Top-slide with long travel for Emco Compact 8

I wanted a top-slide (compund) with a longer travel for my Emco Compact 8 lathe. The original top-slide has a travel of about 45mm. When making MT 2 tooling you need around 75mm of travel when using the top-slide. I have seen a solution where a longer hole is drilled to make room for a longer feed screw. I didn't want to make any permanent changes so I made a new top slide. I found a few ideas at the 9x20Lathe Yhaoo group.

Materials

I used a 135 x 56 mm long piece of 30mm thick hot rolled steel for the upper or moving part of the topslide, and a piece of 15 mm thick steel about 66 x 90 mm for the lower or non-moving part of the top-slide.

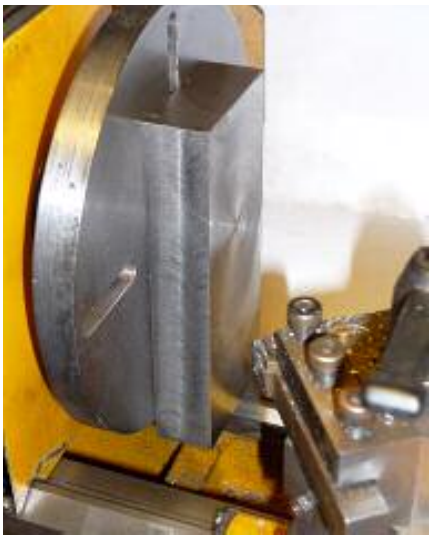
Upper part

The moving or upper part of the new top-slide was first clamped in a vise and one of the long sides faced. Then the work was turned 90° and two 8.5mm holes were drilled to a depth of 8mm. The holes were drilled in the space that will be milled away when making the dovetail. The holes will be used for clamping the work to the milling table of the Mini-mill (upper right picture).

The milled side is facing the table while the opposite side is being milled. This way the two long sides of the work will be parallel.

To face the ends the work was clamped to a small milling table on the lathe. A dial test indicator was used to adjust the long sides of the work parallel to the centre line of the lathe. A fly cutter was then used to face the short sides (right picture).

Since the work was too thick about 5mm was cut away with a hacksaw.



The work was then clamped in the 4-jaw and the bottom faced. The work was then moved to the Mini-mill and I drilled two 5mm holes in the bottom (near the two 8.5mm holes) to a depth of 8mm and tapped them M6. These holes were used to clamp the work to the faceplate (right picture). This way the top and bottom faces of the upper part of the topslide will be parallell.

The next operation was to mill the dovetail. The work was clamped to the milling table with four clamps (one in each corner) and a dial test indicator used to align it.
First a slot was milled with a carbide tipped mill I made a long time ago (left picture). This slot is a bit wider than than the diameter of the carbide tipped dovetail cutter I made for this project. The steel was hard and I had to take light cuts using a slow feed to finish the dovetail (upper right picture). The dovetail cutter was made after Bob Warfields drawings, I just made the shaft 12mm diameter.

I mounted the newly machined part on the original top slide and used the original bearing bracket to spot the holes that clamp the bearing bracket to the moving part. I drilled two 4.2mm holes and tapped them M5.

Lower part

The lower or non-moving part of the topslide was made from a piece of mild steel about 15mm thick. The work was squared in the Mini Mill and the upper and lower surfaces were faced in the lathe. I didn't cut the corners until all machining was finished, it is much easier to adjust square work.
The work was clamped to the milling table and the dovetail milled. I could check progress with the upper part of the original top slide.
I mounted the newly machined upper and lower parts and used the bearing bracket from the original top slide to spot the position in the lower part, of the hole for the feedscrew. This was drilled 6.5mm diameter almost through the lower part to the other end. The rear end was opened up to 9mm and an elongated hole milled 1mm deep. A M6 brass nut with a small flange was inserted in the hole. The flange of the nut is milled with two flats (picture above). The remaining parts of the flanges of the brass nut just fits into the milled recess in the lower part of the top-slide. Two 2.5mm holes were drilled in the outer part of each flange end and into the lower – non-moving – part of the topslide. The 2.5mm holes were countersunk and then tapped M3. This way two counter-sunk M3 screws will clamp the nut to the top-slide so it can not move, and it will be possible to replace the brass nut when it becomes worn.

Feed screw and bearing bracket

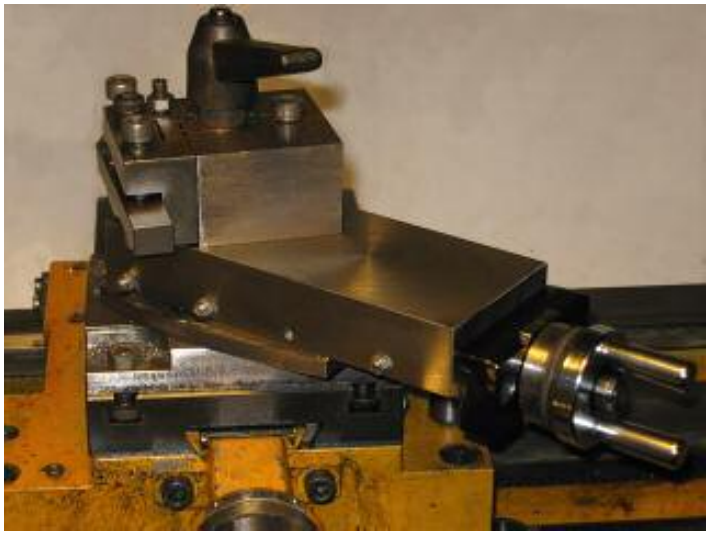
The right thing to do would be to machine and screw cut the feed screw from a 12 mm diameter steel rod. I had a suitable piece of stainless steel rod threaded M6 and

simply turned one end down to 5 mm diameter and silver soldered a short piece of 12 mm diameter steel rod to it. This was turned down to 8 mm diameter to fit the hole in the original hand wheel. The outer 6 mm were threaded M8. I made the part turned down to 8 mm longer than on the original feed screw because I decided to make the new bearing bracket with a ball bearing (as described by Steve Bedair and John Moran). I used a Woodruf cutter to make a keyway same as the original feedscrew and made a key to suit.

The bearing bracket was made from a rectangular piece of steel. The work was clamped in the 4-jaw and the hole for the feed screw was drilled 10 mm diameter through. The hole was opened up to approximately 22 mm diameter for a depth of 7 mm. The 22 mm diameter was tested with a 8 mm ball bearing to give a press fit for the outer race. A small 10 mm diameter sleeve with a 8 mm hole was turned and slipped over the feed screw end. The hand wheel will clamp against this sleeve.

I placed the original bearing bracket on the feed screw and pushed it close to the new bearing bracket to spot the holes that clamp the bearing bracket to the top slide.

Base and clamp ring



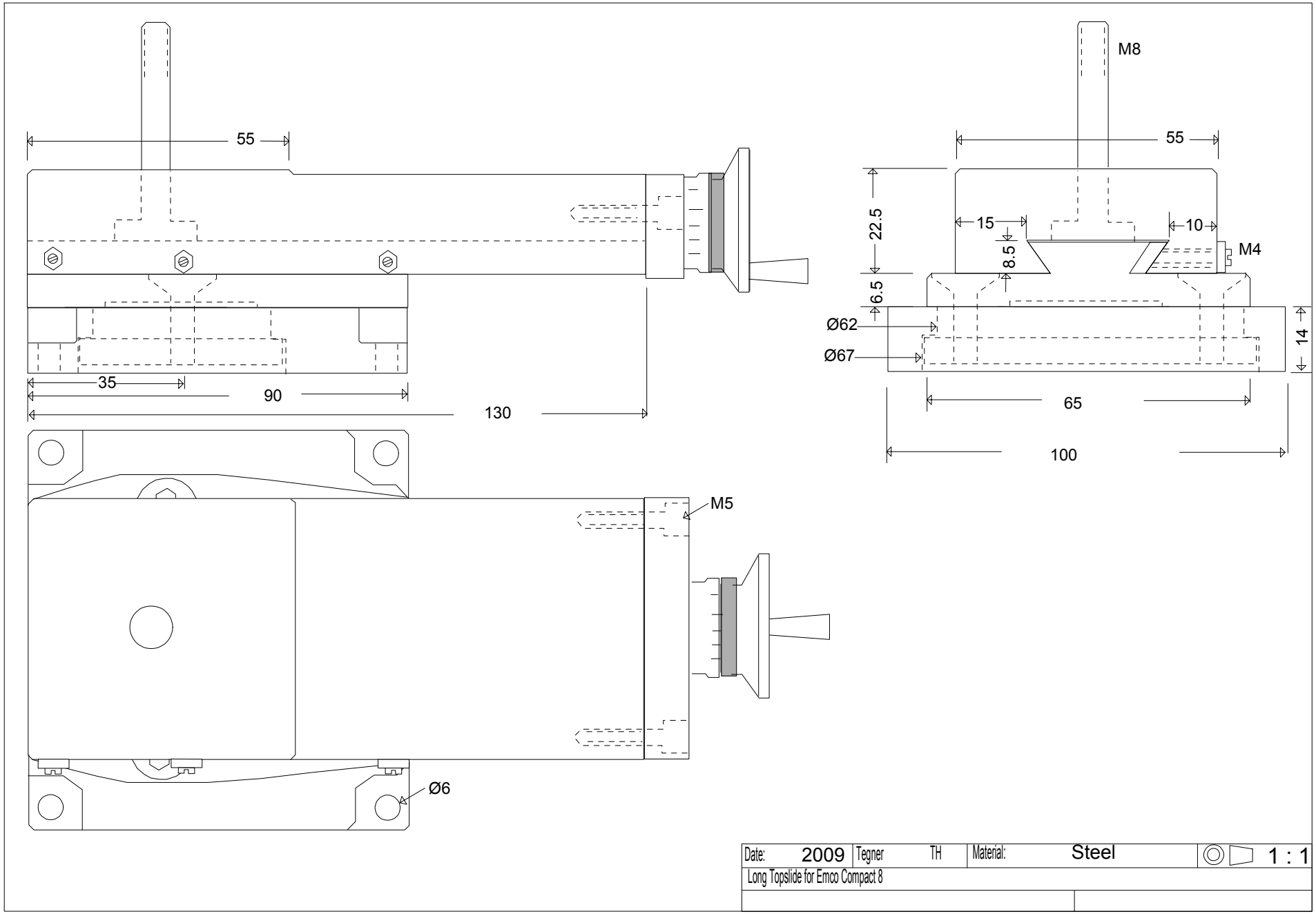
The base was made from a piece of steel from my scrapbox. After squaring it in the Mini-Mill I drilled 5mm diameter holes in the corners (and tapped them M6) with centre distances to suit the T-slots in my cross slide. I then transferred it to the lathe and turned the hole and recess, turned it around and clamped it to the faceplate using two of the holes tapped M6. After finish turning the upper side the 5mm holes were opened up to just over 6mm. The base clamps to the cross slide with four M6 T- bolts. One of them is visible in the right picture. I milled the corners of the base so the top-slide can rotate without hitting the T bolts.

The clamp ring is a simple turning job and a close sliding fit in the recess in the base. The two 5mm holes (tapped M6) in the clamp ring were spotted from the holes in the lower (non-moving) part of the top-slide.

Finished

Here are a couple of pictures of the finished topslide.

I have used the topslide for a few months and I am very satisfied. The way the slide clamps the the cross slide is very rigid. The downside is that I have to use a protractor to set the topslide to a certain angle.


55
35
90
130
M8
55
22.5
15
10
8.5
M4
6.5
Ø62
Ø67
14
65
100
M5
Ø6
Date: 2009
Tegner TH
Material: Steel
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Long Topslide for Emco Compact 8