Making E-16 Collets

From my old Emco Unimat I have two small E-16 collets, one 6 mm and one 8 mm, I also have a collet chuck (MT 2) that takes E-16 collets. I decided to make a few more collets, the largest diameter I could fit was 10 mm. I also needed 5 mm and 4 mm for some old end-mills. The collets can be turned in a small lathe from silver steel (drill rod), but slitting of the collets is a bit more difficult. Three from each side, and these collets are so small it is difficult to hold them in a vise. Juan Moran (http://home.earthlink.net/~moran03) has pictures of a small holder he uses when slitting the 3C collets he made. I have based my holder on his ideas.

Materials

I started with a 23 x 23 x 32-mm piece of HRS for the holder block. The bottom part was made from a piece of 6 mm steel plate from my scrap box. I used 16 mm silver steel for the collets.

Holder block

First I mounted a long end-mill in the chuck with about half the length protruding from the jaws. I slid one of my E16 collets over the end-mill and used a Dial Test Indicator to adjust the angle of the compund. Then the holder block was faced to its final dimensions. The centre of the hole was layed out and the piece mounted in the 4-jaw. With a centre drill in the drillchuck mounted in the tailstock it was easy to line up the holder block. After centre drilling, a 10 mm hole was drilled straight through. Then a small boring bar was mounted in the toolholder and the hole was turned conical.

Holder plate

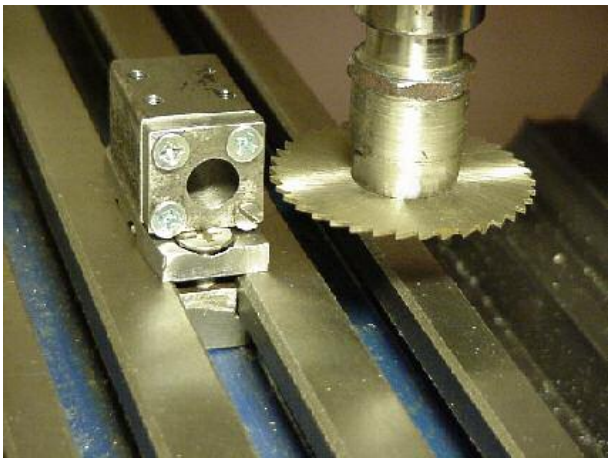
I used a small piece of 5mm steel plate to make a holder that pushes the collet into the conical hole in the holder block. I drilled one 10 mm hole mounted in the 4-jaw, and then made the hole conical to match the short part of the collets. I drilled one hole in each corner. Corresponding holes was drilled in the holder block and tapped (see drawing at the end of this document). You cant just use a nut as you do in a collet holder, the position of the slitting slot will vary depending on how much you tighten the nut.

Bottom plate

I drilled three 4 mm holes in the bottom plate. On the underside of the holder block, three corresponding 3.3 mm holes was drilled and tapped M4. I started by marking drilling and tapping the first hole. Then I used a screw to attach the bottom plate to the holder block and used the holes in the bottom plate as a template for starting the remaining two holes.

Putting it all together

Then the pieces was mounted together and moved to the mini-mill so the slot along the side could be milled.



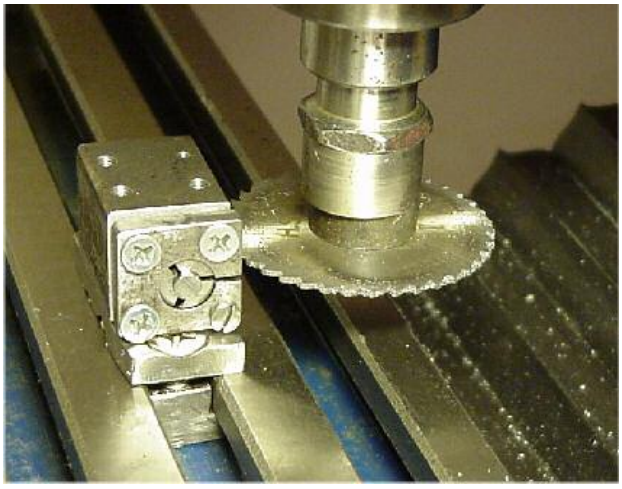
Making the collets

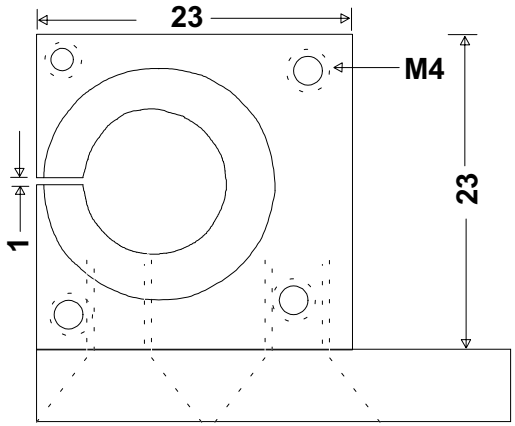
I adjusted the compund slide the same way I did for the holder block, and chucked a piece of 16 mm silver steel. The end was faced, and the the cone was turned to a length of 21 mm. Silver steel is hard, but easy to turn with carbide tipped cutting tools. The surface finish you get is quite good, and you can always use emery cloth for the final finish.

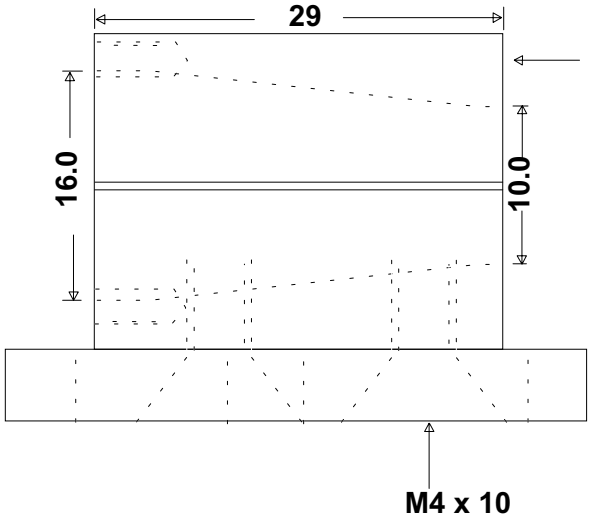
The picture shows the first cone next to one of the E-16 collets I already have.

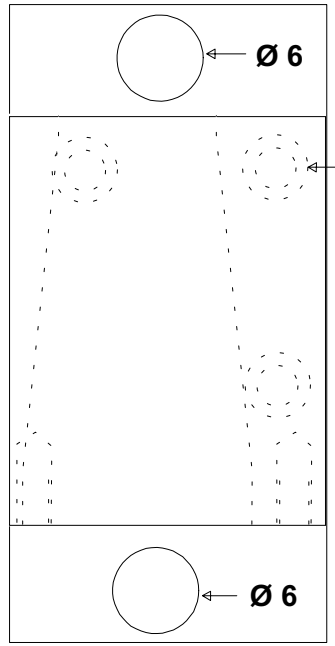
The next operation is to turn the short cone. I used a protractor to set the angle of the compund. After finishing the two conical surfaces, the hole through can be drilled and reamed.
I didn't have a reamer with the correct diameter, so I drilled the hole undersize and used an end-mill to open up to the final diameter.

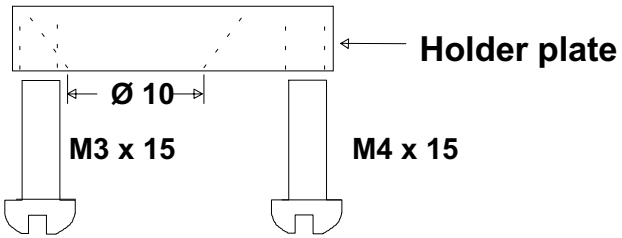
Finally I mounted the collet I had made in the fixture and milled the slots. I put a piece of mild steel rod in the collet so the clamping force wouldn't deform it.

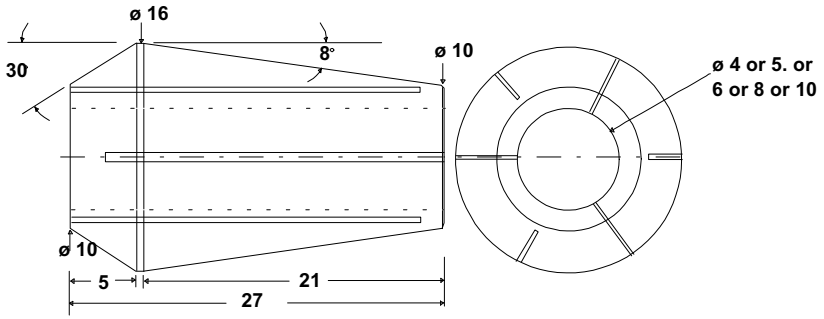












E 16 collet (silver steel)

Dato:	Tegner	Materiale:	
2003	T.H.	Steel	

E-16 Collet fixture