

Tooling - Universal Pillar Tool

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It soon became apparent that some form of tool or jig would be required to hold the 10BA and 12BA taps in a direct line with the steam flanges that have a 4 hole bolt circle. I haven't tried to tap these by hand as the taps are really quite expensive, so after looking around at various options I settled upon the design of the universal pillar tool after Geo H Thomas. I guessed that I should be able to produce something very similar without resorting to castings, also gave me a chance to try out my new oxy-propane kit.

Here's a photo of the tool as it nears completion, sadly I didn't create a photo blog as I built and machined the various components, the ball handles were actually easier to produce than I expected. The base started out as a 3" diameter by 3" long mild steel billet, quite a lot of machining on this and a lot of swarf although the carbide tooling made this much easier to machine. The two arms are from 1 1/4" square steel, the column and ball handles are in 303 stainless steel, where possible I have kept to the general dimensions in Geo H Thomas's book 'Workshop Techniques' an invaluable source of reference.

The table was machined from a 1/2" x 6" disk of mild steel, the back face was machined first, holding the work in a 4 jaw chuck a small recess was made for the spigot to mate into and the hole was bored through about 15 mm dia. The spigot was machined next and made the best fit that I could. Three matching holes were then carefully drilled and tapped, ensuring that there was about a 1/16" machining allowance on the front of the plate without fear of the mounting holes breaking through the surface.

The two pieces were then thoroughly cleaned and degreased and a small amount of high strength retainer, bearing & shaft grade was then applied to the mating surfaces and the screws torqued down, the whole was then left in a warm place for 48hrs. The plate was then mounted into a 3 jaw chuck and the front face and edge were then machined.

Once I was happy with the front face the chuck and plate were then mounted onto the rotary table on the vertical mill and the radial clamping holes were machined, to get a good finish on the top surface the whole unit was then re-mounted on the lathe and with a toolpost grinder the top surface was ground, the resulting finish is quite nice although now needs a good clean and treatment to prevent rust.

Using The Pillar Tool

Here is a sequence of pictures of the pillar tool in use, tapping some 10BA pipe flanges on my model boiler.

Here the tap is presented to the work.

The tapping action is very smooth and it is

very easy to feel what is going on.

This is the last hole being tapped, this was much easier
than I expected.

Here the last of the bronze studs have been inserted

and locktite'd in.

Here one of the pipe flange unions has been dropped over the studs, now for the nuts.