Quick Change Tool Post for Emco Compact 8

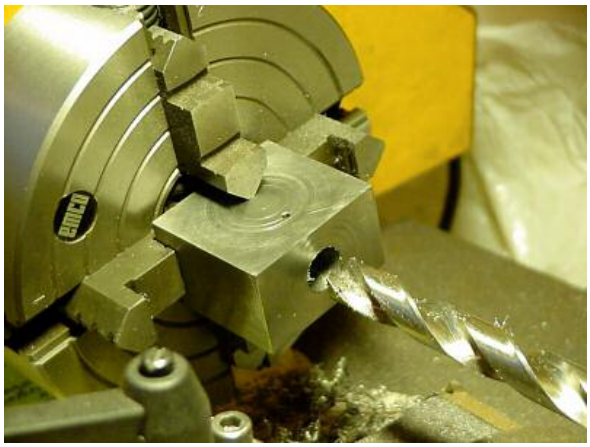
By Thor Hansen

A Quick Change Tool Post saves time and allows precise adjustment of tool height. Ty Hoeffer's site (http://warhammer.mcc.virginia.edu/ty/) has drawings of how he built his tool post. His construction uses a piston with a dovetail that pull the toolholder against the toolpost block. I liked his construction and have based mine on his ideas. Ty made the toolpost block from two pieces; I had a single piece of suitable size so I had to adjust my construction a bit.

I had a 20-mm dovetail cutter and decided to create the dovetail in each toolholder by taking one final pass through each holder with this cutter. Then all holders should have identical dovetails. Then I only had to carefully machine the mating dovetail once.

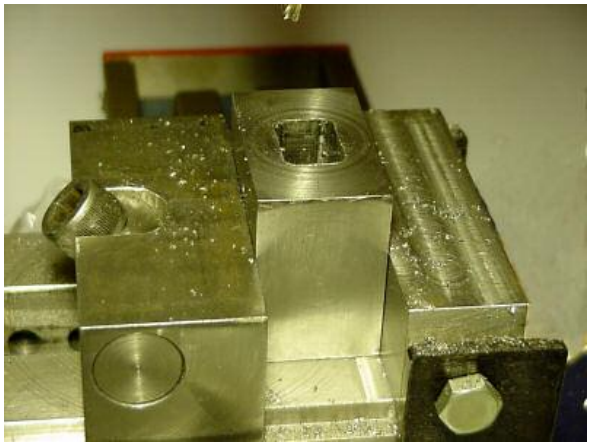
Materials

I started with a 50 x 55 x 32-mm piece of HRS for the toolpost block. For the toolholders I used various pieces of steel from my scrapbox.



Toolpost block

First the block must be faced to final dimensions. I did most of that in my lathe. There are two holes through the toolpost block, one 8 mm and one 6 mm. In addition a 14-mm hole is drilled from the side (almost through). To make sure that the 8 and 6 mm holes could be drilled accurately after the large hole was drilled I first drilled to small holes to act as pilot holes for the 8 and 6 mm holes. Then the block was moved to the 4-jaw and the 14-mm hole drilled. In the picture you can see one of the pilot holes.



Next I moved the block to the mill vise to enlarge the front part of the 14-mm hole and make it square. I used a small 5-mm end-mill to mill the corners. The square part is a bit deeper than the position of the 8-mm hole. With the front part of the hole square it will prevent the piston with the dovetail from rotating.

Then the toolpost block was mounted the right way in the vise and the two pilot holes opened up. The one closest to the tool holder to 7.9-mm, then reamed to 8-mm.

The other hole was opened to 6 mm almost through, the bottom 6 mm was opened to 5 mm and tapped M5. I decided to thread the lower part of the cam so it could not accidentally come loose.

Making the toolholder

The toolholder was made from a piece of 30 x 25 steel bar, 50-mm long. It was mounted in the 4-jaw and faced in the lathe. Then I mounted it in the milling vise and milled a square slot using a 4-flute end mill. Then I removed the end-mill and mounted an old 16-mm dovetail cutter in the collet (see picture). I milled part of the dovetail profile with this cutter and used a new 20-mm dovetail cutter for the finish cut. This was done in one pass, and I carefully measured the depth of the cut. This way it is easy to make a new tool holder that will fit the dovetail in the toolpost block.

The toolholder was turned around and the slot for the toolbit was milled and two 5-mm holes drilled and tapped M6.

Making the piston/dovetail

I used a piece of 30 x 20-mm steel bar, 50-mm long. I mounted it in the 4-jaw and turned part of it to ø 14-mm, a little over 19 mm in length. The middle part was turned to a diameter equal to the distance between the corners in the hole in the toolpost block (21-mm in length). The last part (6-mm in length) was left as it was. The piece was

then mounted in the milling vise and the middle part milled square to fit the square part of the hole in the toolpost block.

Then the piston was put into the toolpost and clamped in as far in as it would go, and the 8 and 6-mm holes drilled. I removed it from the block and mounted it in the milling vise and made the 8-mm hole a bit oval. This way the piston can move a bit around the 8-mm bolt in the toolpost.

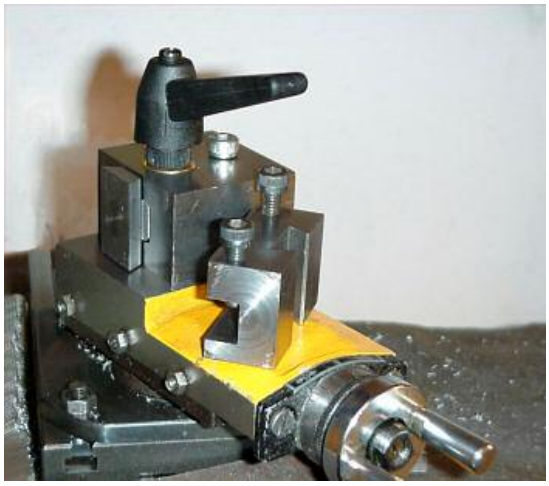
To mill the dovetail in the outer part of the piston, I mounted the piston in the toolpost block and inserted the cam. I had an M6 screw of suitable length and used it to make the cam.

I used small pieces of brass to wedge the piston as far out as possible (red arrow in picture) and mounted the whole in the milling vise. The pieces of brass should have protruded a bit, that would have made them much easier to remove afterwards.

This way I could mill the dovetails and a short distance into the square part. This gave good clearance for sliding the tool holder over the dovetail. I was very careful when taking the last cuts, checking often with the toolholder I had just made. I went for a slightly loose fit (about 0.5-mm) so less than half a turn of the cam locks the toolholder in place.

Putting it all together

I made a thin brass washer and mounted the toolpost block on the topslide, see picture. The toolholder next to the block is still missing the height adjustment. I just drill a 4.2 mm hole through and tap it M5. I then use a piece of threaded rod with a brass tip silver soldered onto one end to adjust the height. The swarf you see is from the first test, the toolholder worked very well.



Parting-off toolholder

I found a carbide tipped parting off tool on a webshop and bought one for 2mm wide inserts and another for 3mm wide inserts to use on my larger lathe. In a local skip I happened to find a suitable piece of mild steel suitable to make a toolholder that would fit the home-made QCTP on my small lathe. I could then even use my small lathe to part off difficult steels.

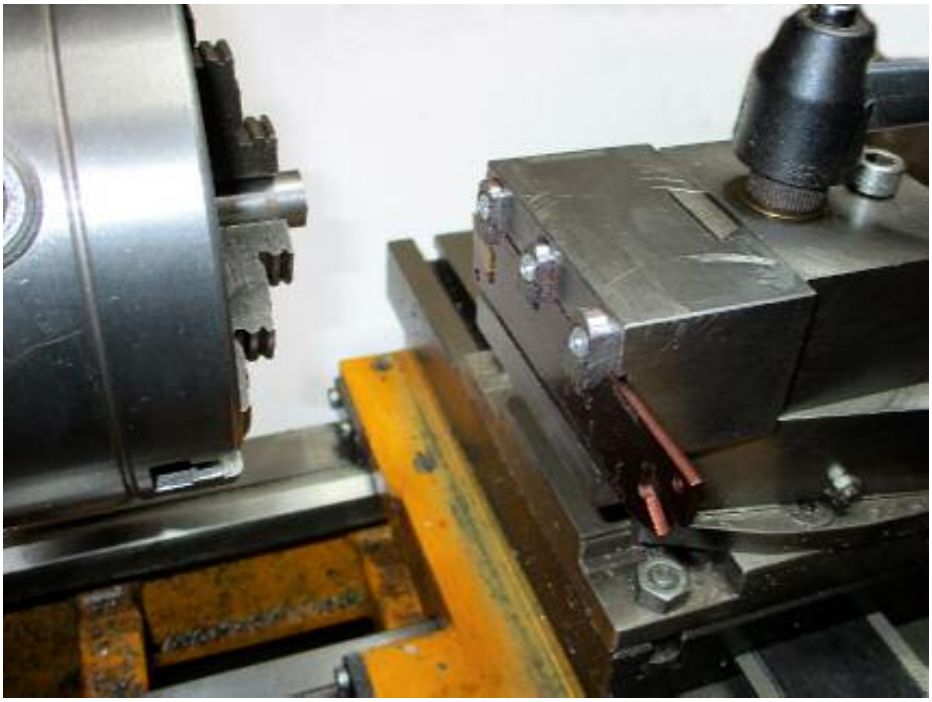
I started by squaring the piece in my milling machine and milled away the bottom leaving about 13mm at full depth. This way the toolholder will rest on the topslide while the protruding part will have enough meat for the 19mm high parting blades.
I also milled a slot and then used a 60 deg. dovetail cutter to cut the dovetail so the toolholder would fit my QCTP. See right photo.

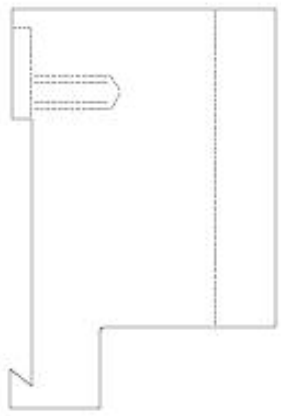
The right photo show the parting blade (with one tungsten carbide insert) in the toolholder. I decided to make three small clamps that will push the blade down and towards the toolholder.

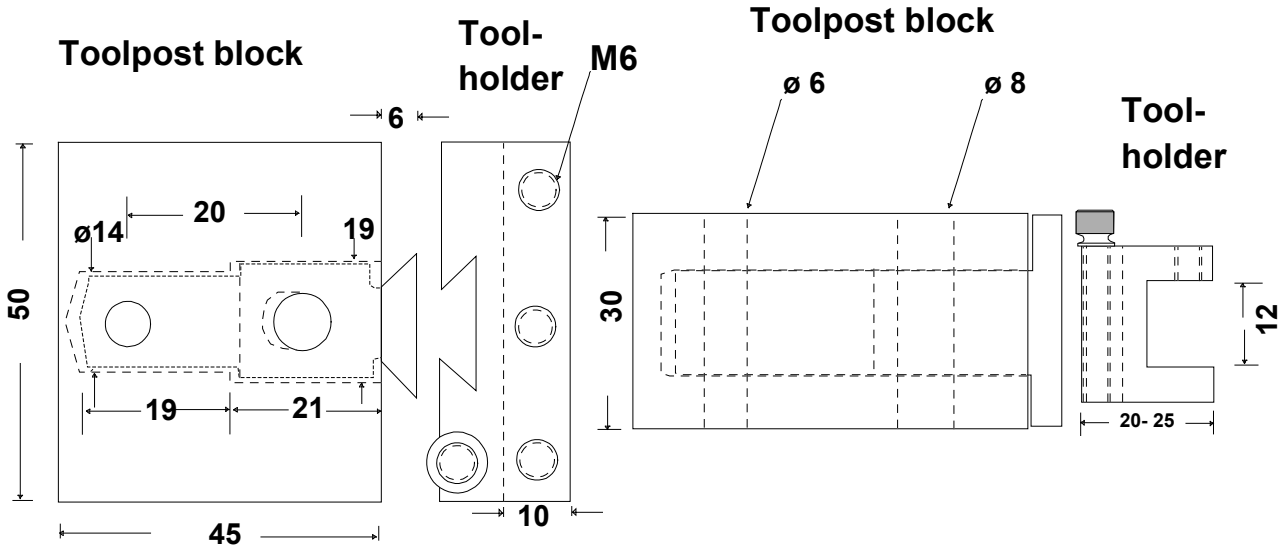
The work was turned around in the vice so the front was facing up and a recess milled for the parting off blade. I used another dovetail cutter to mill the bottom of the recess at an angle so the parting blade will be pushed towards the tool-holder when the blade is clamped (left photo).

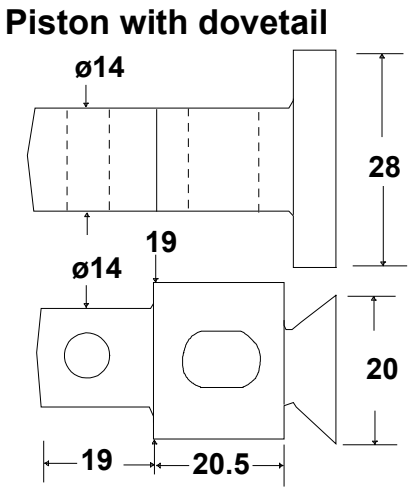
I just used a slot drill to mill three slots for the clamps and then drilled and tapped three holes for M4 screws – right photo.
The small clamps are angled on the side facing the blade and the milled recesses mean they can't move upwards, see photo below.

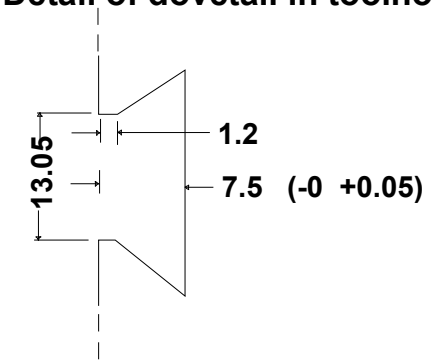
The last photo shows the parting off blade with a 2mm wide insert mounted in the tool-holder. Since the tool-holder rests on the top-slide there isn't much flexing during parting off. I carefully milled the underside until the top of the insert was on lathe centreline. The tool-holder and parting off blade has worked very well.











Dato:	Tegner	Materiale:	
2003	T.H.	Steel	

"Quick Change Toolpost", Emco Compact 8