

V – blocks

By Thor Hansen

I needed a pair of identical V-blocks to clamp the Bonelle/Quorn toolholder. I wanted to mill the sides of the tool holder parallel to the mandrel and bar bed centre lines. To get two identical V-blocks I made one long V-block and used a hacksaw to part it in two. The photo to the right show one of the V-blocks with one clamp.



Materials

I found a piece of steel in my pile of scrap that was just big enough. The piece was a little over 60mm long, just enough to make two V-blocks. The piece was 27mm thick hot rolled steel. For the clamps I used a piece of steel 12mm thick.

V-block

I used a hacksaw to cut the piece roughly to the shape needed for two V-blocks as I intend to machine the V in both blocks while the blocks are still in one piece. This way the blocks will be as identical as possible.

I mounted the work in the screwless vice and cleaned up the hacksawed faces to make a rectangular block. I marked the position of the slots on each side and used an 8mm end-mill (right photo). A small adjustment with the cross feed and a finishing cut made the slots 8.5mm wide.



The top and bottom of the work was fairly flat from the manufacturing process. With the two slots milled the work was clamped directly to the milling machine table and the top and bottom surfaces cleaned up with a carbide tipped end mill. This will make the top and bottom surfaces parallel with each other. The surface of black mild steel is hard and will soon dull a HSS end-mill, carbide is much harder.

After the top surface was milled I drilled four 4.2mm holes – one in each corner – and tapped them M5.



The position of the V was marked on the block. I used an angle vice to clamp the block in a 45 deg. position so I could mill the V.

I used a hacksaw to part the work to get two V-blocks and then cleaned up the surfaces in the Mini-Mill.



Clamps

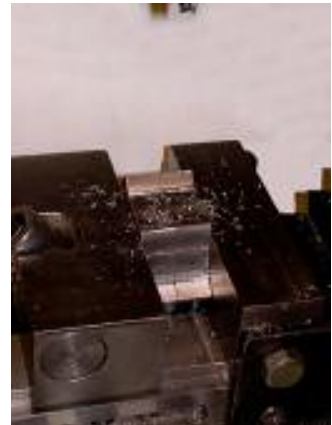
The piece I used to make the clamps was just big enough to make four clamps if I laid out the clamps stacked together and adjusted the angles slightly.

I drilled some holes to mark the outline of each clamp and used a small Eclipse hacksaw for the cuts. The right photo show the work laying on top of the first clamp, with 3 holes drilled and a couple of cuts left for the second clamp.



Two clamps were glued together with superglue and machined together. I used M5 all-thread and machined M5 nuts (see photo below).

The V-blocks has seen some use and have made it easy to machine long rods.



V-block for cross-drilling round stock

I found this idea in an old Popular Mechanics (August 1958), just use a V-block and mount it upside down in the milling vice. And make a hardened drill bush to put in the hole and you will be able to drill through the radius of the work. Since the V-block can be moved up and down in the vice it can cope with work of various diameters.

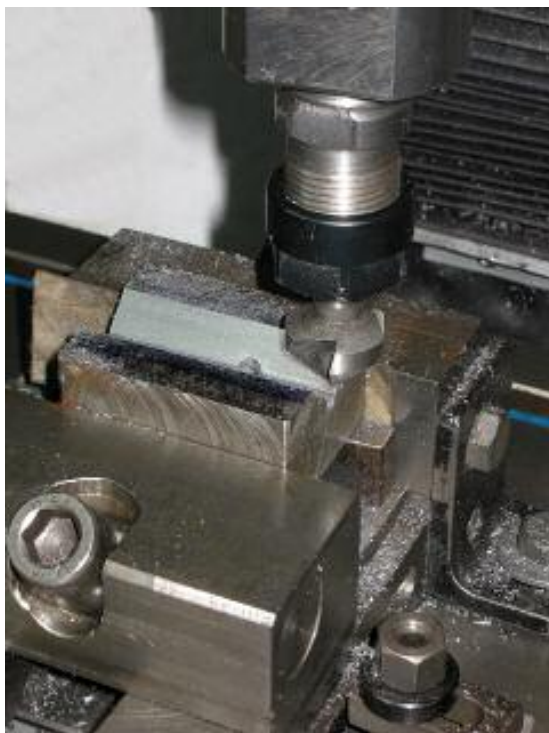
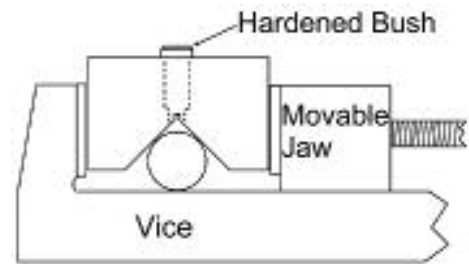
I already had a couple of V-blocks, but they were a bit short on length so I decided to make a longer one for cross-drilling round stock. The V-block I made can cross drill work from just under 8mm diameter to over 30mm, depending on the height of the vice jaws. I drilled two holes through the centre of the V, one 3mm and one 7mm. The 7mm hole was opened up to 10mm for most of the length to accommodate some hardened drill bushes I already had.

This photo show the finished V-block with a drilling bush in place and a 20mm dia. steel rod.

Materials

I used a piece of black mild steel from my scrap box, approximately 25 x 40mm and a little over 52mm long. It was squared up in the milling machine and the centre line for the V marked out. I used a centre drill to find the centre line and locked the milling machine cross slide. The centre drill was used to start the two holes and the first hole was drilled through with a 3mm twist drill. The second hole was drilled through with a 7mm drill.

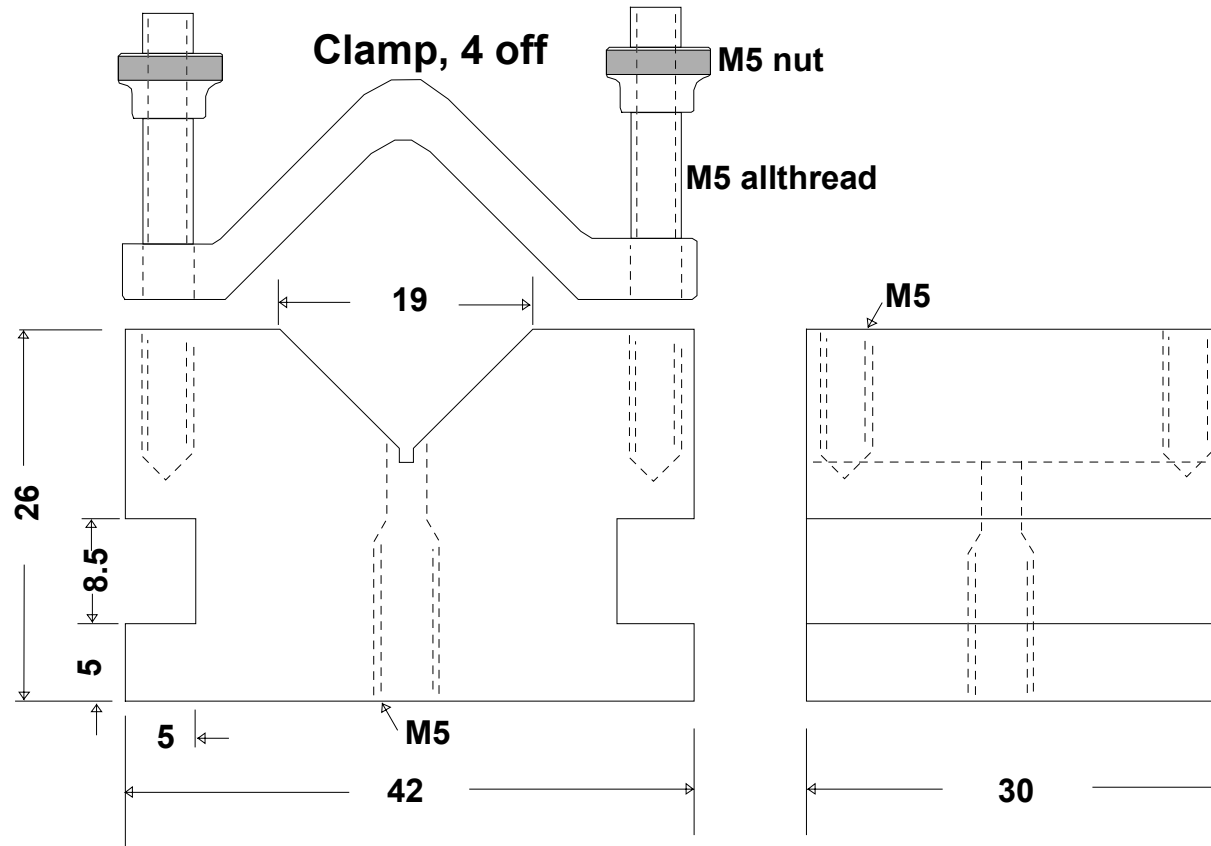
After drilling the two holes the drill chuck was replaced with the ER-16 milling chuck, and I used a few slot drills of varying diameters to drill a slot of



varying width to remove the bulk of material before using an ordinary countersink to mill the V. Since the cross slide was locked all the time the two holes should end up in the centre of the V. This is a bit of abuse of the countersink, but this was an old countersink and it worked fairly well as long as I used small depth of cut. The 5-flute countersink was worn and I used a new 3-flute countersink for the final finishing pass, I think the resulting finish was Ok.

After milling the V, the work was turned around in the vice and the 7mm hole opened up to 9.8mm for a depth of around 13mm and reamed to 10mm so I could use the old drill bushes I already had.





V-block, 2 off

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| Dato: 2006 | Tegner T.H. | Materiale: Steel | |
| V - block | | | |
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