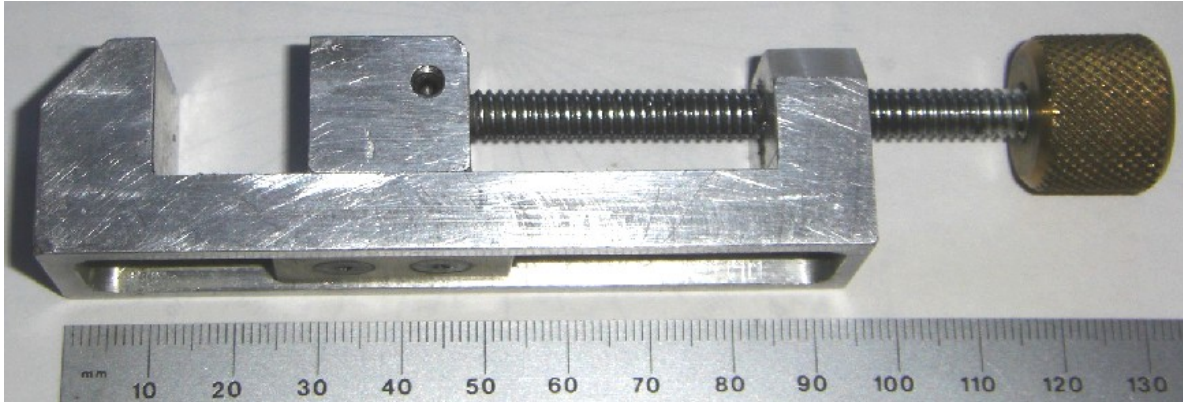


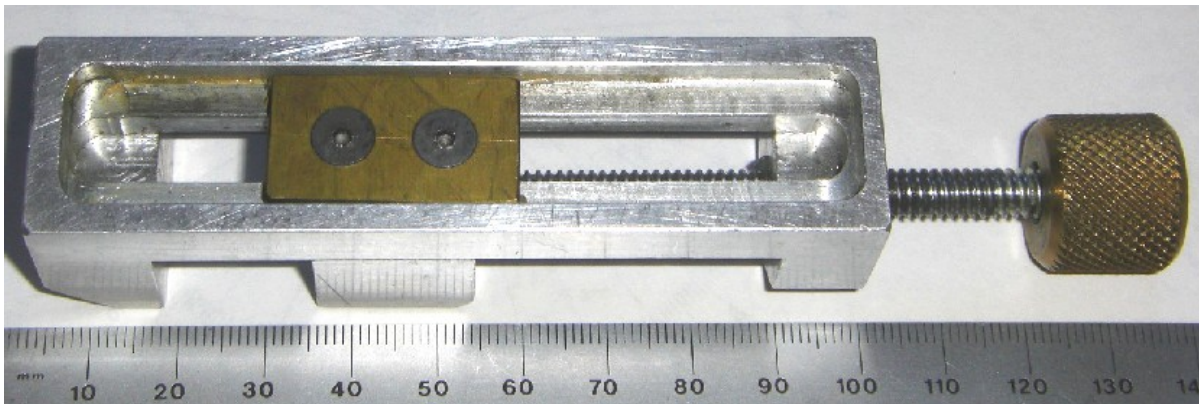
Little Vise

someonesdad1@gmail.com 4 Oct 2013

Many shop workers eventually make something like this for themselves. This little vise sits in the main drawer of my tool chest and is useful for all kinds of little holding tasks. I got a box of 1 inch square aluminum cutoffs from work that someone scrapped and the vise was made from that material by milling and filing.



The movable jaw's bottom clamp is from a chunk of 1/8 inch brass stock and some flat head cap screws I had:



The vise is nominally 1 inch square and can hold something just over 2 inches long. The actual dimensions are 0.98 inches tall by 0.92 inches wide by 3.70 inches long.

The screw is 1/4-20 threaded rod and the brass knob is held on with Loctite. A dog-point set screw holds the movable jaw to the threaded rod. After assembling the thing, I took a light cut with an end mill on the three sides to make everything flush and square. Then I sanded everything smooth on a chunk of sandpaper.

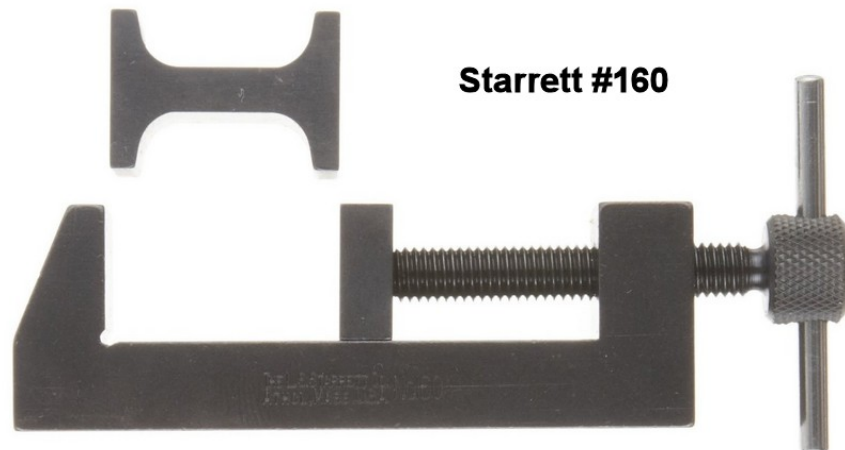
If I recall correctly (I made this vise about 15 years ago), most of the work was in making the movable jaw just long enough so that it moved freely back and forth when the brass piece was clamped down, but no more (this requires fitting things to within 0.001" or so). The movable jaw rotates about a vertical axis just slightly (perhaps 1/4 of a degree either way), but there's absolutely no play at all in the vertical direction. The final fitting to get this behavior was done with a smooth file. It's possible I also used shim stock between the jaw and the clamp (it's not hard to remove just a little too much material), but I haven't taken it apart to check. That would be another way to get an exact fit, especially if you filed a bit too much off.

The movable jaw moves roughly 1 mm back and forth before the set screw stops it (this is controlled by the length of the groove in the threaded rod). This is convenient, so I'd suggest not trying to get a

tight fit. If you want a tight fit to the threaded rod (i.e., little backlash), use a thread cutting bit to put in a 60° groove in the threaded rod and put a matching point on a set screw, adjust it as needed and Loctite it in place.

I remember milling out the top with an end mill, then carefully filing things flat and smooth. It took a bit of time to get these nice fits, but it has been worth it, as this little vise is a joy to use. It is lightweight and easily slips into a pocket. Every few years I put Vaseline on the screw thread and the ways and it moves smoothly. It's one of those little tools you'll use for the rest of your life if you take care of it.

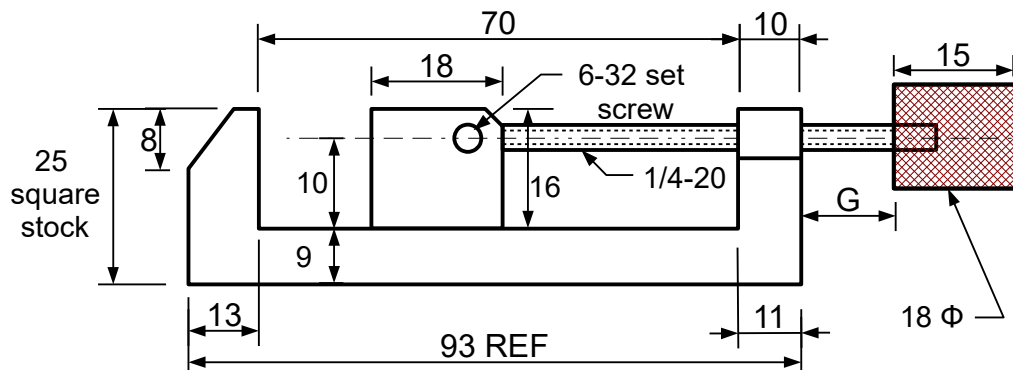
For around \$200, you can buy a pair of the Starrett 160 vises, which are made from case-hardened steel (Brown & Sharpe also made a similar vise):



The two right-hand jaws slip over the clamping screw (I haven't seen one of these vises close up, so I can't sketch the design). Note the transverse hole at the base of the fixed jaw that was drilled or milled for clearance of burrs on the workpiece. My only objection to Starrett's design is that extra jaw could be easy to lose or misplace.

While you might think the aluminum vise I made is Mickey Mouse compared to these case-hardened commercial vises, the aluminum won't damage a cutter that runs into it and you'll appreciate the light weight (I slip mine in my pocket or my tool apron every so often and don't really notice it). This has worked well for me as a home shop machinist. If you make your living with it, then you might want to make it from steel, harden it, and grind it to size. But most of us HSMs don't have the need or equipment to do this.

Here are the dimensions of mine to about the nearest mm, although of course you'll make yours to suit your tastes and stock on-hand:



The final width perpendicular to the drawing plane was 24 mm. None of the dimensions are critical. Gap G is 2 mm when the jaws are closed.