TIP 81 — Rotary Milling Fixture/Joe Saylor

First of all, I'm just a "hobby machinist" or worse, but I've always been fascinated with "making" things. From the first time I saw a Sherline (Craftsman at that time) lathe, I knew I had to have one. That was 1986. Since then I've upgraded and modified my Sherline lathe and mill many times, the latest being to CNC the mill and starting on the lathe. The base for this fixture is similar to a tooling plate, only longer and thicker than most, as you can see from the file indicating dimensions (See Figure 4).

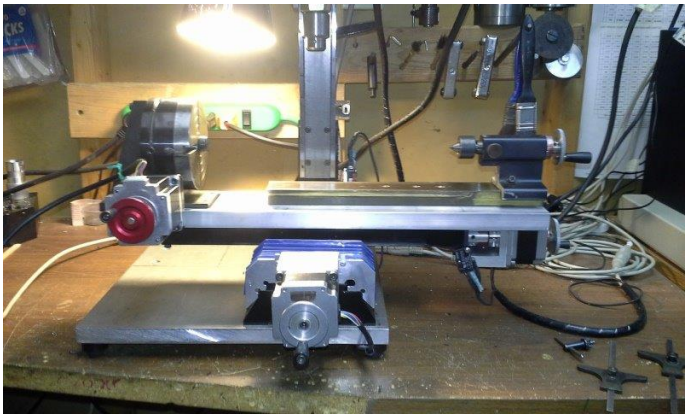

Figure 1— Rotary Milling Fixture installed on 5400 mill

I started this milling project as a result of discovering that the material I wanted to work on was too long to fit between the rotary table on vertical mount and the offset tailstock, yet I had 8" of X-axis movement. I was sure there was a way to get more work handling capacity. The original project that inspired this fixture was a custom muzzle brake, but any part that can be held between the rotary table and the tailstock of this fixture can then be machined in multiple dimensions, similar to a CNC trunnion, except that this fixture allows for 360 degree rotation and machining.

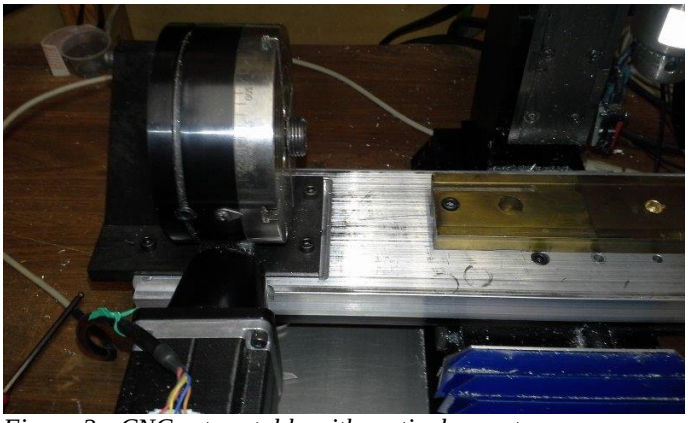

Figure 2—CNC rotary table with vertical mount

My mill is a 5400, with minor modifications over the years, such as the "long" Z-axis column, all self CNC'd, and mounted on a heavy, aluminum base plate to allow the mounting of a second vertical column to the side when/if needed. Because my Sherline mill was CNC'd by myself, and not an off-the-shelf build, I had to be creative and started with a rectangular bar of 6061, .75" x 3.5" x 18" for the base, my CNC rotary table with vertical mount, a spare Sherline lathe bed (brass) and a spare tailstock (old style). The brass lathe bed is to enable the use of a standard lathe tailstock instead of an offset tailstock and facilitate easy "slide" adjustment for part length. The only part that really cost me anymore $$ was the aluminum stock, since the other parts I had on hand anyway—my version of recycling!

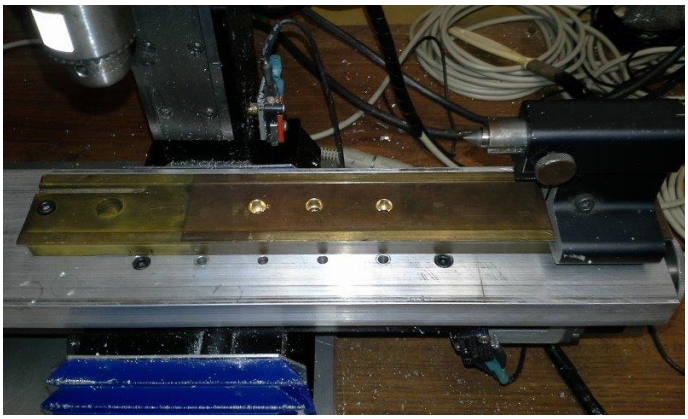

Figure 3—Brass lathe bed to enable the use of a standard lathe tailstock

It took some time to work through the necessary machining steps and dimensions, but the finished product seems to work rather well, even though it's only been actually used once, and that was for a prototype. Planning and accomplishing a project, which many of you know, can take weeks or months, especially if this isn't your Day Job.

There are some drawbacks to this arrangement, however.

1. Initially, the brass lathe bed and base plate have to be trued to one another and then the mills table. Allowance for small alignment movement was built-in while making the fixture.
2. If the rotary table with vertical mount is removed from the fixture, it too has to be adjusted to be "true" to the base, tailstock and mill itself.

NOTE: Some dimensions changed between the time of the initial paper drafting and the final product, and there are later modifications that I didn't get pictures of.

Hopefully this can serve as food for creative thought and independent thinking.

Go BUILD something today!!
Joe Saylor
Skill Level: Beginner

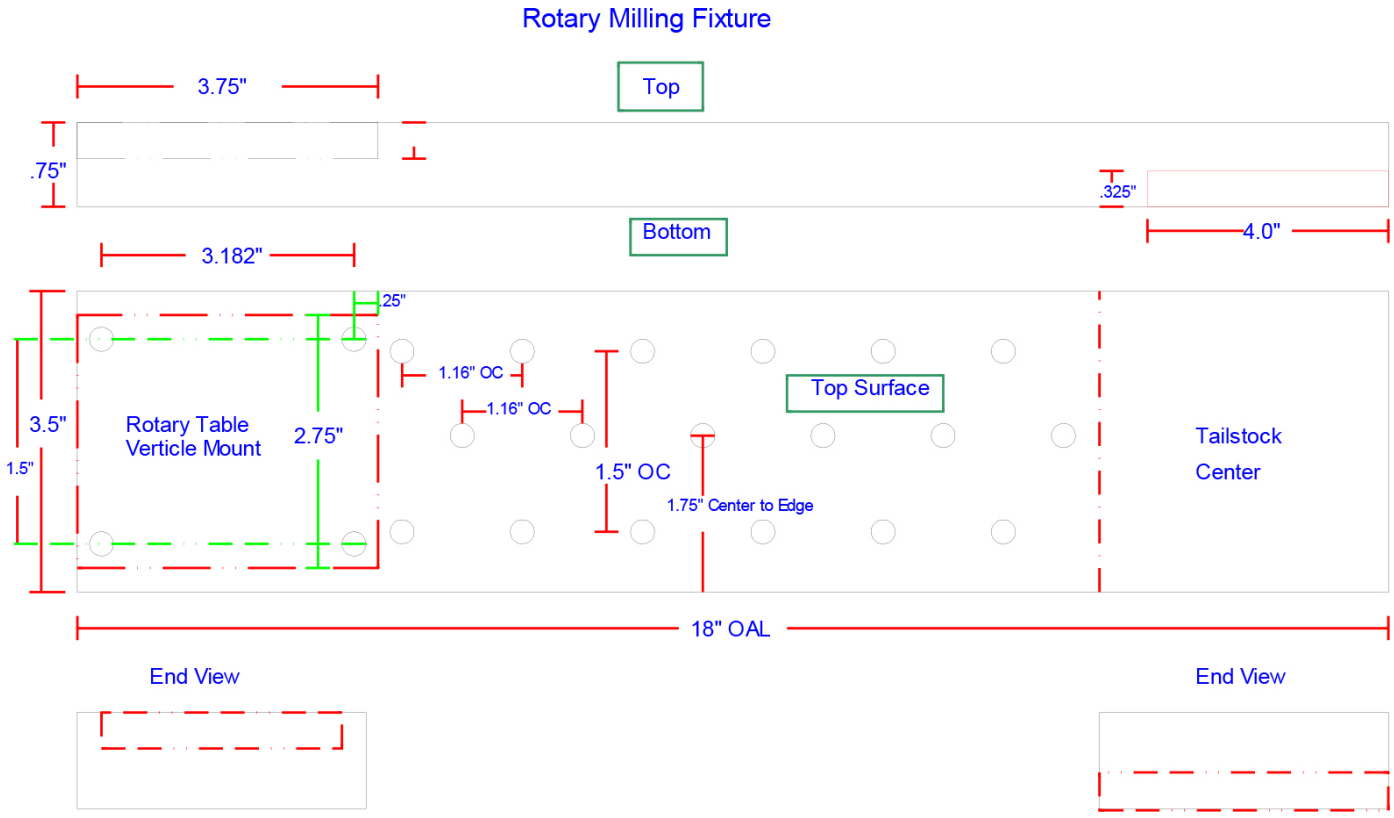

Figure 4 —Dimensional drawing

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