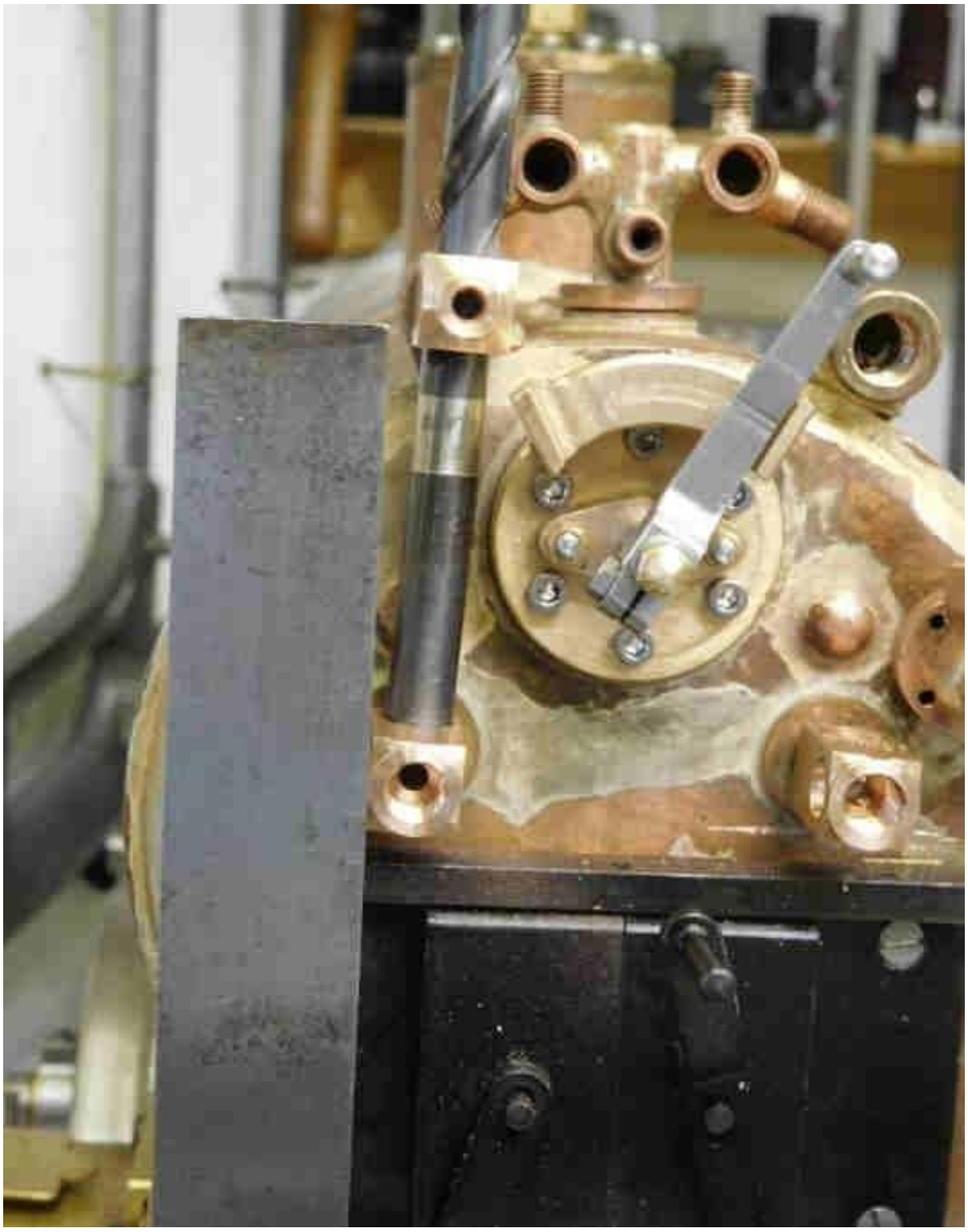
Work on the Table – March 2020

I've been quietly occupied of late (as some of you may know) with boiler fittings for my Isle of Wight LSWR 0-4-4T O2 *Ashey*.

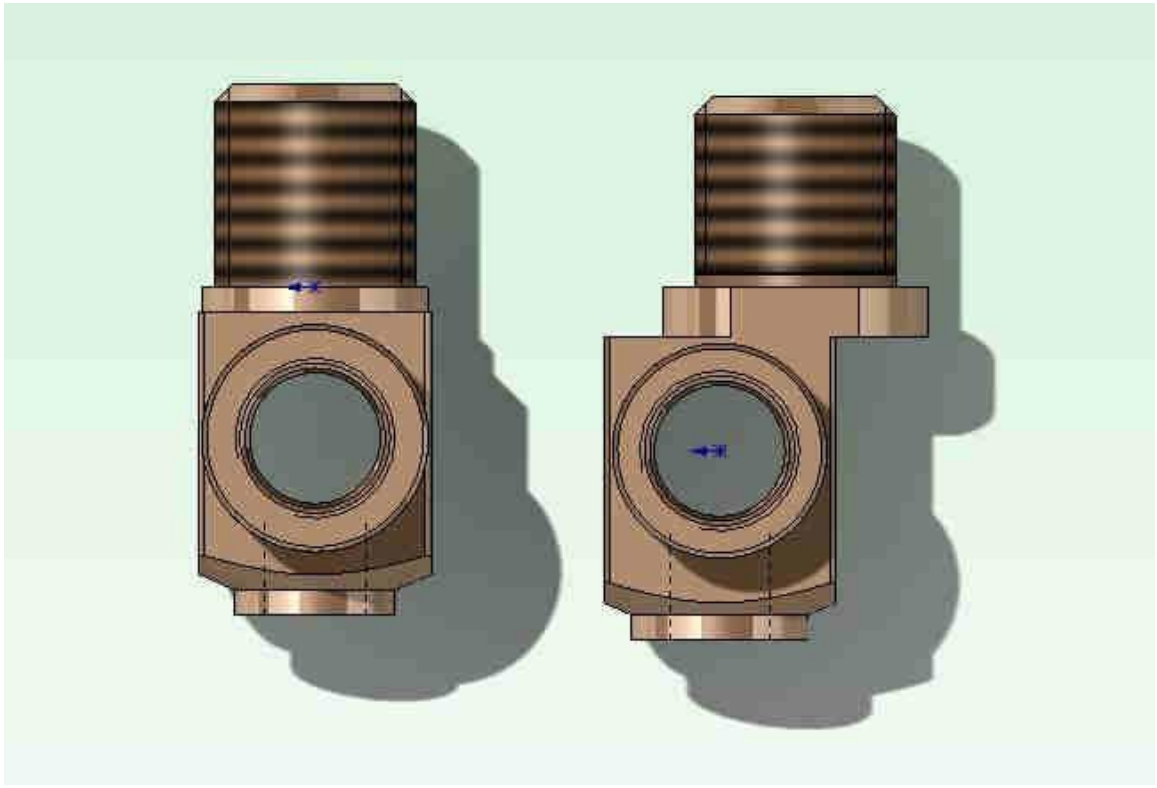
I was rather miffed when attempting to fit some embryo bits to check alignment, to discover that my boilermaking skills didn't include Getting The Bushes Vertical. Rats! As you can see, the upper bushes – both of them – would cause the gauge glasses to lean appreciably:



So that's those fittings assigned to the next project, then, when I hope I can get the boiler bushes in the right place! What to do now, though?

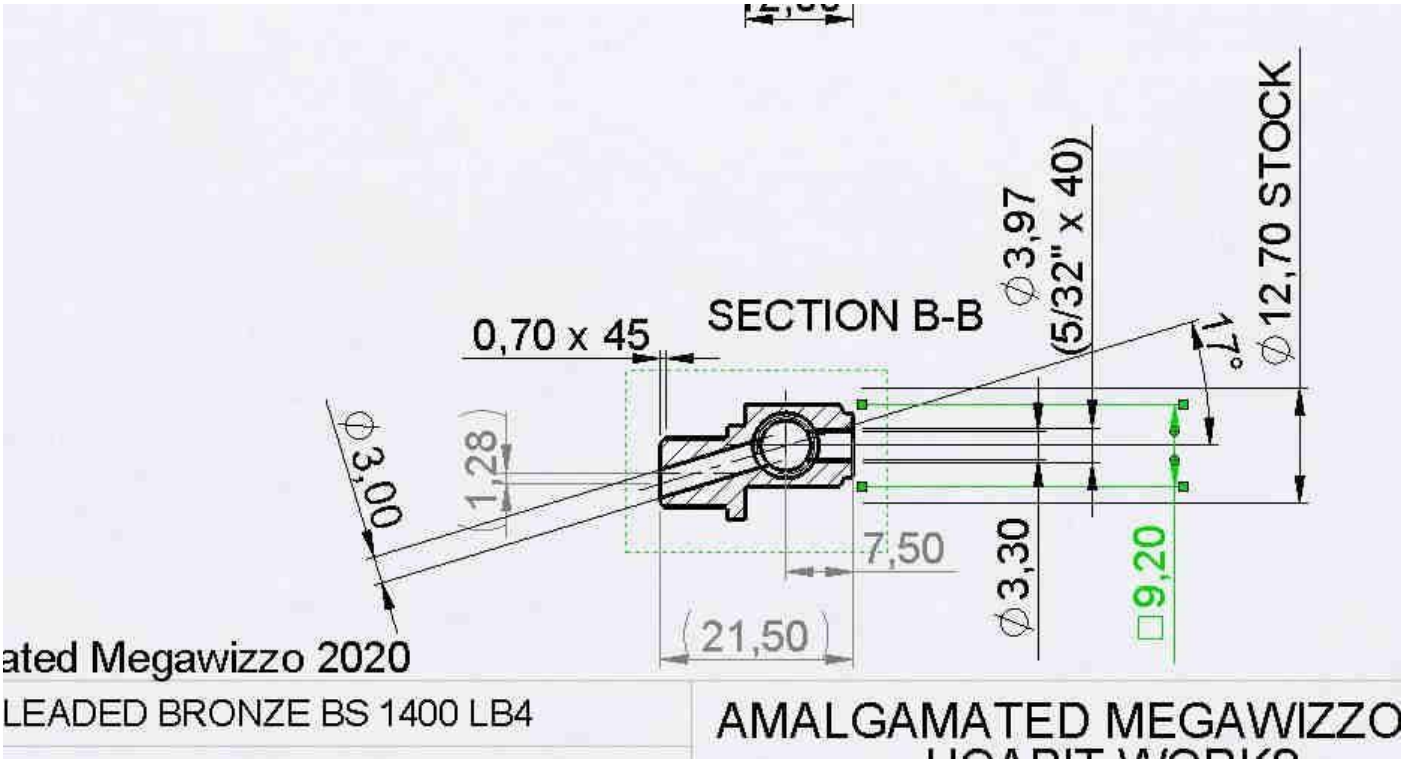
I opted for making some new upper fittings with a 3mm (1/8” or so) offset on them. This would bring the gauge glasses vertical and would not, I hoped, look too obvious that I’d blundered. Purely for the challenge of it, I thought that I would have a go at making them from solid – and not as I had originally intended, from a couple of pieces silver-soldered together.

I got busy on the CAD; you can see the new offset version on the right:

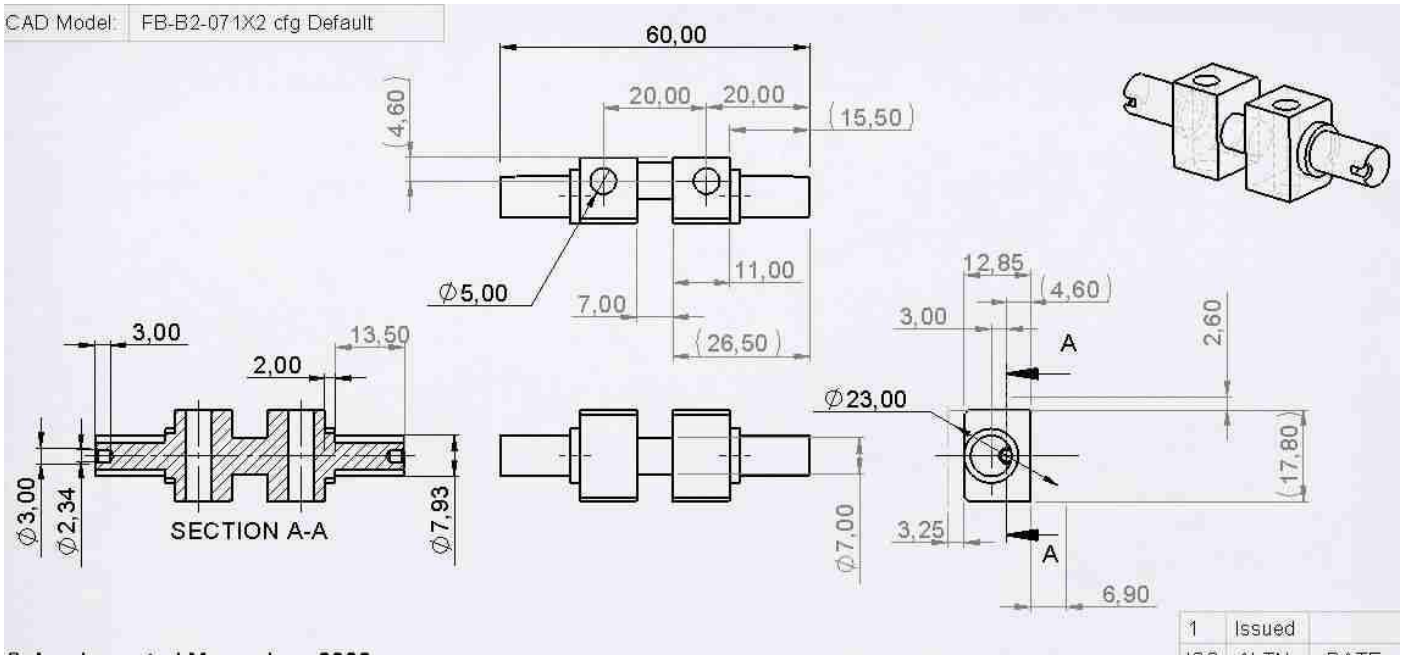


How hard could it be?

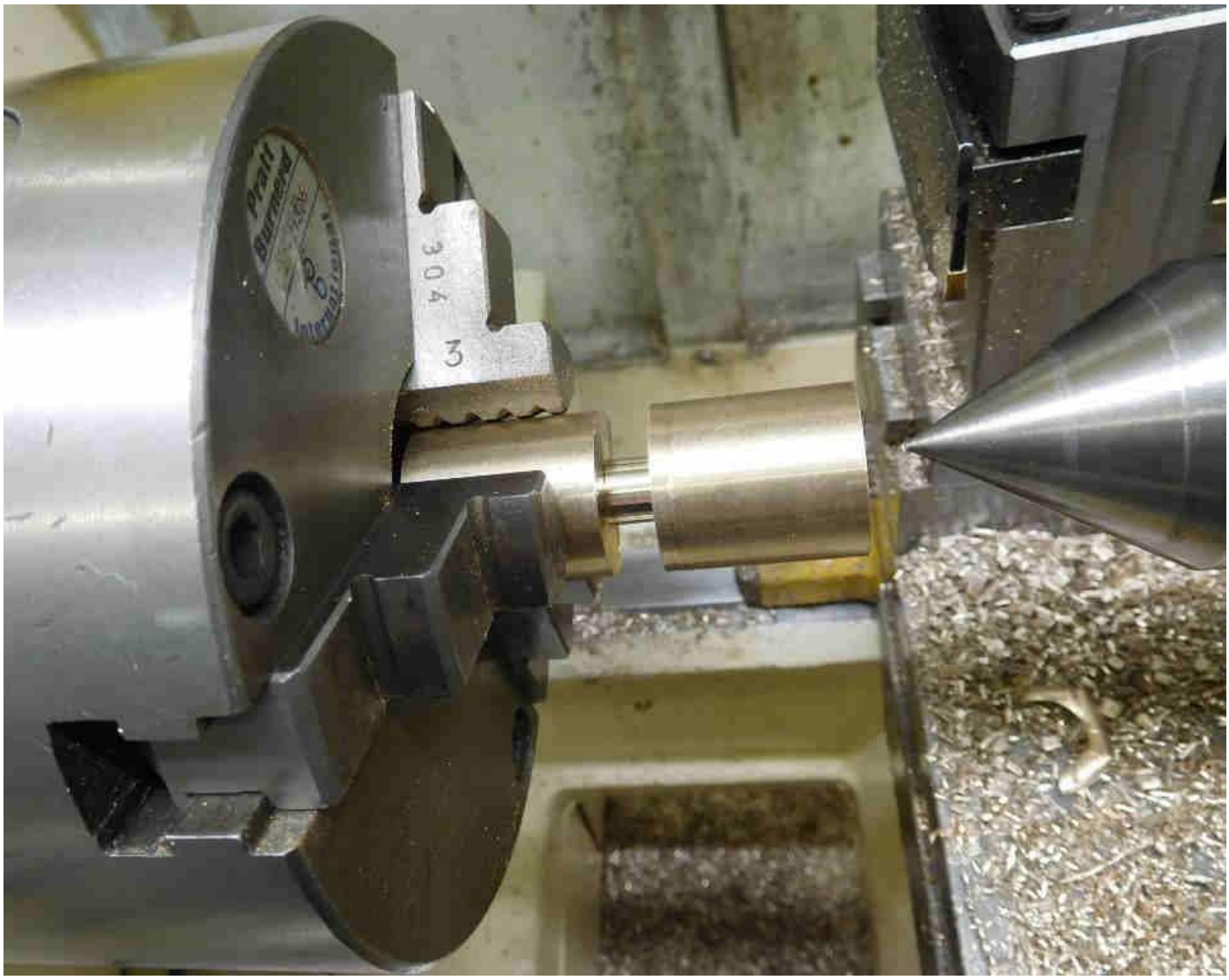
The drawing below gives a horizontal cross-section. I can still wangle a pipe cleaner through it to clean the passageways!



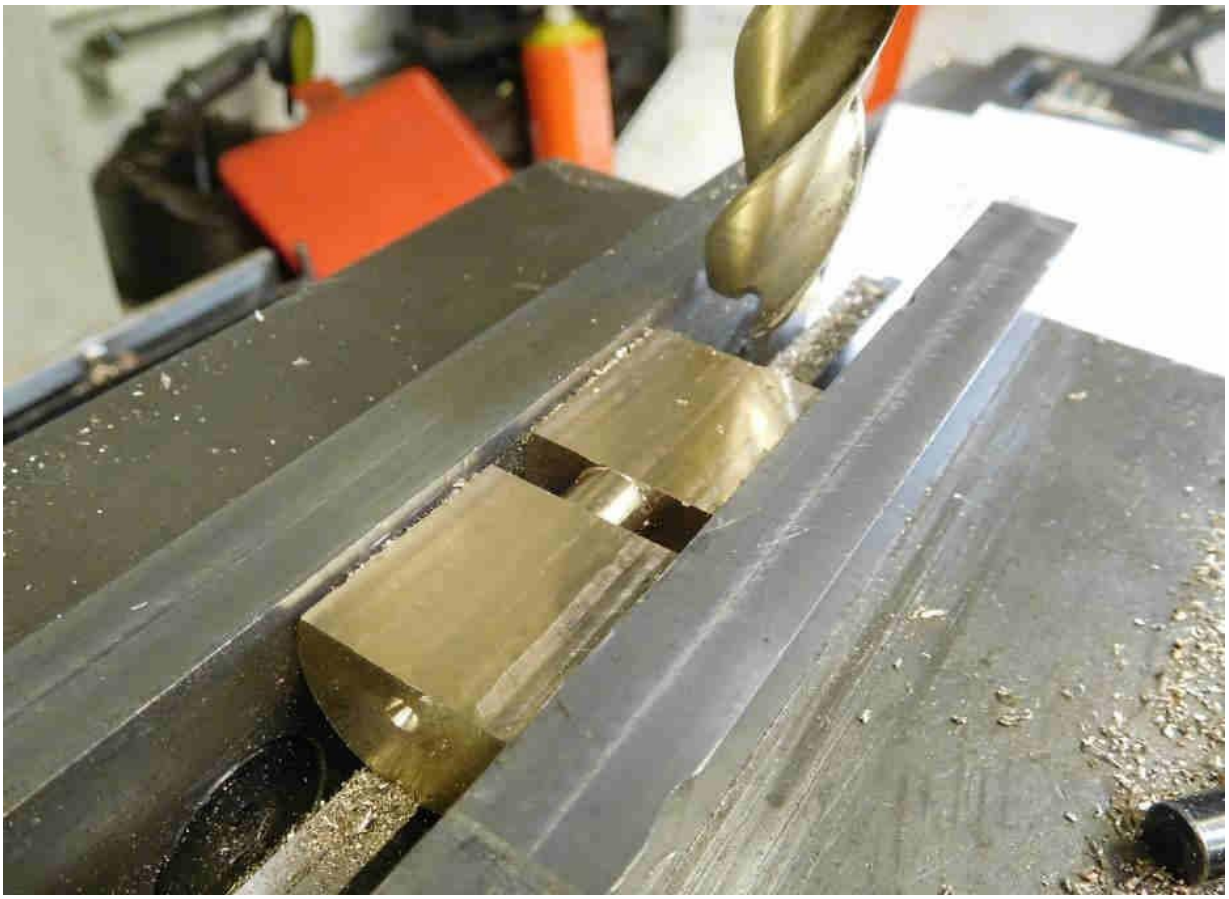
I also prepared a drawing showing the parts partly machined; it looked to be a good idea (it was) to keep the two of them together as long as possible as it would make workholding easier. I was also very acutely aware of the need to make two parts of the same correct hand – ending up with a nice pair of left-handed ones when I wanted righthanded was something I wished to avoid.



Let's start cutting metal! The "blank" was turned from bar:

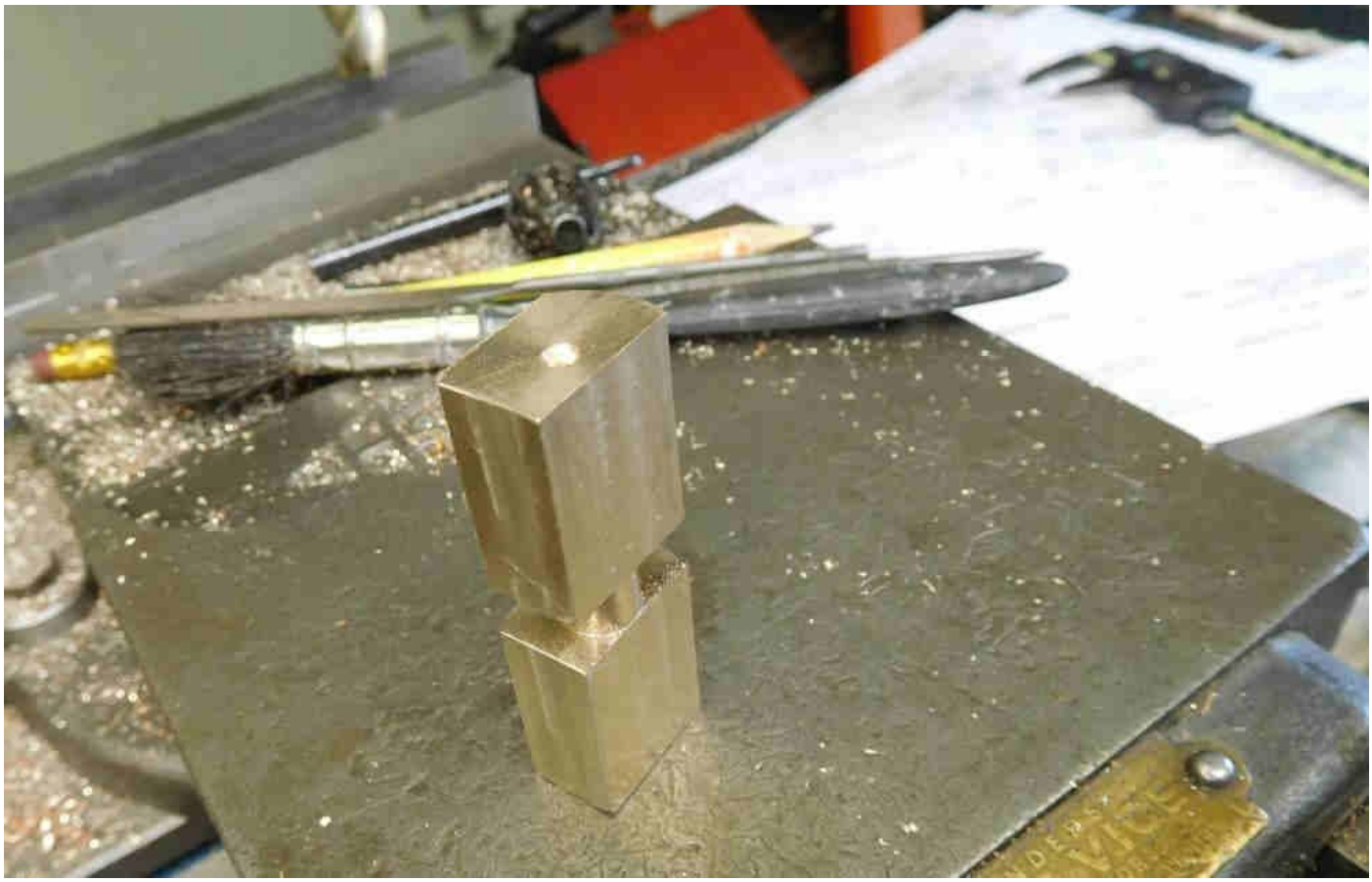


And then flats were machined on it to the appropriate depth.

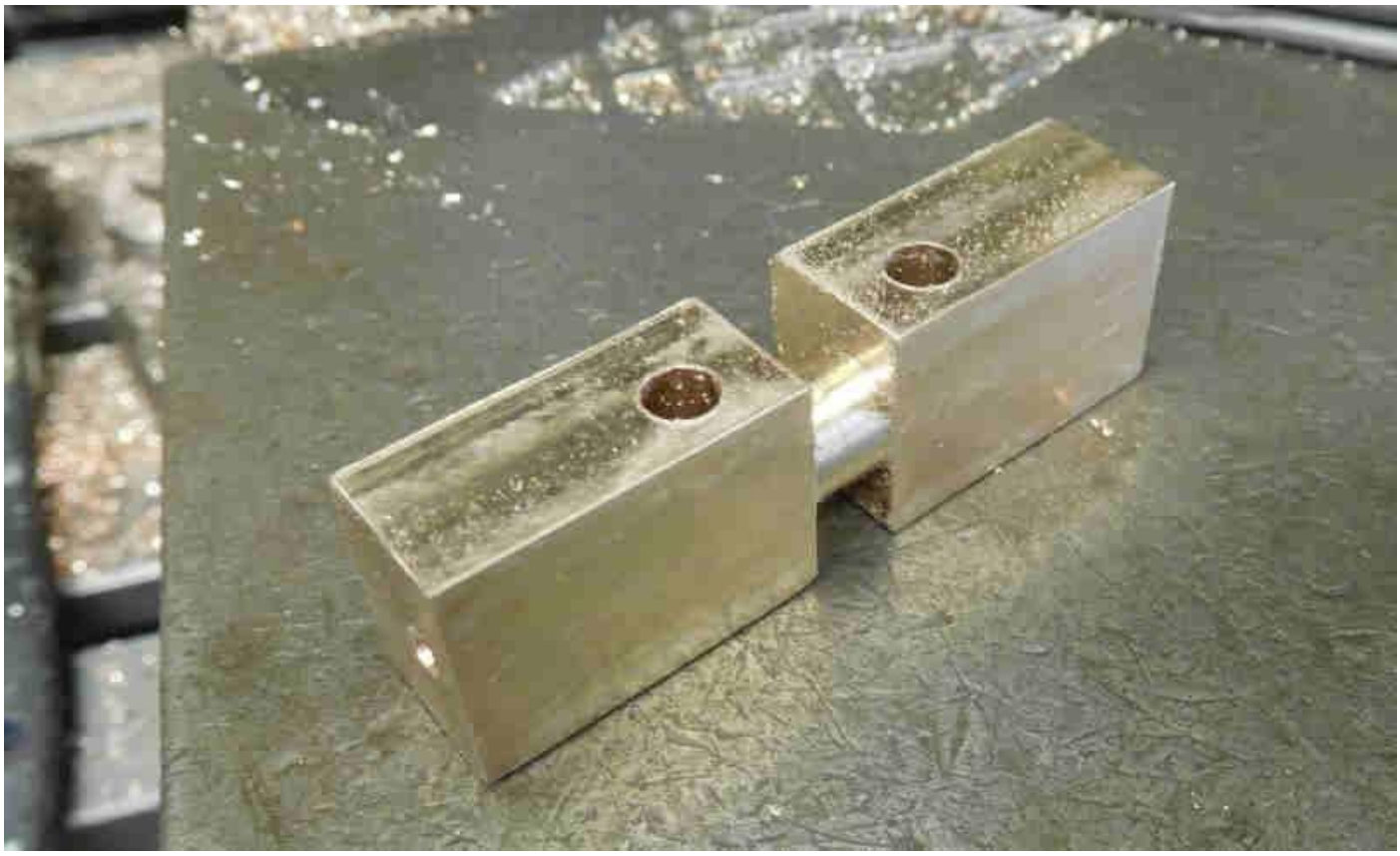


Second flat. Note the “back-up” CAD system in the background...

Three of the flats now done:



Then the final side, and also the cross-holes – where the gauge glasses will fit –were coordinate drilled with some reamed 5mm holes.



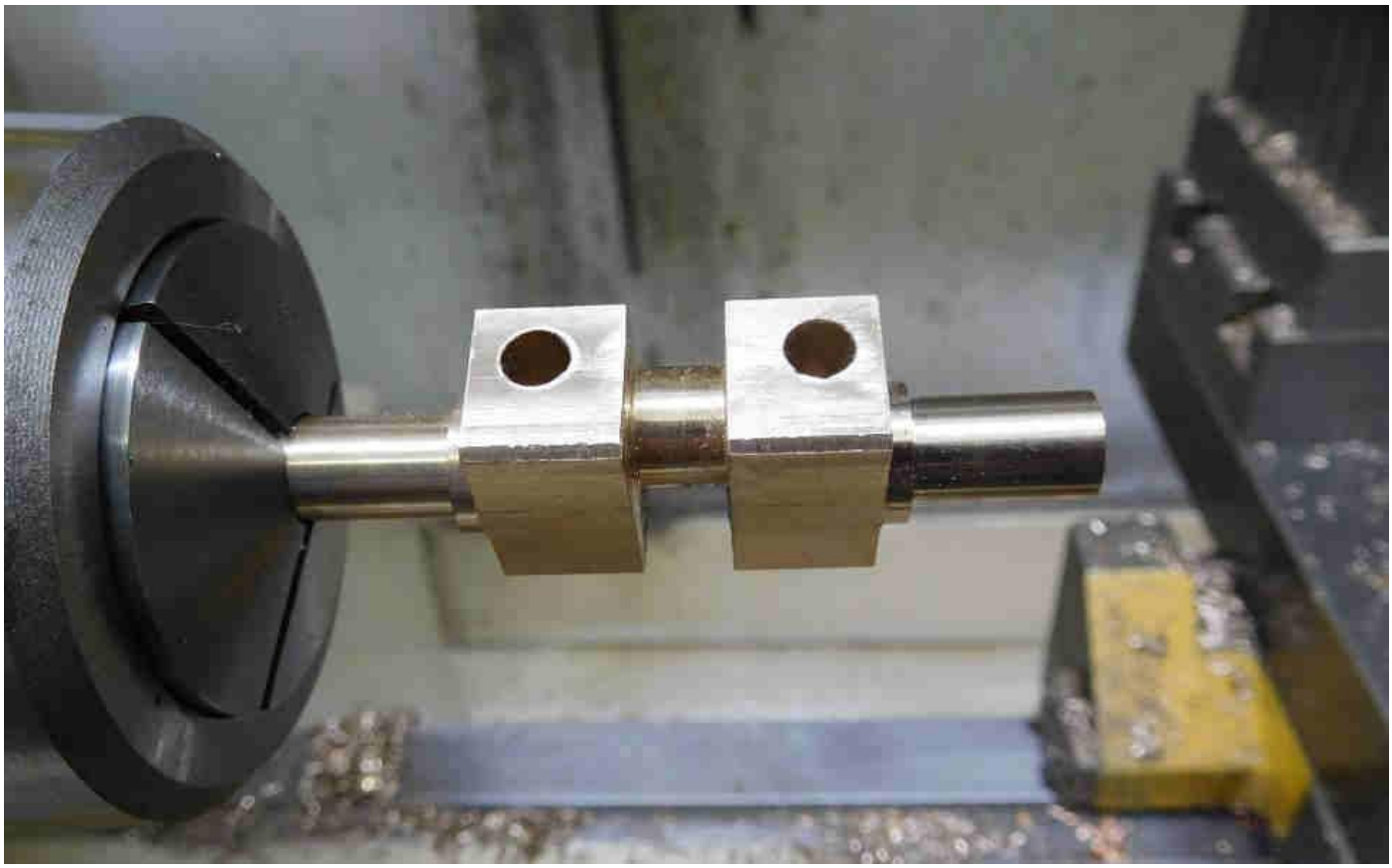
Not photographed; I added a second centre hole on the end of the blank at each end, with the 3mm offset. I popped a centre in the lathe headstock and pushed the blank on to the new centre hole, using the tailstock centre. This aligned

the part between centres as I wanted. I then tightened the 4-jaw on to it and began turning the end – this would eventually form the 5/16” x 32 section to fit into the boiler bush.

Here it is partly machined, showing both centre holes. I had left the 5/16” diameter well up on size to suit a collet I had.

I mounted the turned end in the collet and machined the other end, again using a centre to support it. In theory I could have used the 4-jaw chuck again but it was easier this way as it didn’t mark the job. You can see jaw marks on the flats!

Both ends now turned to diameter.

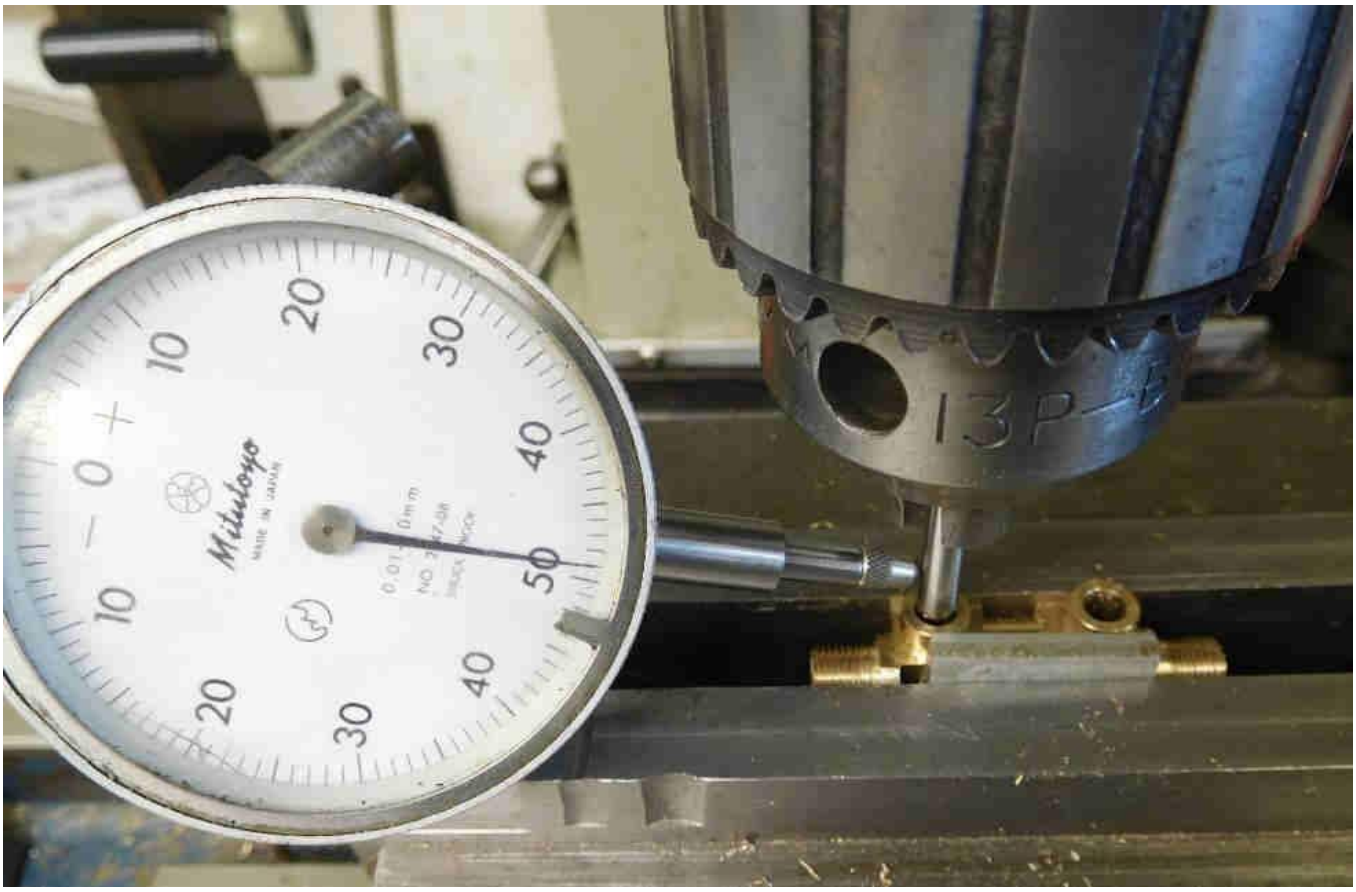


End threaded; note I've made these bosses over-long so I can machine away the centre holes later.

I prepared a simple fixture – just a chunk of aluminium, skimmed flat in the 4-jaw on the rotary table. This was to machine the circular bosses. I drilled and tapped an M5 hole in the fixture at X=0, Y=0 and another one at 20mm. The screws were a pretty tight fit in the reamed holes to locate the part well. My decision to make the two parts together is justified!

Part was removed and replaced to bring the remaining three bosses to size:

I needed now to tap the bosses ¼" x 40. Now as these are the same hand, one boss is tapped on this side, and one on the other. I put a 5mm dowel in the chuck and moved the table until the clock gauge registered no movement as it entered - in both the X direction (as shown below) and the Y dimension. Yes, you may *think* you've got it aligned if the dowel enters the hole, but this way checks that the spindle/chuck/dowel aren't deflecting.

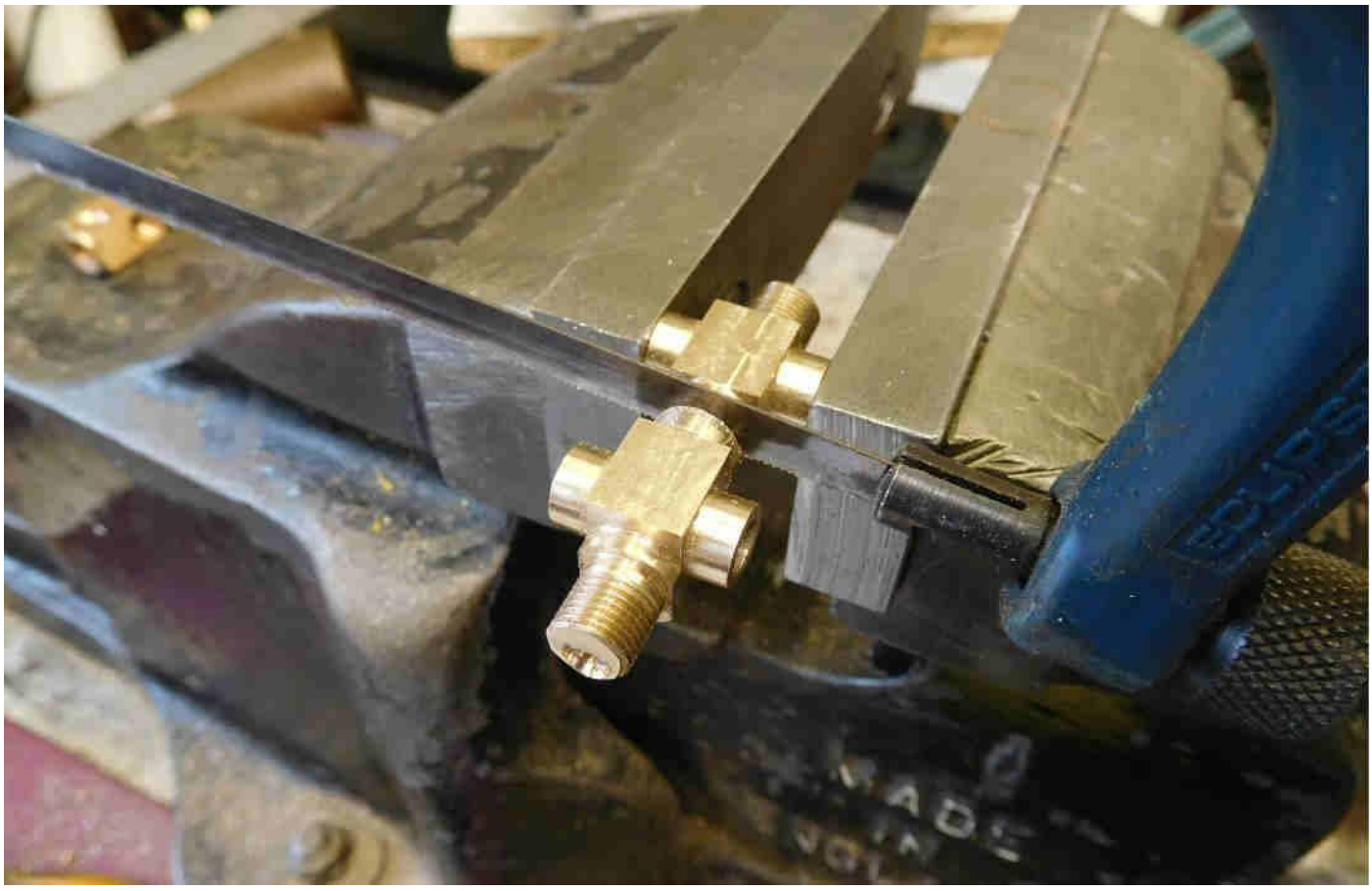


It was here that I stopped and looked over at my loco. Was I tapping the right side? No, you clot, you weren't! So moving the thing to the correct position and drilling it tapping size to depth, I tapped it to depth as well – hence the nut on the tap. Then the part was turned over and the other one done. *Measure twice, cut once*...

Time now to drill the 17° angled hole – those Wixey gauges are just the job! Milling cutter used first to spot face it level to get the hole started:

And then drilled to size. Nothing burst out of the side, so I must have got that bit right.

Using the parting-off tool... No, I'm not daft enough to part it off in the lathe at this stage!



Then I made a little split, threaded bush to hold the almost-finished part for the final operation of making the end pretty and drilling and tapping it 5/32” x 40 (for rodding out).

Finished! Also shown is the threaded bush.

Sorted!

So that's that – for now. You may well argue that I chose the most difficult way to do the job, but if you never try anything new, you won't learn anything, will you? It was a most interesting exercise and if it assists anybody with a solution to a problem, then it will have been doubly worthwhile.

Stay safe! Look forward to seeing you when life returns to normal – whatever normal is...