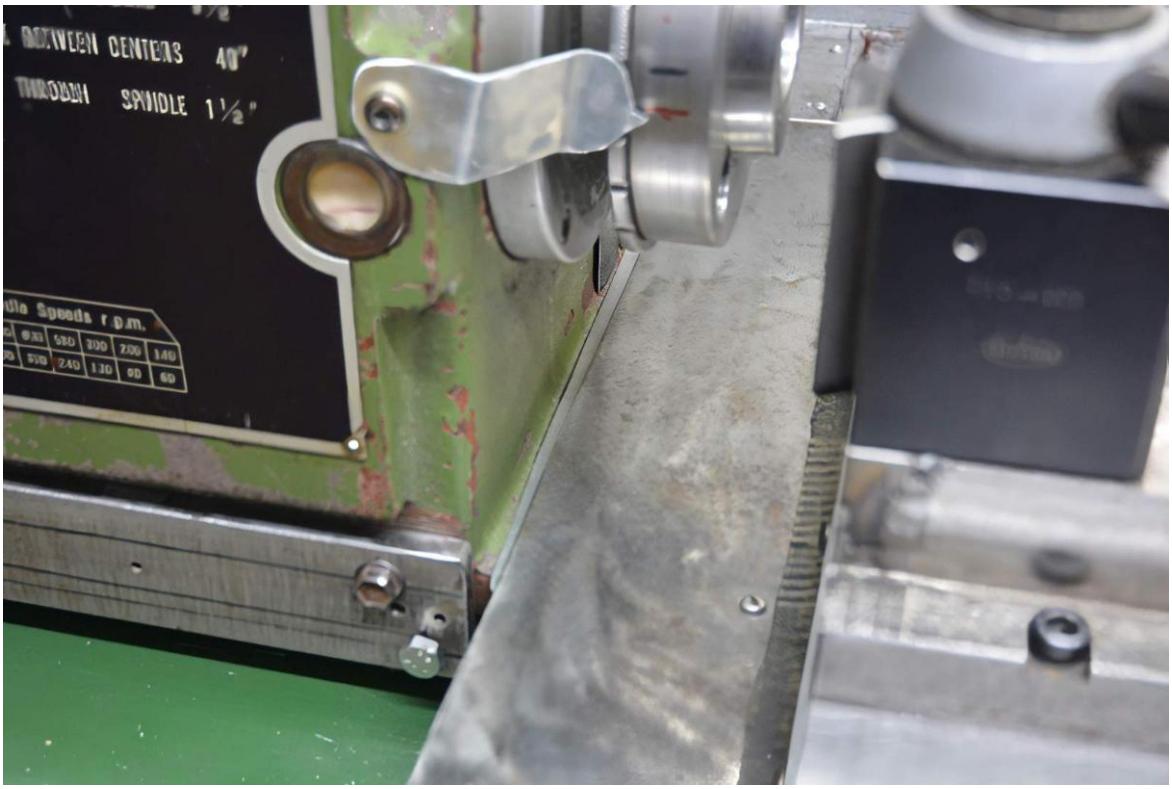
Lathe covers (c) Tony Foale Jan 2024

This document details covers that I have fitted to my lathe, principally to control swarf. The subject is mainly covered using photos with minimal text.

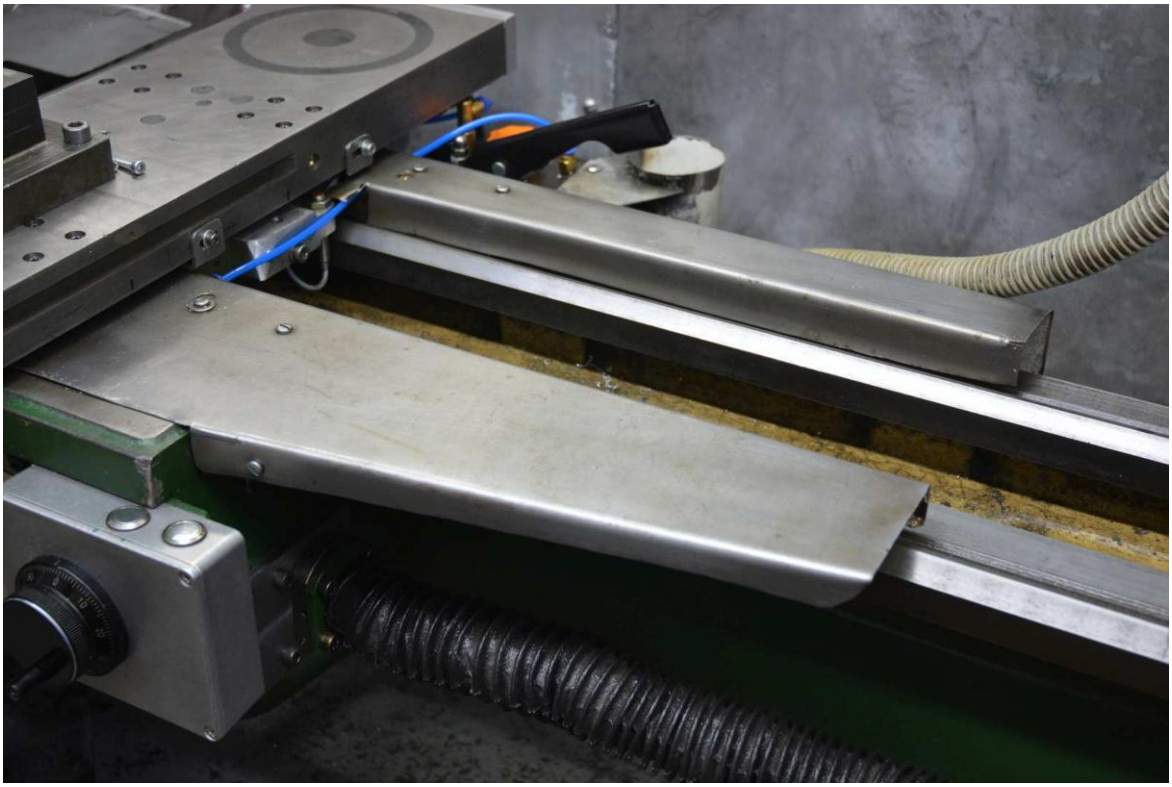
This cover is fixed to the head stock and mainly directs swarf to where it is relatively easy to brush away. The cut outs are for the forward extensions of the saddle.

This cover moves with the saddle and most swarf falls on this or the saddle and is easy to brush away even with the lathe in use. Note rubber strip seal to keep muck off the X axis rails. This cover overlaps the previous fixed cover over the last part of the saddle movement and for most work close to the chuck, collets or faceplate.

The cover is as long as possible without restricting Z axis movement. The limit sensors cut the Z feed just before the cover crashes into the head stock as shown in the next photo.



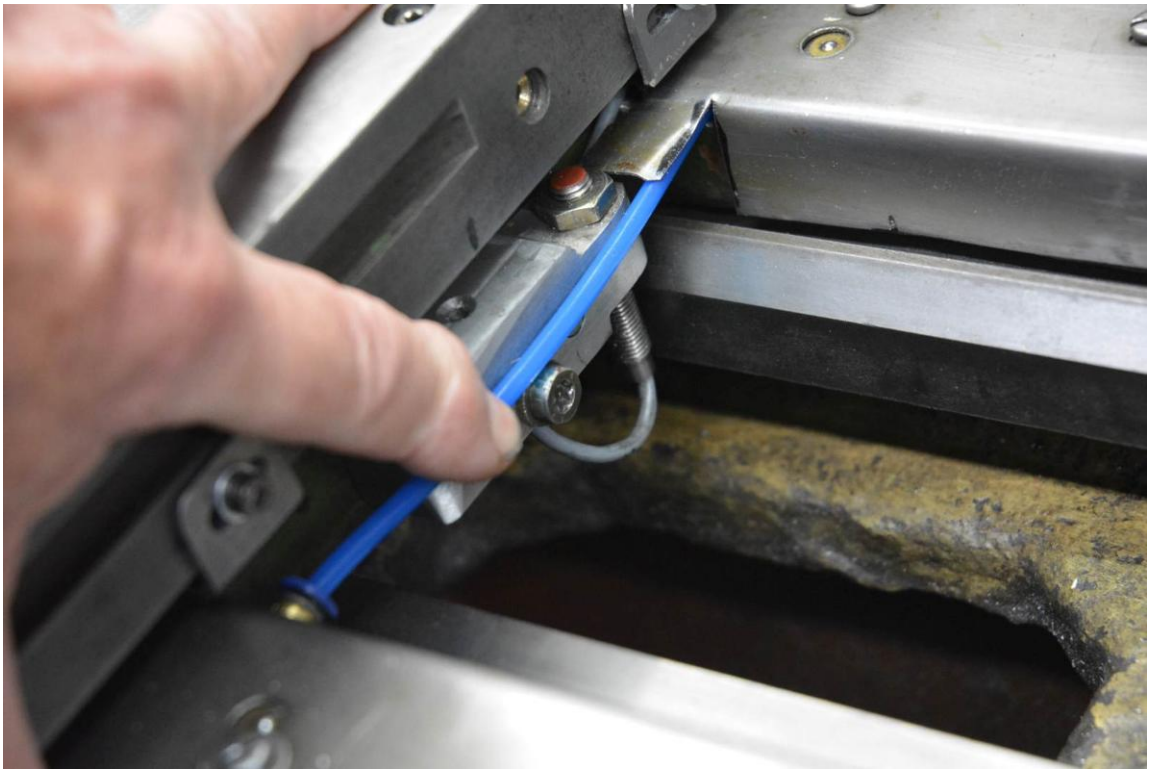
A concertina type cover will be fitted between the fixed and moving covers when I find a suitable one. Until then I use this piece of rubbery sheet from a milling machine as a flexible and removable cover. It just sits there held in place with a magnet.



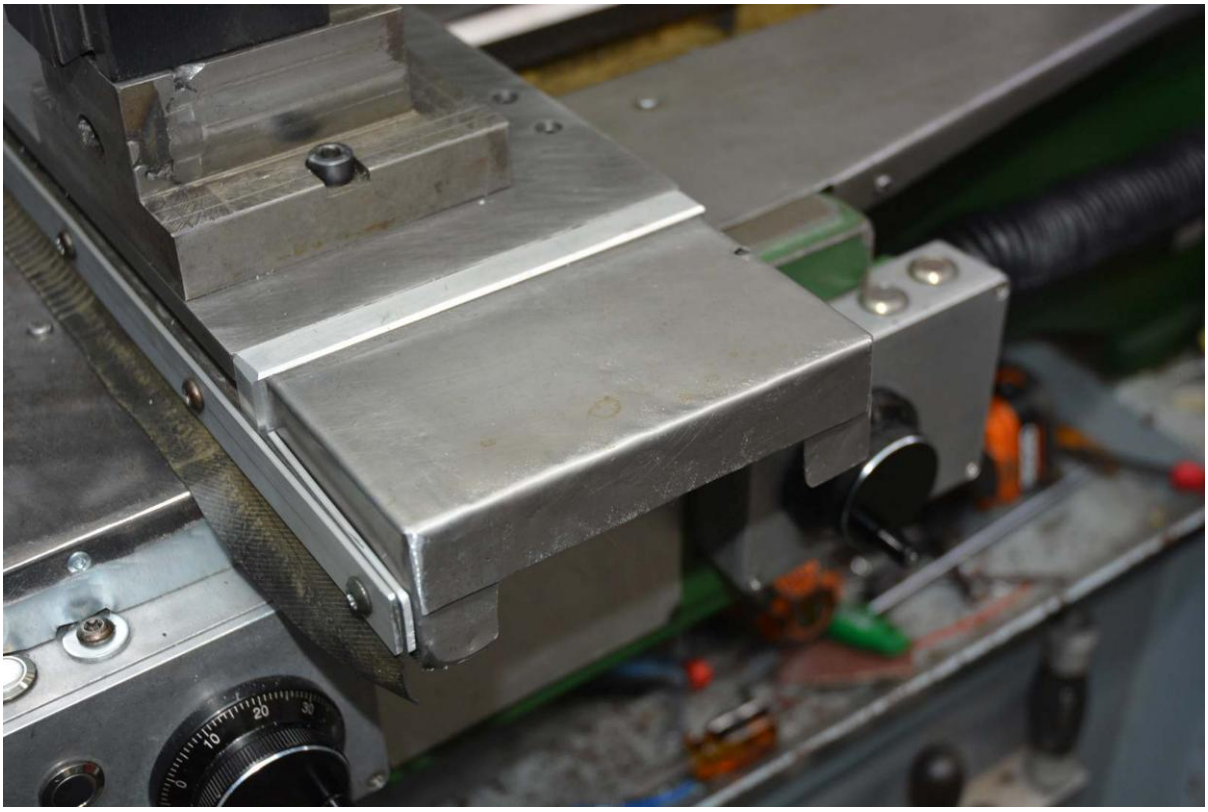
Now for the rear of the saddle. Tailstock access dictates that each side has a separate cover. The ways for the tail stock have to be left uncovered. These covers reach beyond the bed of the lathe when fully back. This lathe has a 1 metre long bed so I do not go that far back very often.

The tailstock fully forward relative to the saddle. The covers are close but do not obstruct the tailstock.

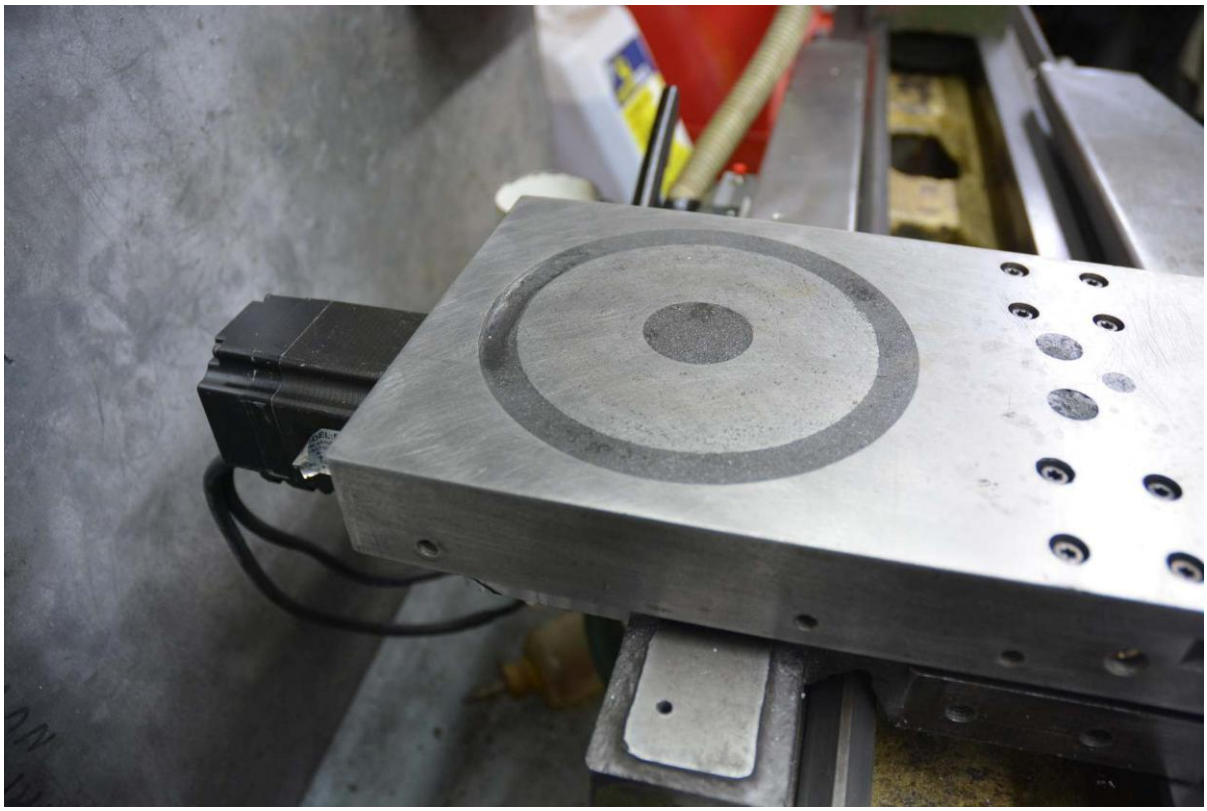
Not really much to do with covers but it got photographed when I was doing the covers. This is a hand pump to send oil to the ways and I would recommend anybody with a mill or lathe to fit one. Use proper way oil with it. The red button releases the total shutdown of the motors when a limit sensor is triggered. It is out of the way but still easily accessible

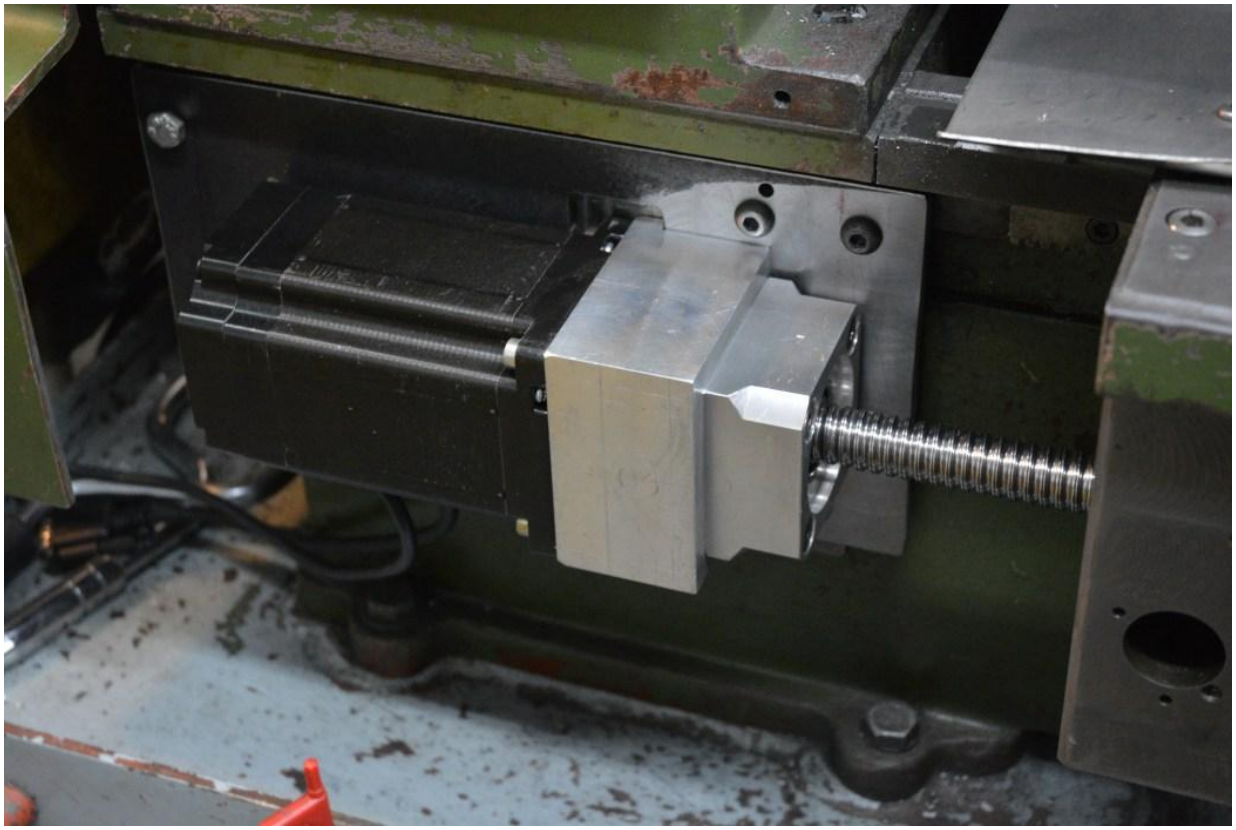


Oil is delivered in 4 mm pneumatic tubing. This oil line passes behind the X axis limit sensor, where it could get crushed by the tailstock. My finger points to a screw which limits how close the tailstock can get as protection for the tube.

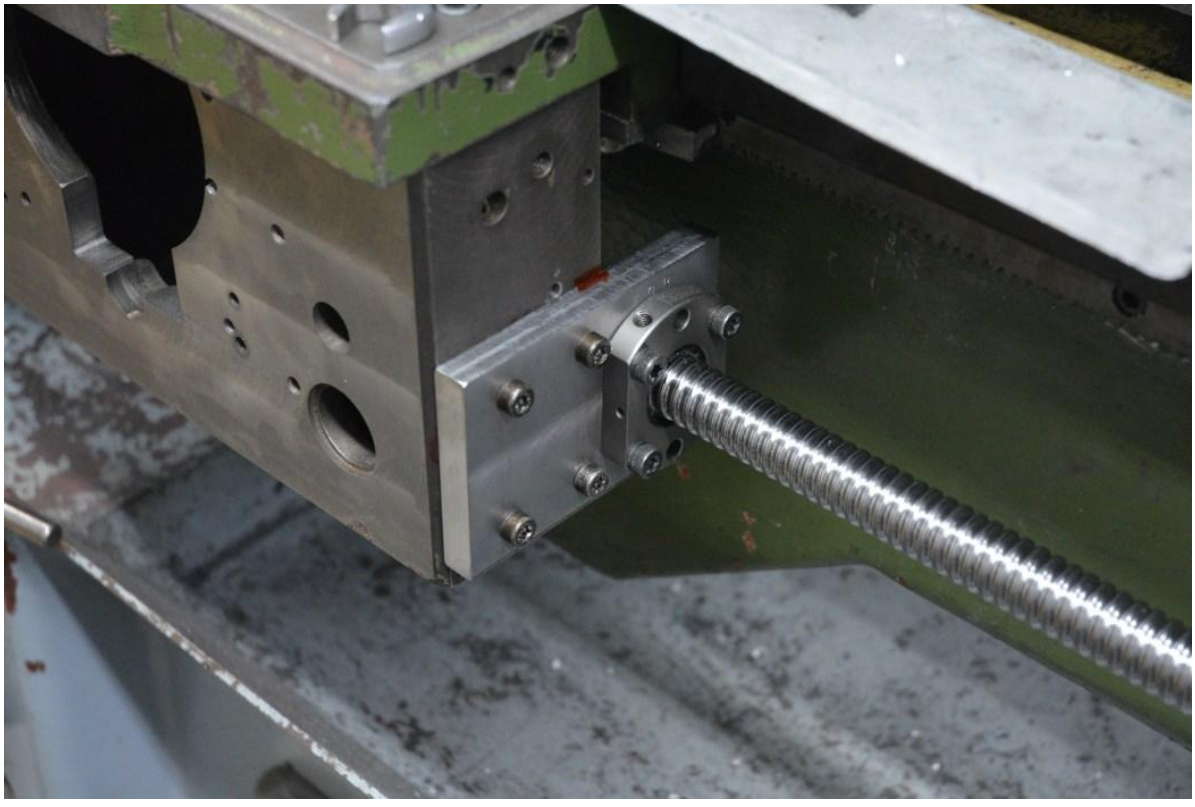


At the front of the cross slide I added a simple sheet metal extension which covers the ball screw and rails when the cross slide is fully inward. The cross slide is longer than stock and provides sufficient covering for the screw and rails at the rear. However, the X axis motor is mounted at the rear and is uncovered when the cross slide is forward. I added a similar cover (not shown) at the rear to cover the motor.

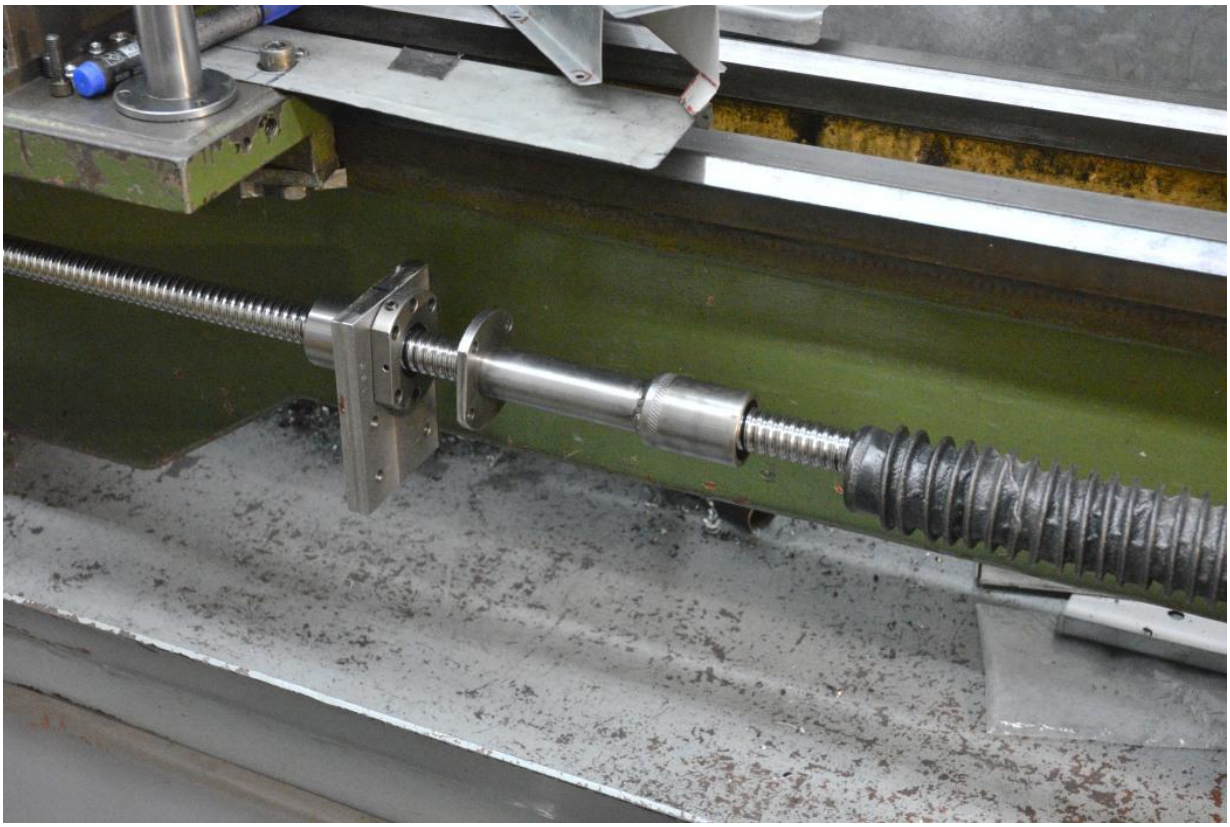




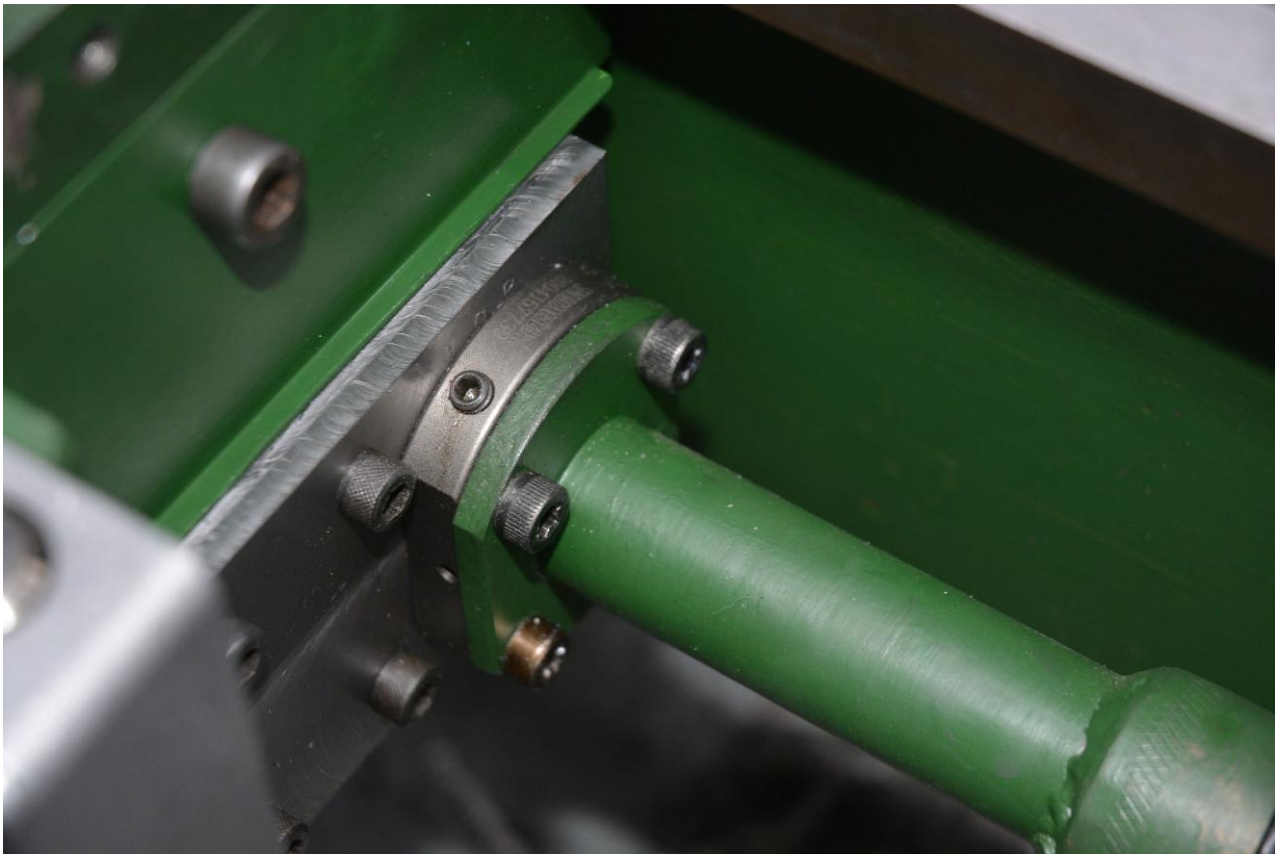
I fitted a motorized ball screw on the Z axis but the following cover methods are equally applicable to conventional ACME lead screws. Due to the relative movement it was necessary to make multi-piece telescoping covers which experience has shown offer complete protection. Left and right cover systems are quite different. Here is the uncovered screw.



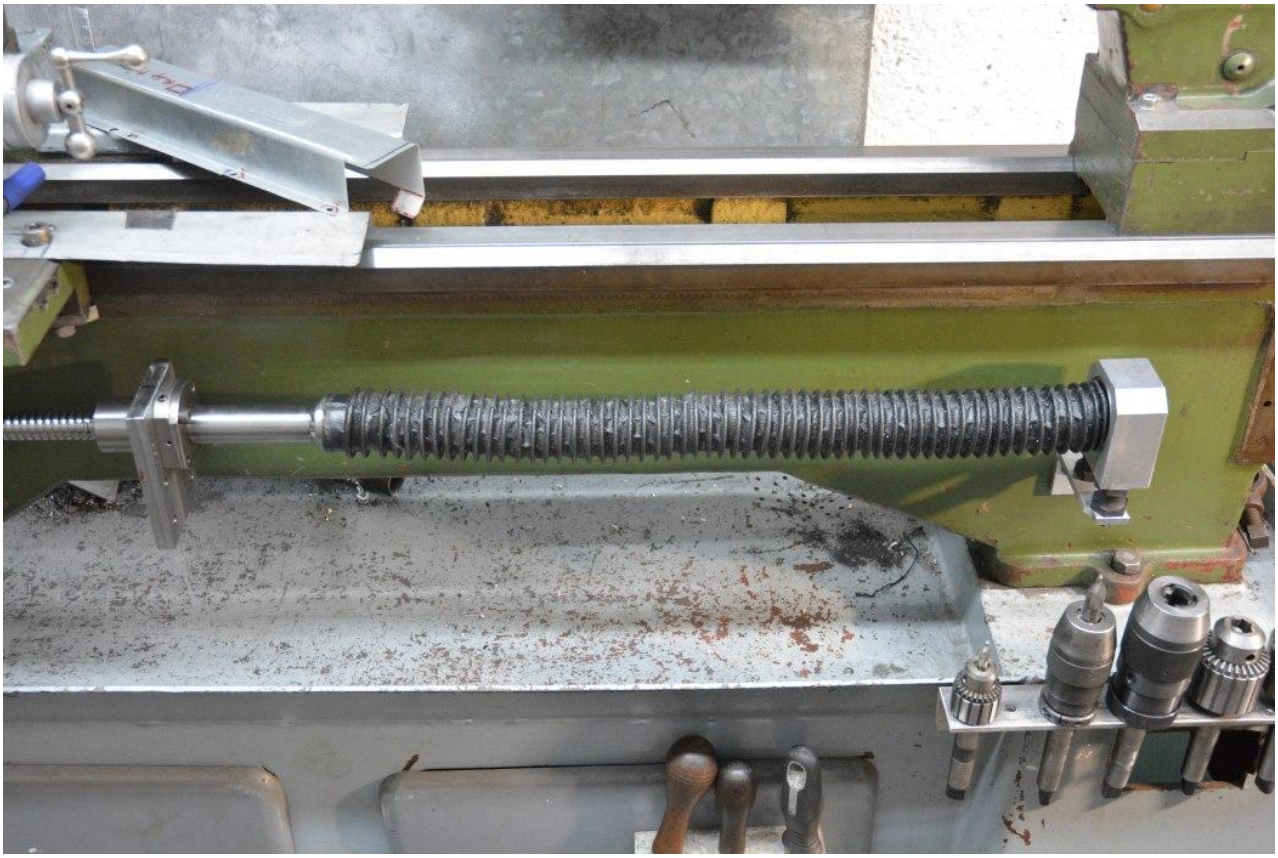
The LHS of each section was protected by a flanged tube. The length of each decided by the distance to the end supports of the screw. The flanges were welded on and then faced off true to the bore of the tube. The tube was not much larger than the screw so it had to be close to concentric to achieve clearance.



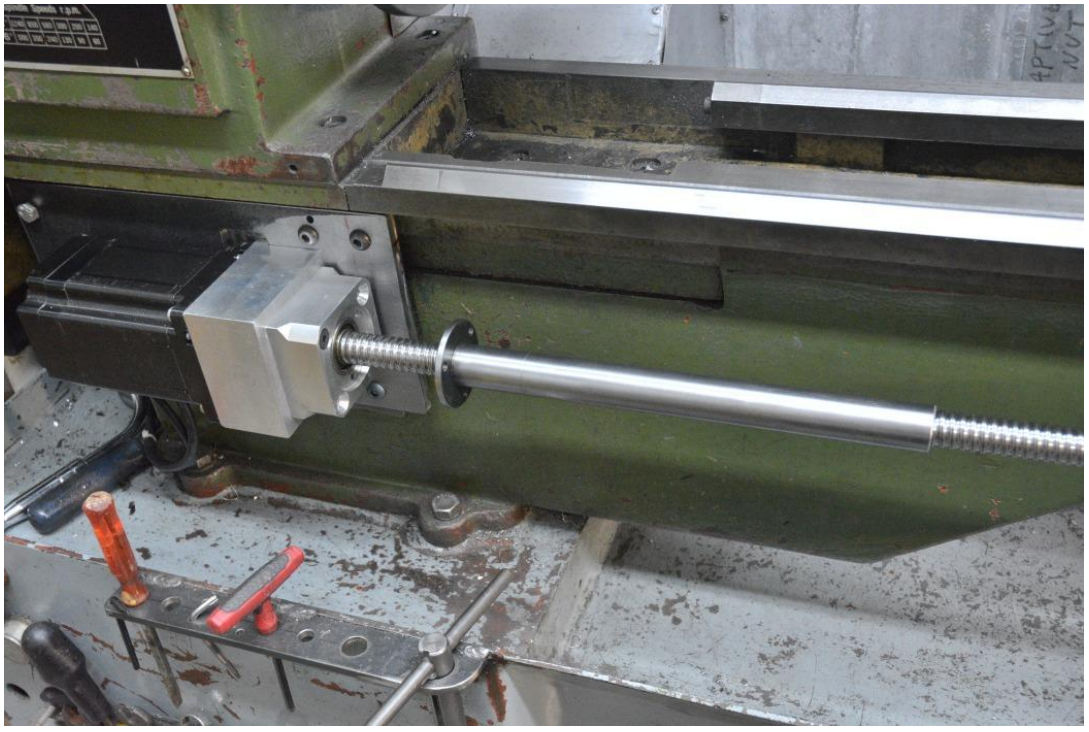
On the RHS the tube had a larger end welded to it to match the size of the rubber gaiter. The flange gets bolted to the saddle apron sandwiching the ball nut as in the following.



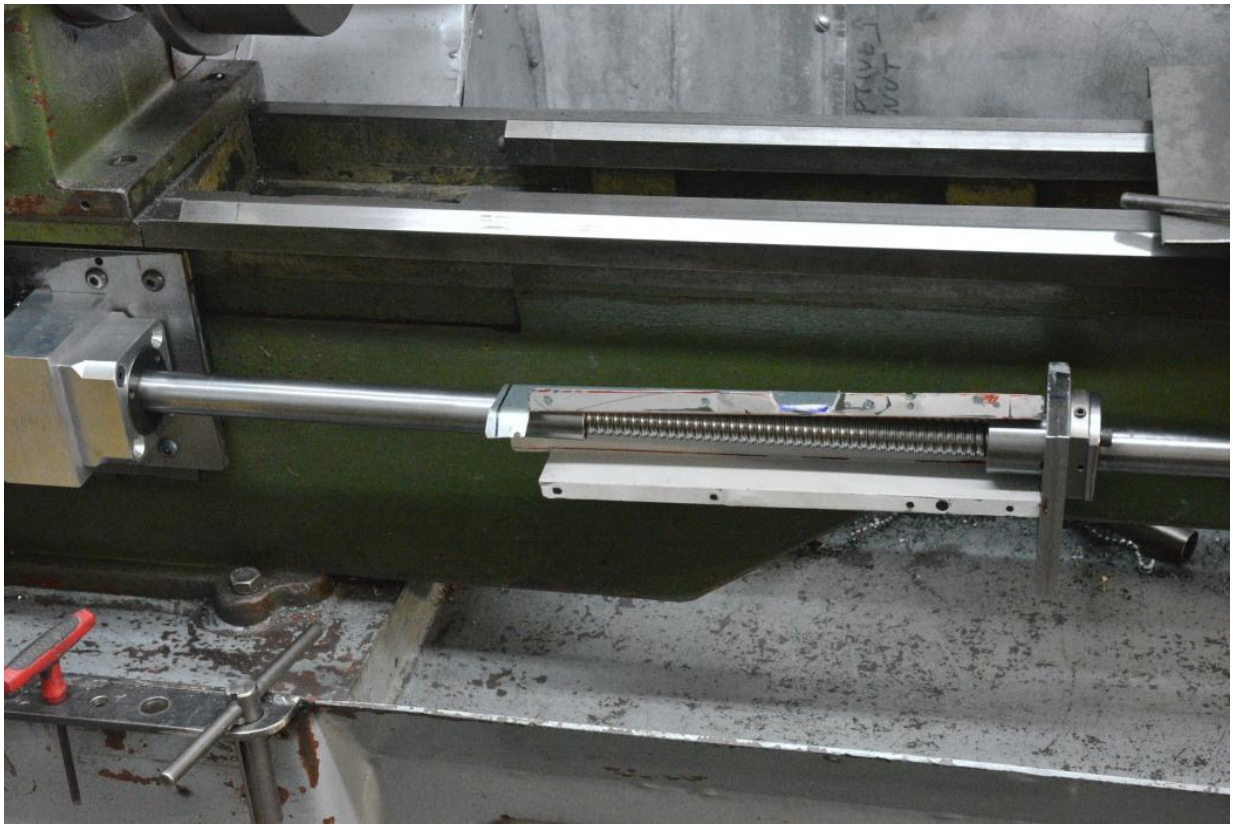
All bolted up.



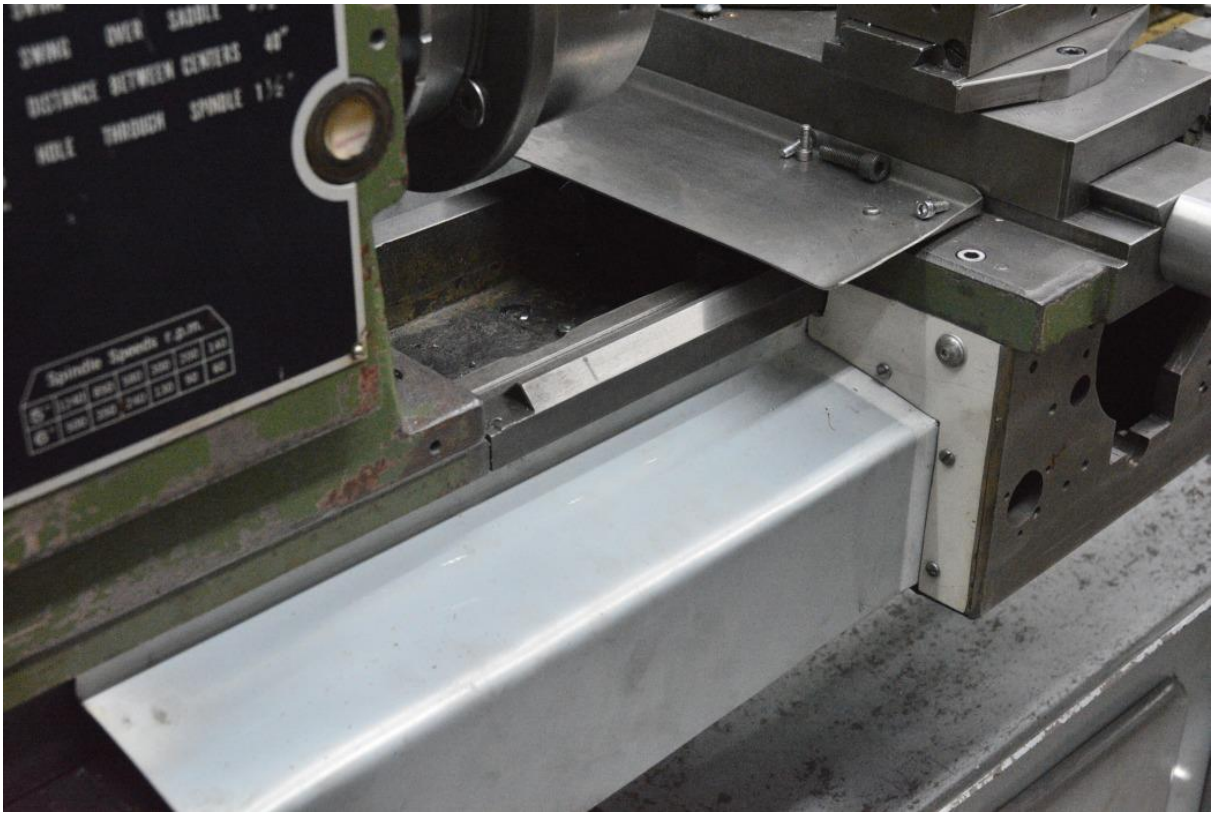
The LHS was more complex. For reasons that I have long forgotten using a gaiter to accommodate the movement wasn't a good option so I made a 3 piece telescoping cover. The cover fitted cover was this sheet metal channel screwed to the back of the apron. This area is largely out of sight of meandering swarf but anyone who has ever looked will know that swarf and oily stuff does find its way there. The afore mentioned tube is always partly covered by this channel.



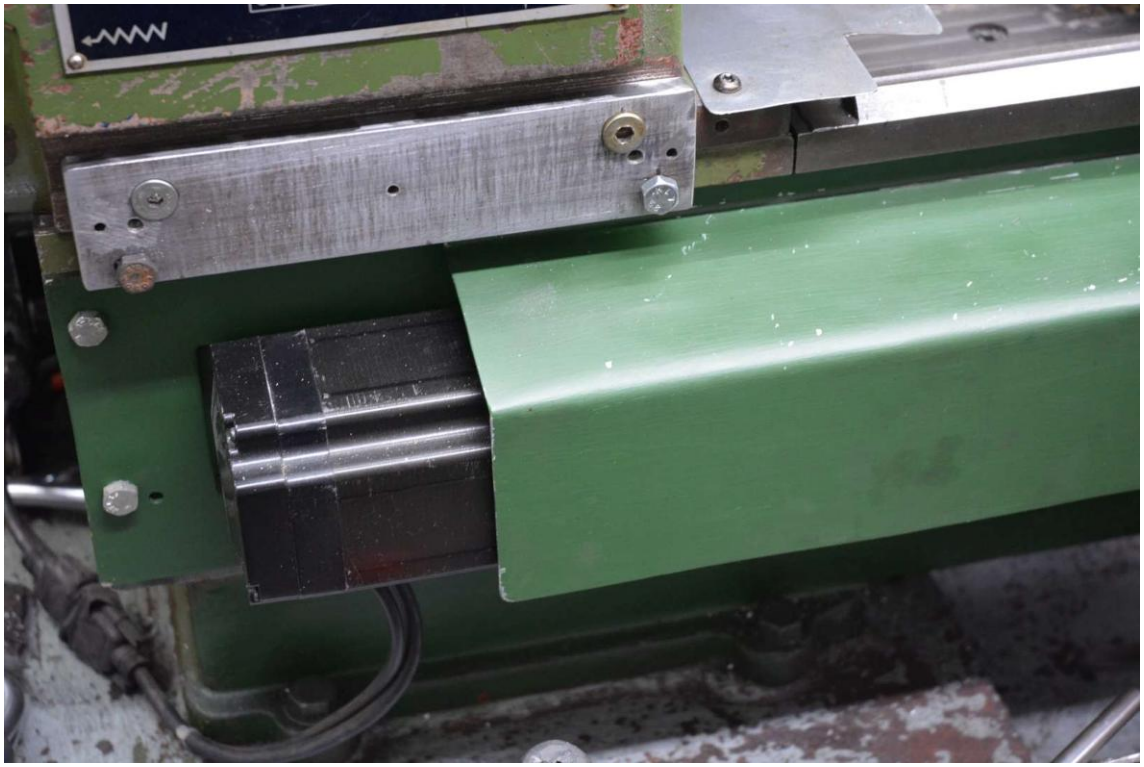
Here is the flanged tube waiting to be bolted to the motor mount. You can see how close the screw diameter and tube bore are but it bolted up fine with no interference.



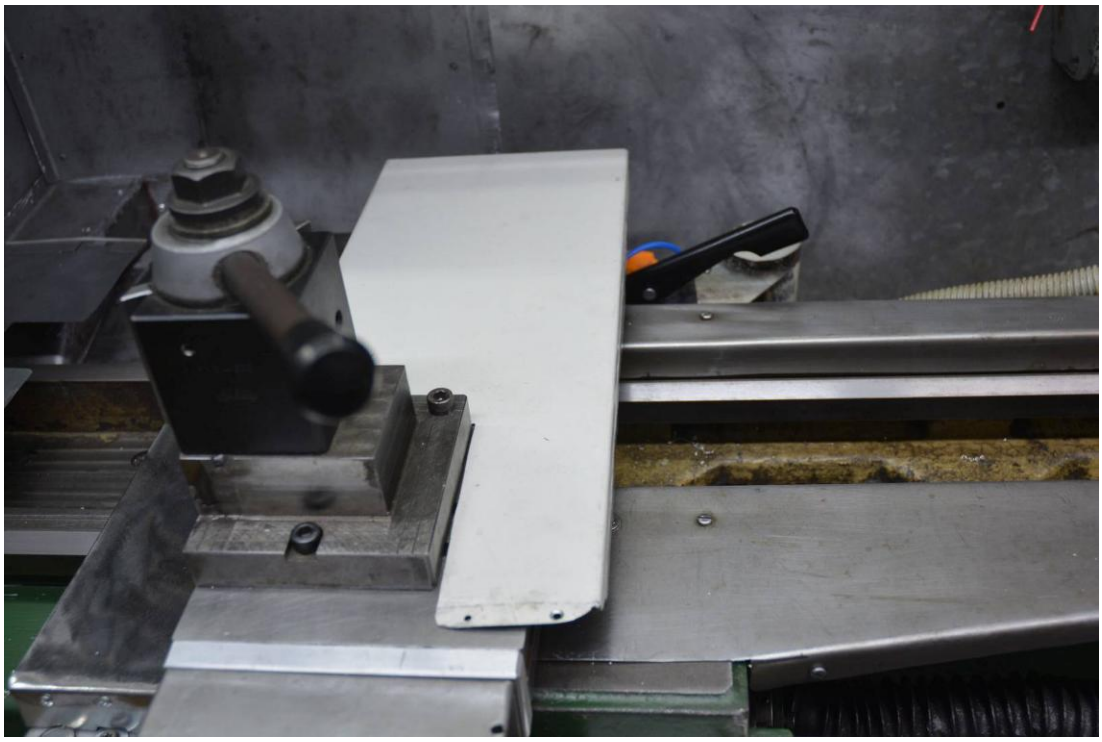
This shows the stack up of the ball screw covers. From the left is the first flanged tube followed by the sheet metal channel which bolts behind the apron. Then the ball nut and the second flanged tube and gaiter (not in this photo).



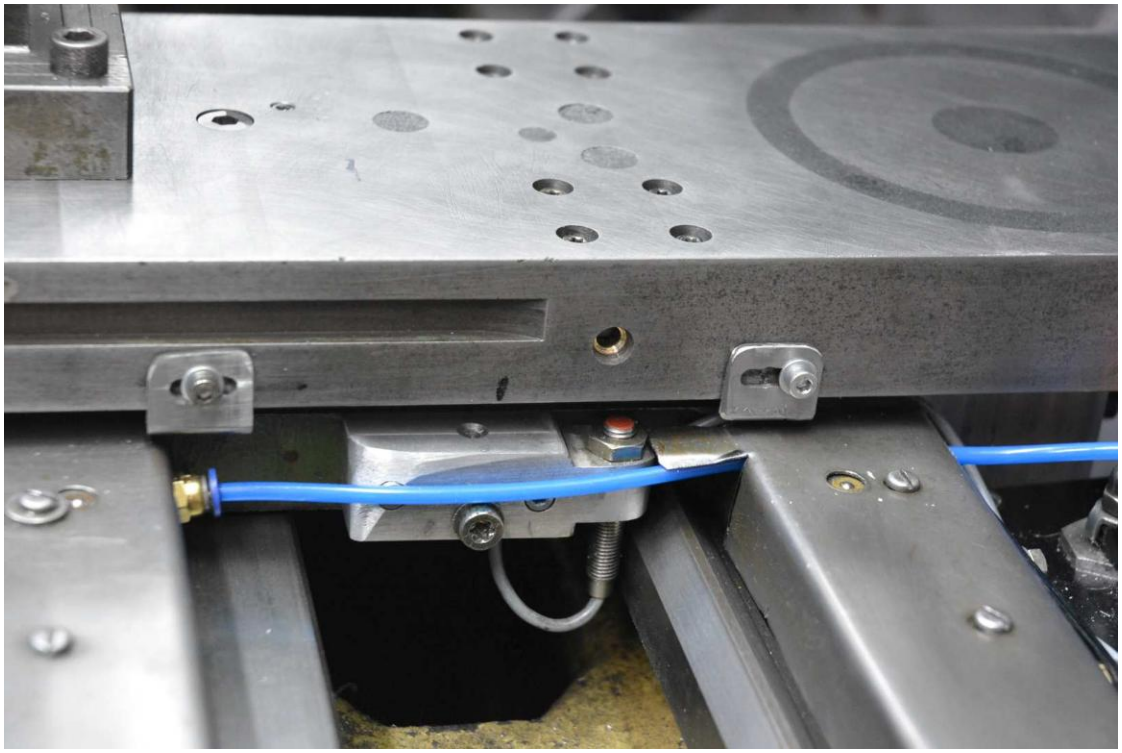
The final cover. This has a twofold purpose. It hides the tube cover from swarf which could build up behind the tube and make more work cleaning. Instead this open bottom sheet cover just needs a simple brush off to keep it clean. Its other job is as a cover for the motor. It is a little shorter than I would like for that job but if was any longer it would run into the OEM cover for the change gears when the carriage is near the head stock. The motor becomes half uncovered when the carriage is close to the RHS end. To avoid that I extended the OEM cover forward to form a cover for the cover.



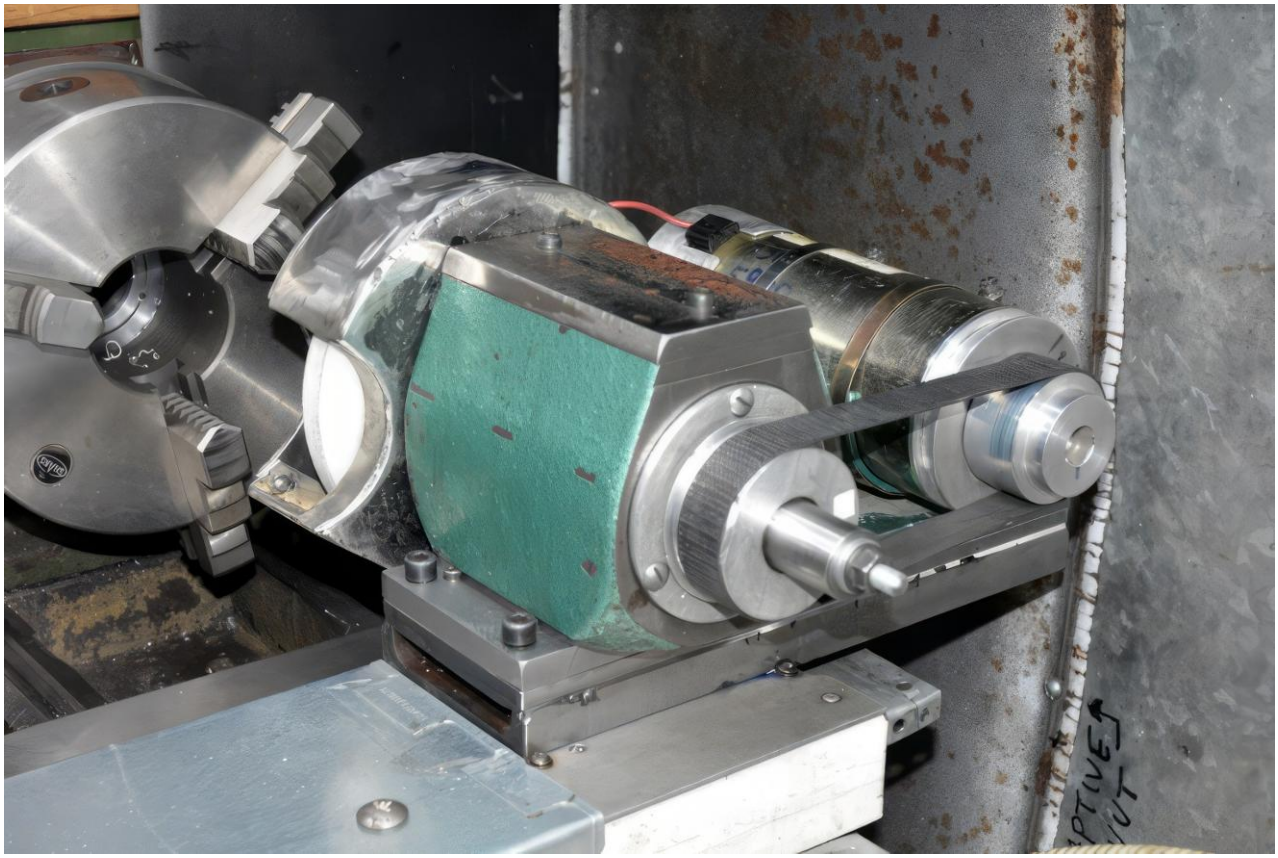
The final cover just lays on top of the cross slide. It is the top from an old PC computer with a cutout for the toolpost base. I just lift it off when it is in the way such as when needing to bring the tailstock up close or to add additional tooling to the cross slide such as a grinding head.



It is wider than the cross slide and the back edge provides protection to the X axis limit sensor and the lubrication hose.



My grinding head. I can't call it a toolpost grinder because it bolts to the cross slide rather than being fitted to the tool post.



A lathe is not the ideal tool to use as a base for grinding for several reasons but on a hobby level we have to use what we have. One problem is that the open ways and lead screw do not take kindly to being covered in grinding debris. Covers such as described in this document are from from a complete answer but they go a long way to enabling an acceptable solution. I lay out a plastic over most of the lathe and cover that with wet towels with a strong magnet underneath the towels in the firing line of the sparks. My permanent covers provide a good support for the plastic sheet and the wet towels. I also have a close fitting grinding wheel cover with a vacuum fitting at the lower rear (not visible).