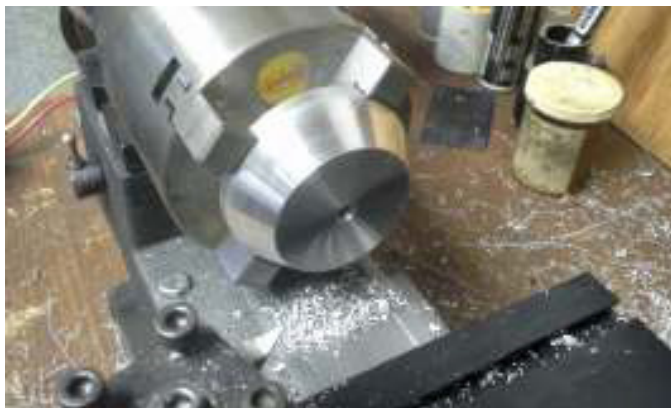


FIGURE 2



FIGURE 3



FIGURE 4

Solution: Using headstock and tailstock riser blocks allowed enough clearance over the cross slide, but the Sherline tailstock bull nose center wasn't large enough for 1.75" ID stock.

A larger Bull Nose was required. Unable to find such an animal, I was inspired to make one.

First Problem Solved.

Problem #2: The project will also require some internal threading, 20TPI, for about 1/2" depth, inside each end. Since I've spent some time finishing the outside of the tubes, I didn't want to mar them in a standard steady rest. I use support arms in my Sherline rest with small roller bearings on the ends. With these in place my, 1.5" OD stock won't fit through and NO WAY can I steady 2" OD stock. Inspired again, I came up with the following (Figures 5-8):



FIGURE 5



FIGURE 6



FIGURE 7



FIGURE 8

Second Problem Solved.

The Bull Nose was turned from 6061-T6 round stock, 2.25" OD (Figure 9). The mechanics are pretty simple and can probably be improved upon. It likely will be used once and then stored away. The beauty is that it was simple, made from available materials and some odds and ends.....and it works!

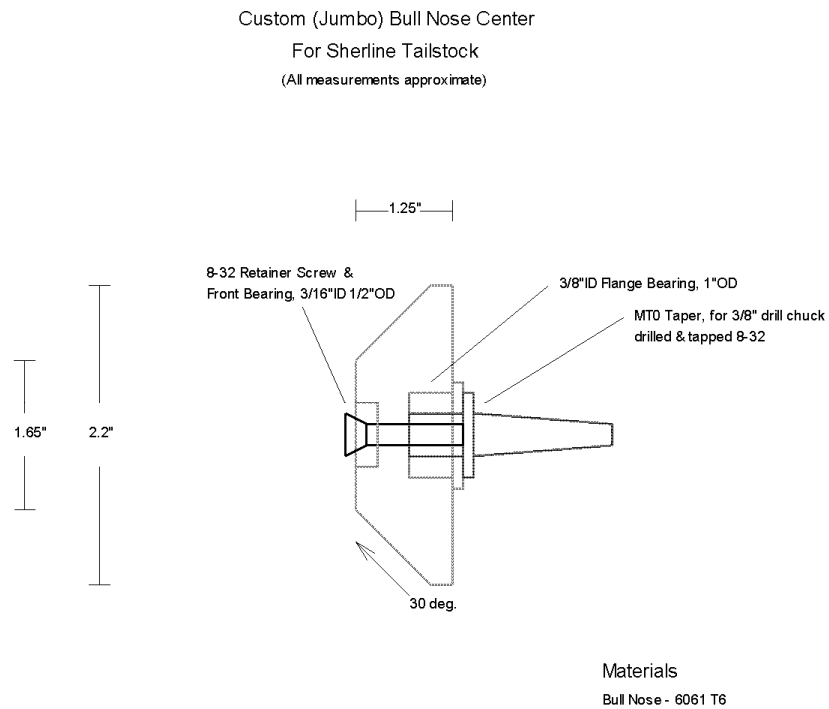


FIGURE 9

The Steady Rest started with a spare tailstock riser, a piece of 1/2" x 4" x 6" long 6061 flat stock and some basic layout dimensions (Figure 10).

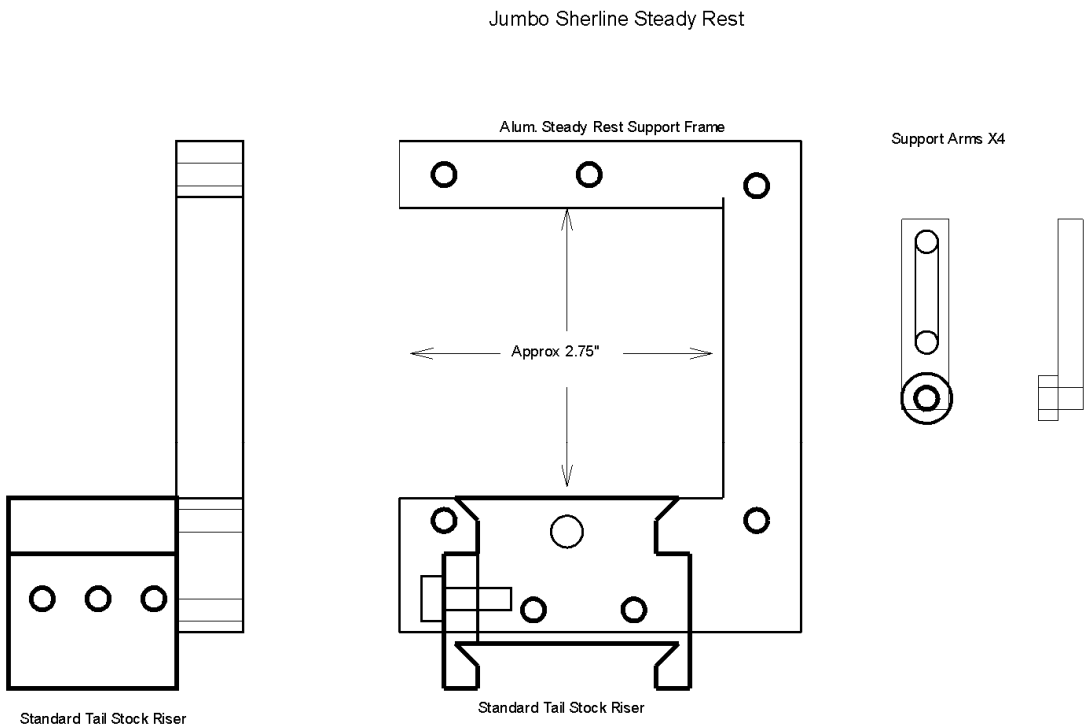


FIGURE 10—I didn't put dimensions to the steady rest diagram, but I'm sure if I can figure it out, almost anyone else can as well.

Setup some scrap 2" OD stock between the chuck and the Jumbo bull nose center. Began attaching the Sherline threading attachment – and of course, some small modifications were required. The threading attachment will work, at least geared for 20TPI RH, but I had to make a small semi-circular relief cut toward the top of the “arms” in order to allow the handwheel enough clearance to attach fully to the tail of the headstock spindle (Figures 11-14).

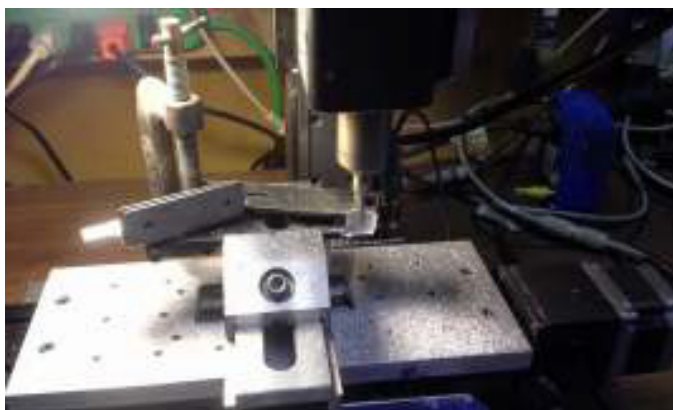


FIGURE 11



FIGURE 12



FIGURE 13



FIGURE 14

Final Problem Solved?

OK, so now things appear to line up, rotate with VERY little runout, and run smoothly. Next we'll see if these custom accessories can do everything as designed. Three thread test runs later and VIOLA! Everything works! The only tools used to make the accessories were a Sherline Mill, (Fully CNC), Sherline lathe, (being CNC'd), some basic hand and layout tools, and a band saw.

In short, the upcoming project was simply “inspiration” to solve some engineering problems on small machines.

Make some chips!!

Joe Saylor