Making a ER-32 chuck for the C8 lathe

Many years ago I bought an ER-32 chuck with a MT 3 shank for my milling machine. Each ER collets can grip over a range of 1mm for the larger versions. That means they are also well suited for workholding gripping round material that is not exactly the diameter stamped on the collet. My small Emco Compact 8 lathe has a spindle with a 20mm through hole so I decided to make a collet holder that fit the spindle nose of the Compact 8. I found several descriptions on the web about making an ER collet holder, the one that inspired me I found at Gadgetbuilder : http://www.gadgetbuilder.com/ER32Chuck.html

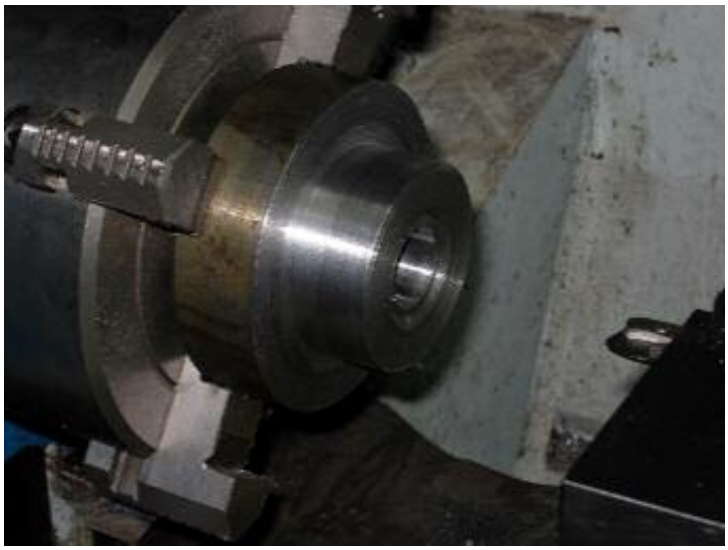
Material

I used ordinary mild steel to make the collet chuck since I already had a piece of 80mm dia. rod. May be a free-cutting steel would be a better choice of material as I guess it would make it easier to get a smooth finish.

For the three M8 studs I used 8.8 high tensile bolts and I turned down the heads and cut a M8 thread at the head end.

The ER-nut is from a spare ER-32 chuck I have.

Body



The chuck body started as a 80mm diameter rod of mild steel almost 50mm long. I mounted it in the 4-jaw of my largest lathe and faced the end and turned it down to around 43mm diameter for a length of 23mm. My larger lathe can take heavier cuts than the Compact 8 so it is quicker to do the rough turning on the larger lathe. I also drilled a through hole and bored it out to 19mm.

I then moved the work from my larger lathe to the Compact 8 and mounted it in the 4-jaw gripping on the 43mm diameter part. I adjusted the top slide to almost 8° from the lathe centreline. I could then face the other end and turn the recess for the Compact 8 spindle nose. I can remove the 4-jaw with work and turn the work around and test if the recess fit and then mount the 4-jaw again and the turned recess will still run true. After a bit of testing I got a good fit and could start marking out were the holes for the three M8 studs. On the Compact 8 lathe chucks and faceplates are clamped to the spindle using three M8 studs with nuts.

Instead of marking out the PCD of the 3 M8 studs I made a short transfer punch that just fit into the holes in the spindle flange, it is slightly longer than the flange thickness (red arrow in photos). I can get a tool-

makers clamp behind the flange and press the transfer punch into the chuck or backplate and so mark out where to drill for the M8 stud.

With the three holes drilled 6.8mm to a depth of 15mm and tapped M8 I could mount three suitable M8 studs and mount the work on the Compact 8 and do the rest of the turning.

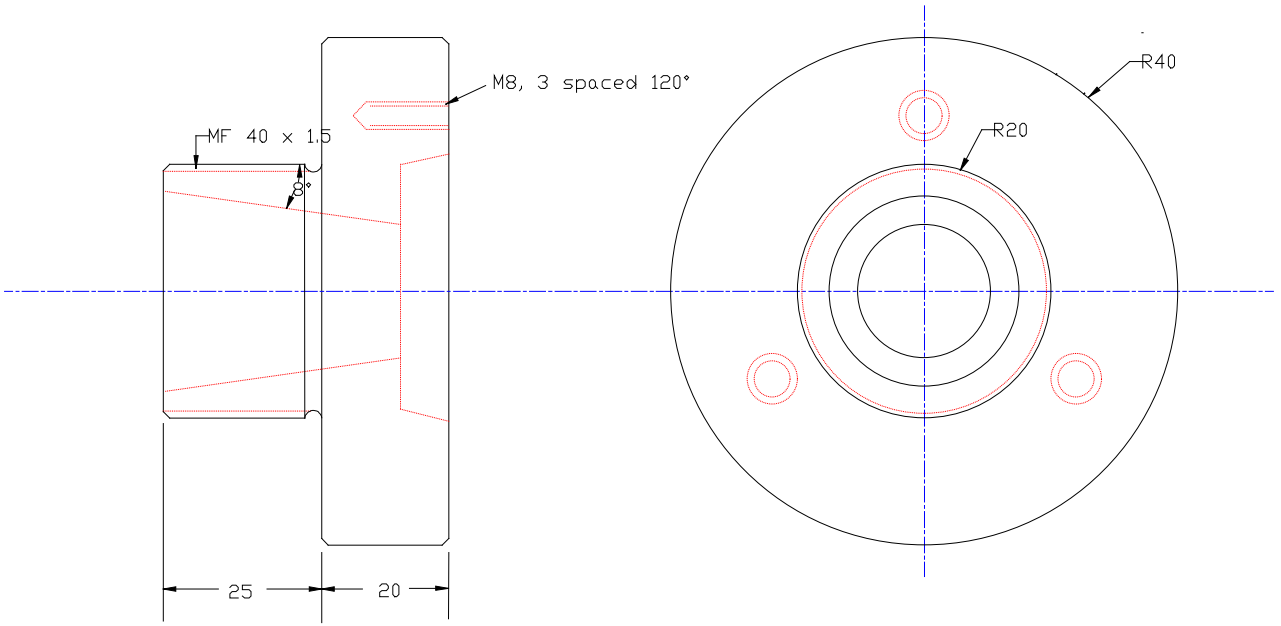
I finish turned the outside and chamfered the edges and turned a small recess for the MF 40 x 1.5 thread to run into. Then set up the Compact 8 for turning 1.5mm pitch threads, same as leadscrew, so turning the thread was easy.

The ER-32 nut fit very well on the thread after I let a triangular fine-cut file run over the threads at the lathes lowest speed.

The next operation was to adjust the top slide to 8° and turn the female taper for the ER collets. I first put a round rod in the 3-jaw and put a collet on the rod and used a Dial indicator to adjust the angle of the top slide. I then turned the taper and tested with a collet, I had to adjust the top slide slightly to get a good fit.

Then I mounted my Dremel clone in the toolpost so I could grind the surface, this improved the surface of the taper but sadly the TIR didn't change, I still got about 0.02mm, well my machining skills aren't better I suppose.

The last operation was to drill three holes in the large diameter part of the body so I could use a C spanner on the body while using another C spanner on the ER 32 nut. So I mounted the collet chuck in a 3-jaw on my dividing head and drilled three equally spaced 4.8mm holes, suitable for the C spanner you can see at the bottom left in the photo.



TH	2015		
Emco C8 ER-32 chuck			