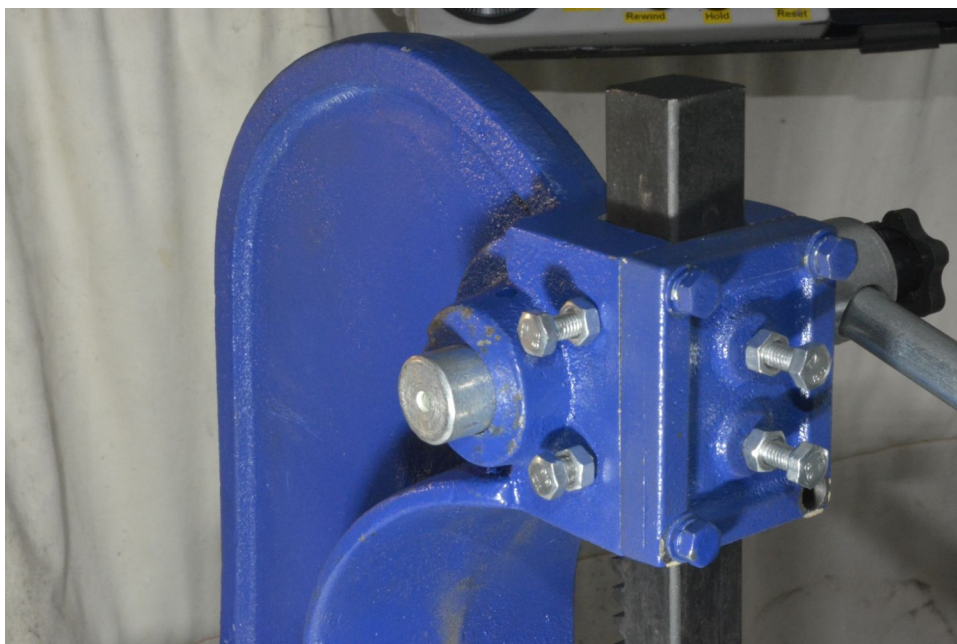


Improvements to a chinese Arbour Press.

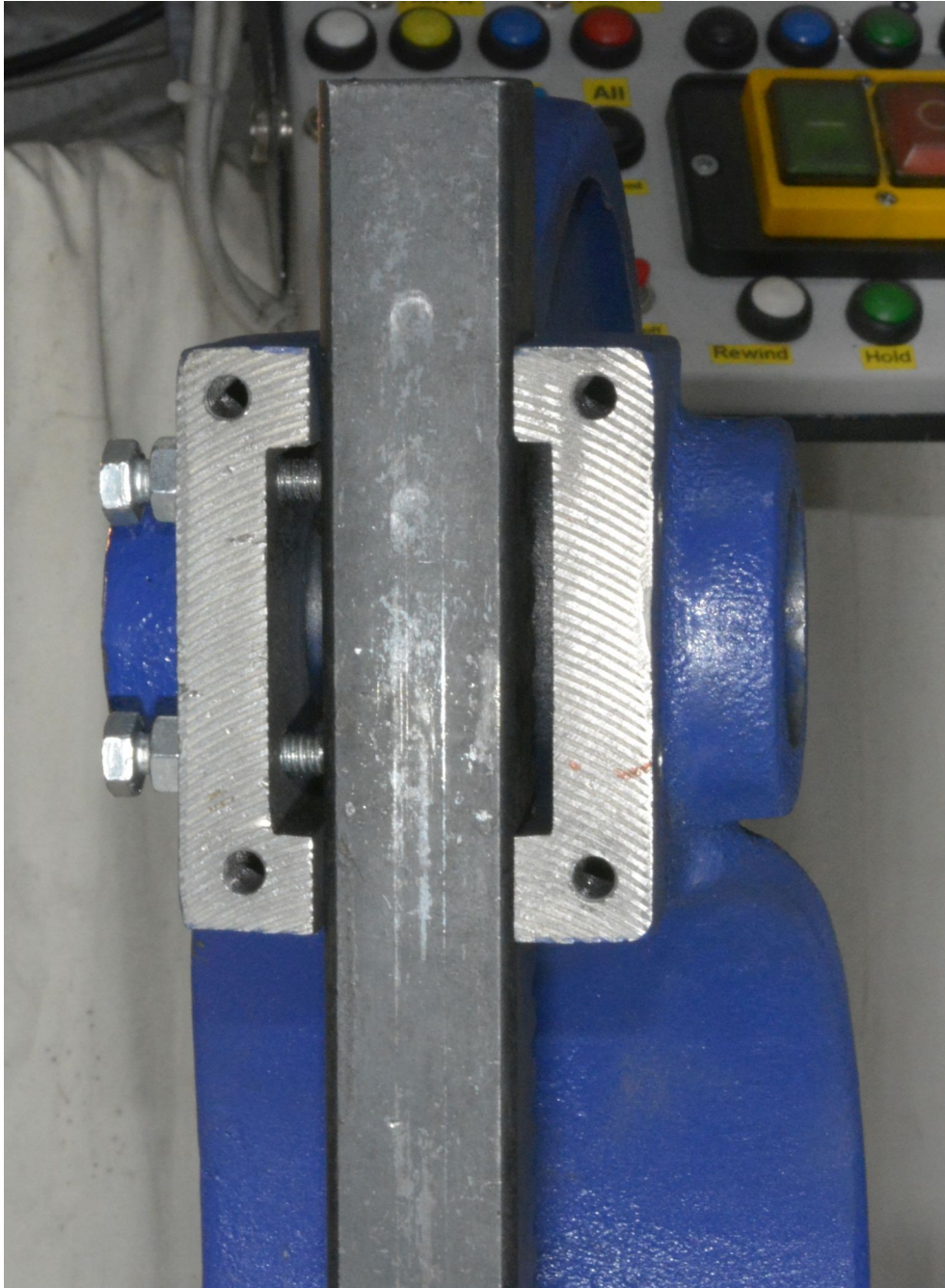
I built an hydraulic press some years ago but for simple and lightweight jobs it is overkill and usually takes time to setup. For those jobs I recently got a cheap 1 ton Arbour Press as shown here:



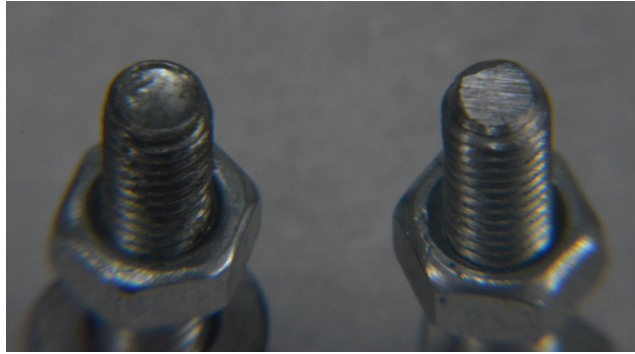
Initially I was very pleased to see the gib adjustments for the ram.



Imagine my horror when I opened it up to reveal that there were no gib strips, the ends of the screws bear directly on the ram. The screws were not even symmetrically disposed. This has to be a joke, where are the cameras?



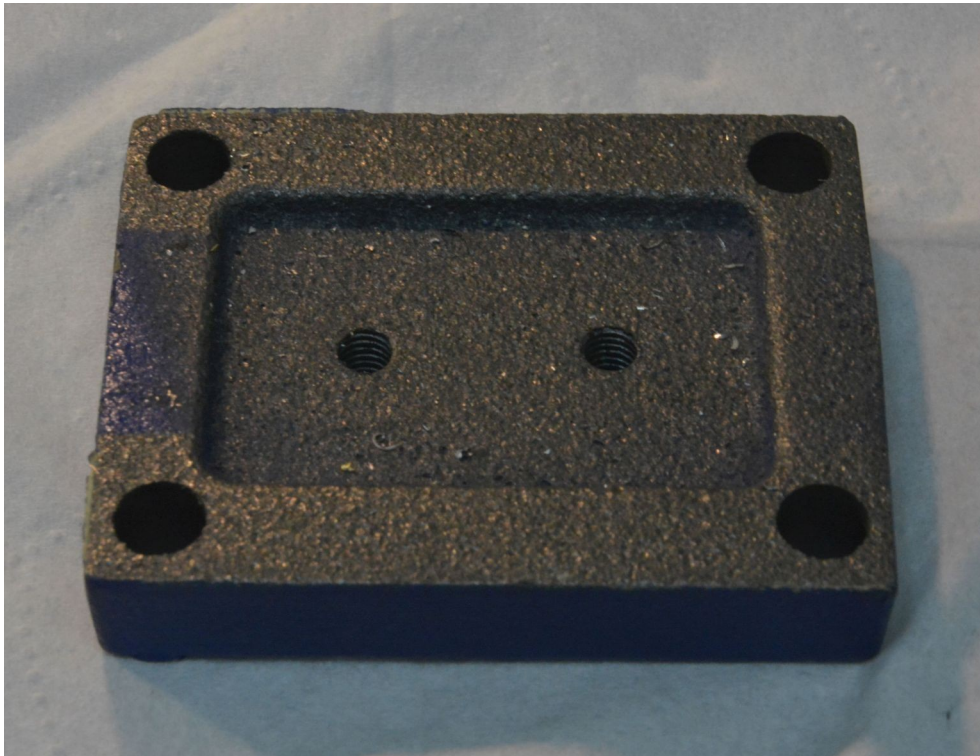
To make matters worse the ends of the screws were “as made” and not smoothed off like the one shown on the right side of the photo below. The ends of the stock screws were dimpled and only made contact with the ram via a thin ring. It is difficult to get a smooth and long lasting motion with such a botched design.



On the left hand side there was enough space for a 6 mm thick gib strip or plate, and by machining the front plate I was able to fit in one of 5 mm. I did not want to thin the front plate too much or I could have machined it deep enough for 6 mm also. The right side had no provision for adjustment and was machined and lapped to sit flush with the casting to give a continuous surface, the thickness came out close to 5.5 mm.

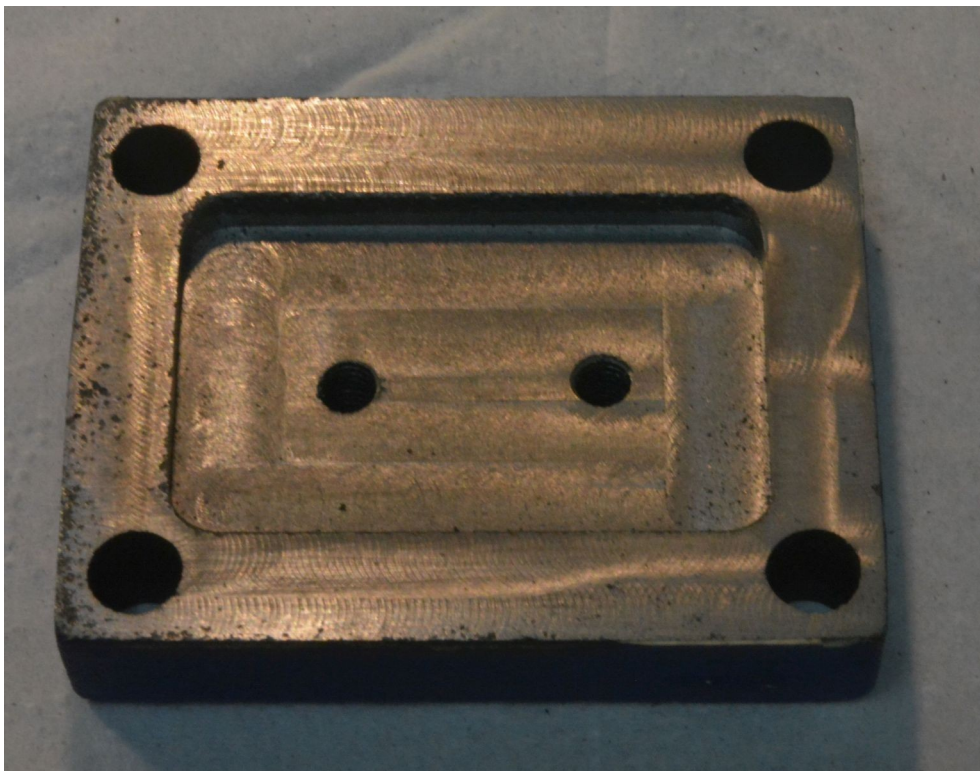


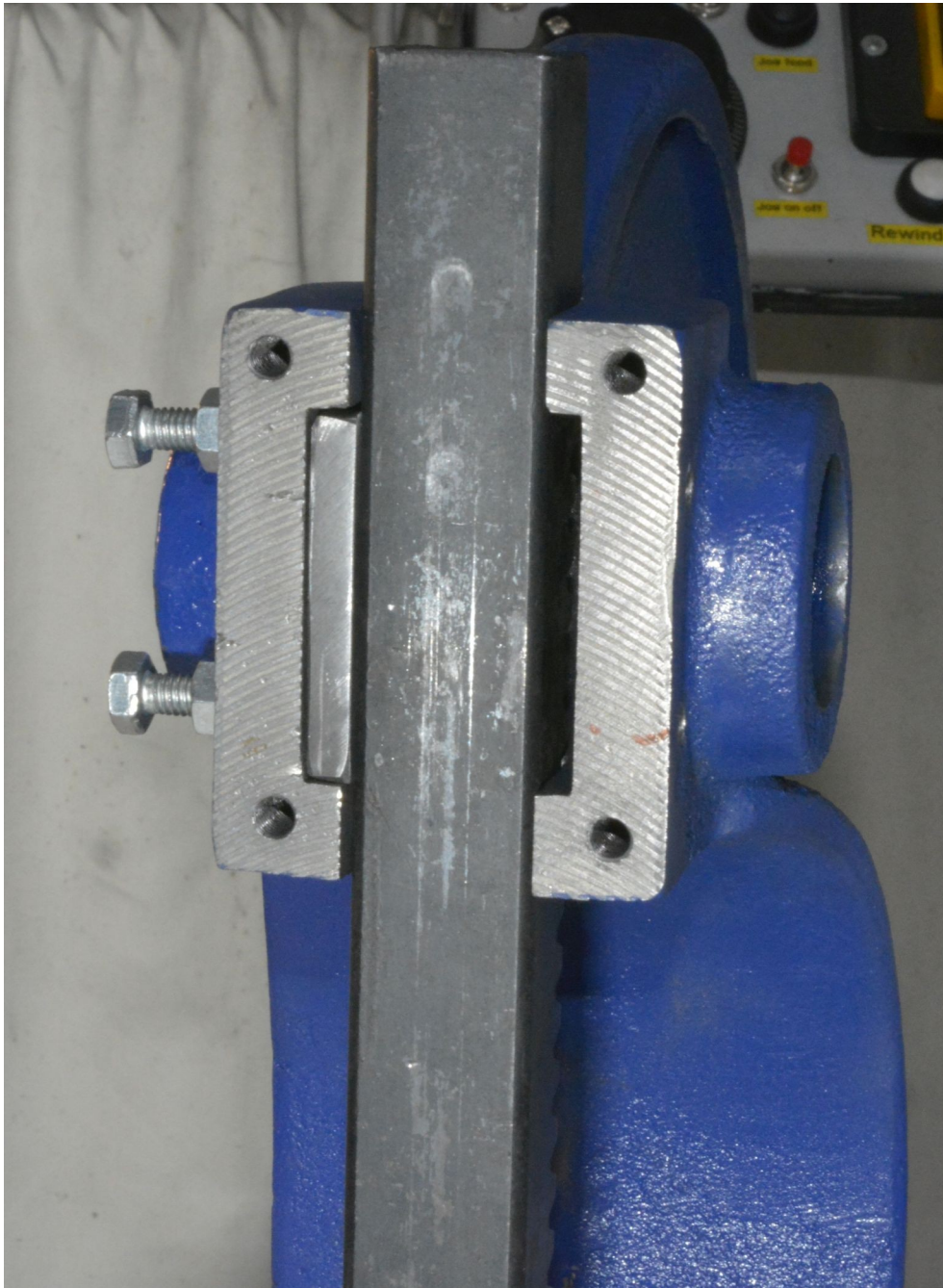
The spot facing on the left and front is to allow the adjusting screws to also act as location for those gibs. The right side is drilled and tapped and gets permanently bolted in place, becoming a permanent fixed part of the press frame. The part circle cutouts on the side gibs are to give clearance for the pinion shaft.



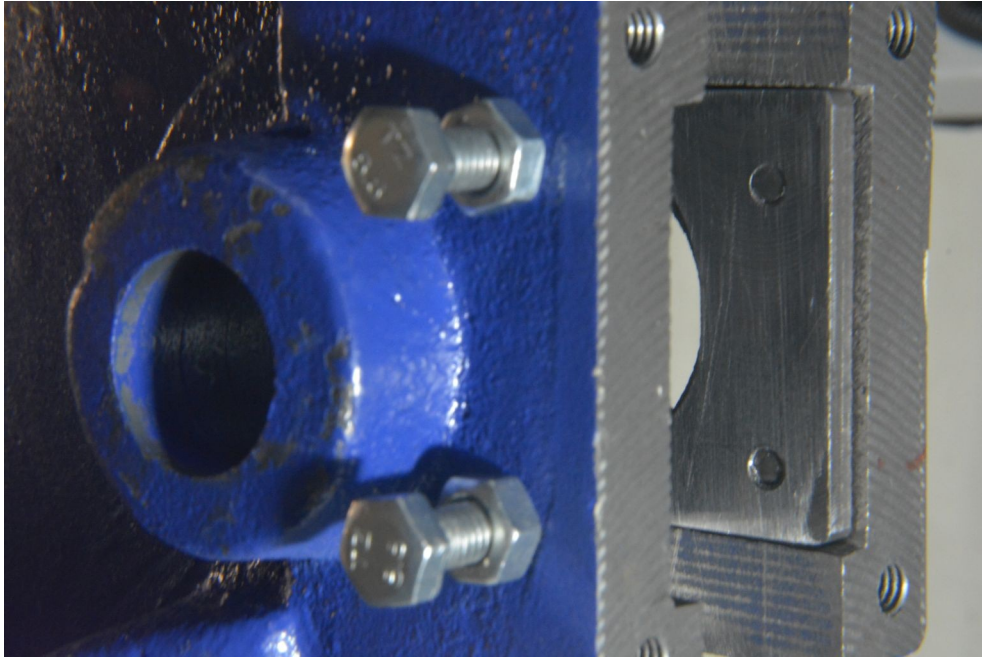
The photo above shows the stock front plate, which except for the holes is totally as cast. The tapped holes are for the adjusting screws.

I minimally faced off the outer surface to give a reliable reference surface and then milled the pocket to a depth of 4 mm for the front gib.

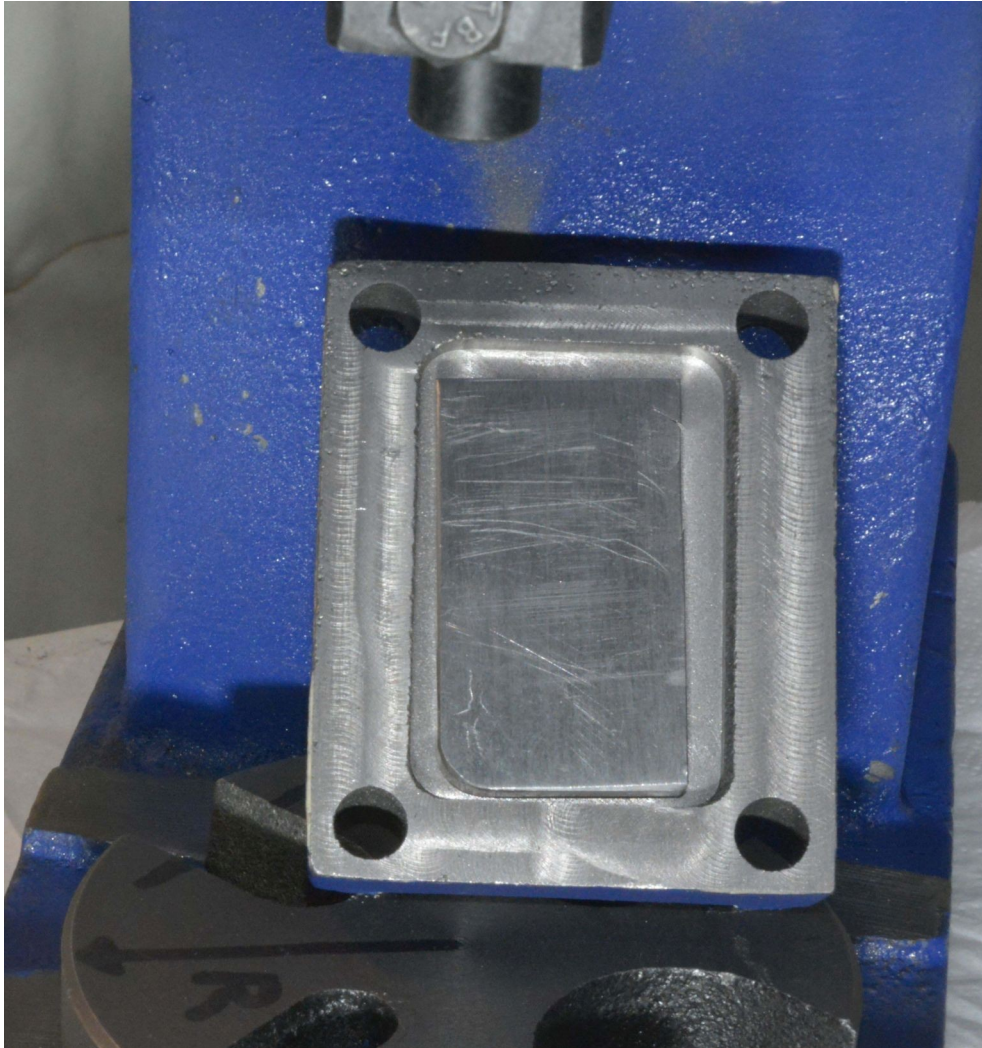




Here we have the left side gib plate in place. I just do not understand why they left space for a gib yet did not fit any.



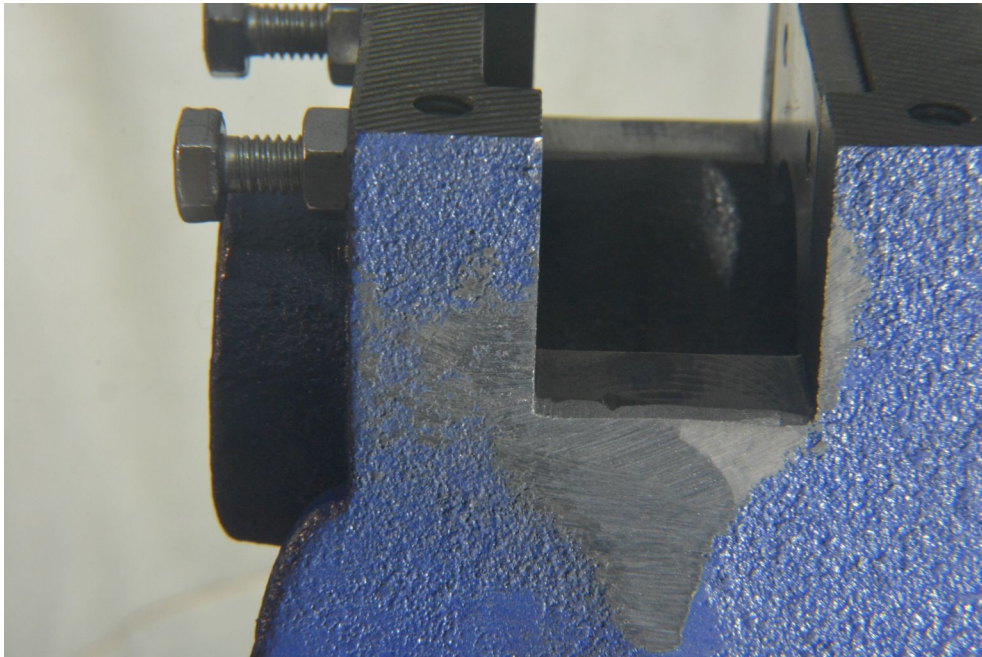
The right side plate is shown here. That is permanently bolted in place with no adjustment, it has been milled and lapped to sit flush with the adjacent surfaces above and below the plate to increase the bearing area for the ram.



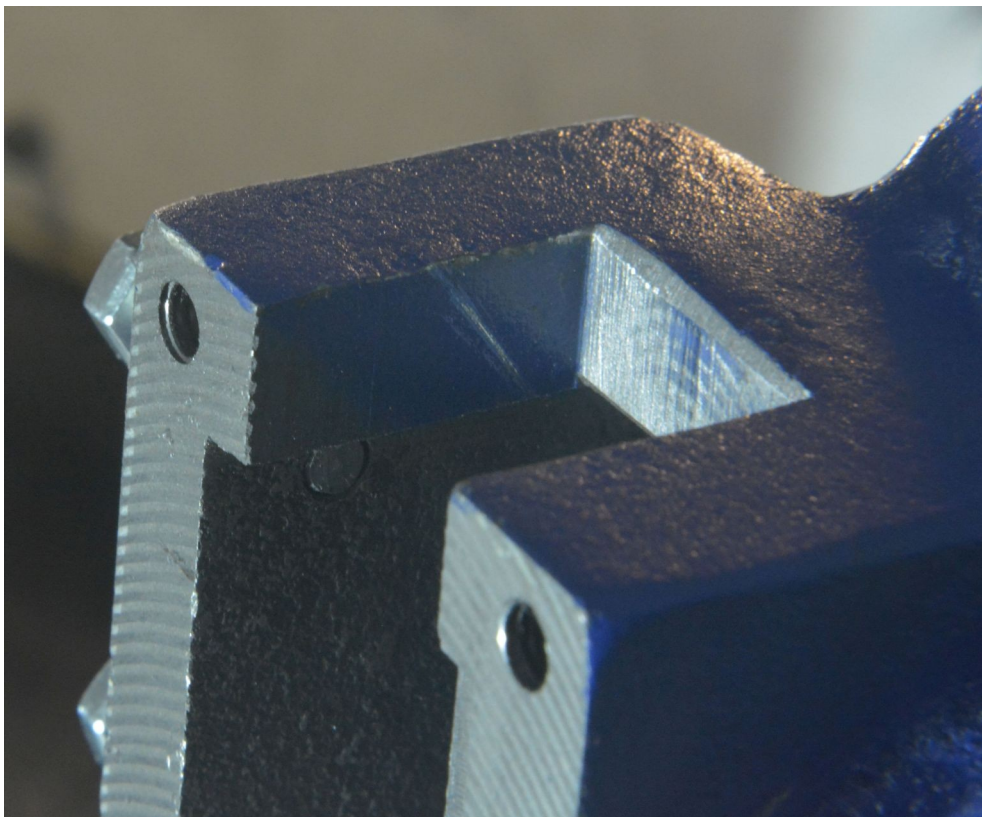
The front plate with gib ready for fitting. The side clearance is to fit inside the side gibs. The height of the plate is determined by the space in the main frame casting. The pocket on the stock front plate casting was larger than required.

When everything was bolted up and adjusted, the result was disappointing. The action was very rough and it was apparent that the teeth on the rack were fouling on the casting. This was not so noticeable if the front adjustment was a bit loose.

A close look revealed that the casting below and behind the ram exit had not been fettled very well and a point had been left. I ground that smoother and also filed lead-ins on all four edges which the rack teeth pass over as shown in the following photos. Now with the gibs greased and adjusted so that there was minimal play at the end of the extended ram the action was very smooth. A vast improvement over the "as supplied" performance.



View from underneath. Casting flash ground away.



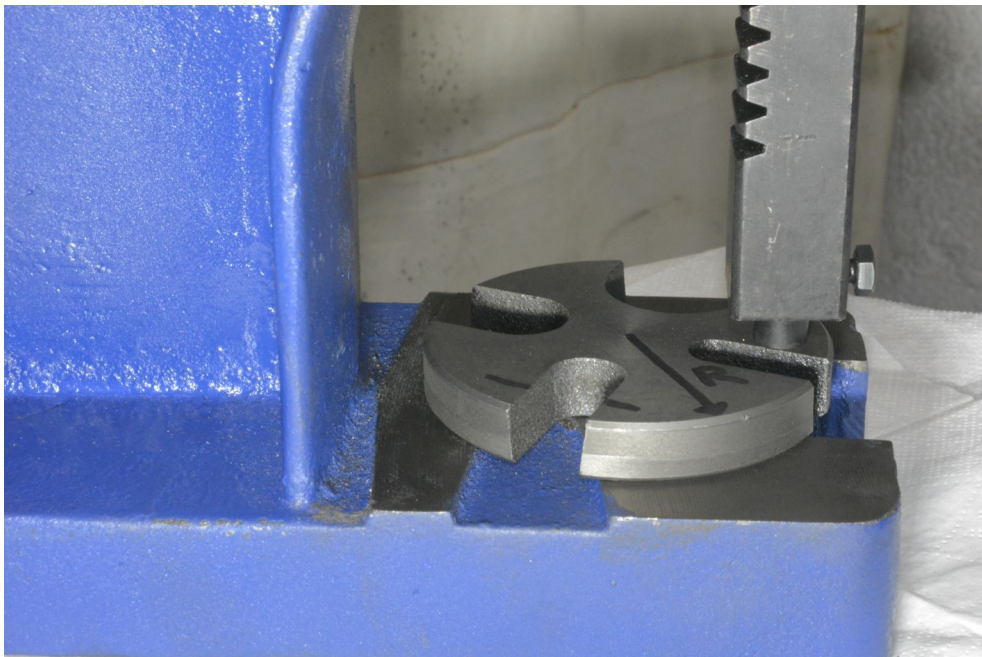
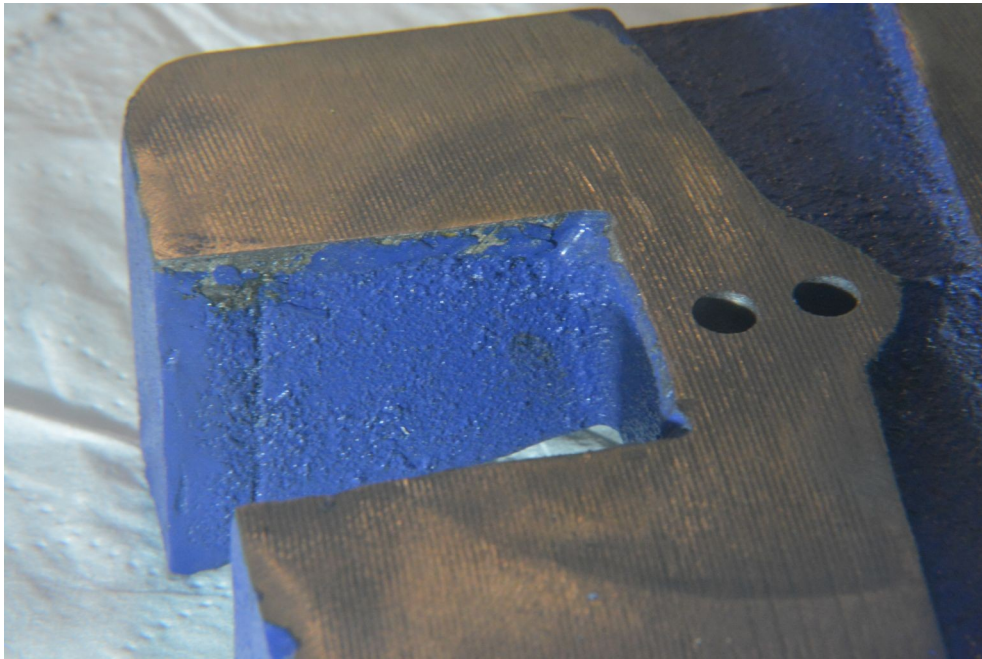
Sharp edge removed to form a lead-in for the rack.

Unfortunately that was not the end of the problems with this press, we have to move to the base and the workpiece support (press plate) for the next.



The top photo shows the underside of the supplied press plate. The roll pin is used as location on the base. The lower photo shows it mounted on the base and we can see that the centre of the ram is aligned with the edge of the plate. This does not give proper support for the workpiece. One obvious solution would be to make a plate with a larger diameter but the photo shows that there is little space behind the plate to do that.

Another solution is to move the whole plate forward, to do that I drilled a new hole to relocate the roll pin as shown next. The hole to the right (rear) is the original, the other hole is the new one towards the front.



Here we can see that with the plate in the new position the ram is well away from the edge giving support to the workpiece. There is now enough space behind the plate to allow a larger plate. I shall make a bigger plate but in steel not cast iron. Steel is more ductile than brittle cast iron and so it will bend rather than break if overloaded. The steel plate will also fix the remaining design fault with the stock plate.

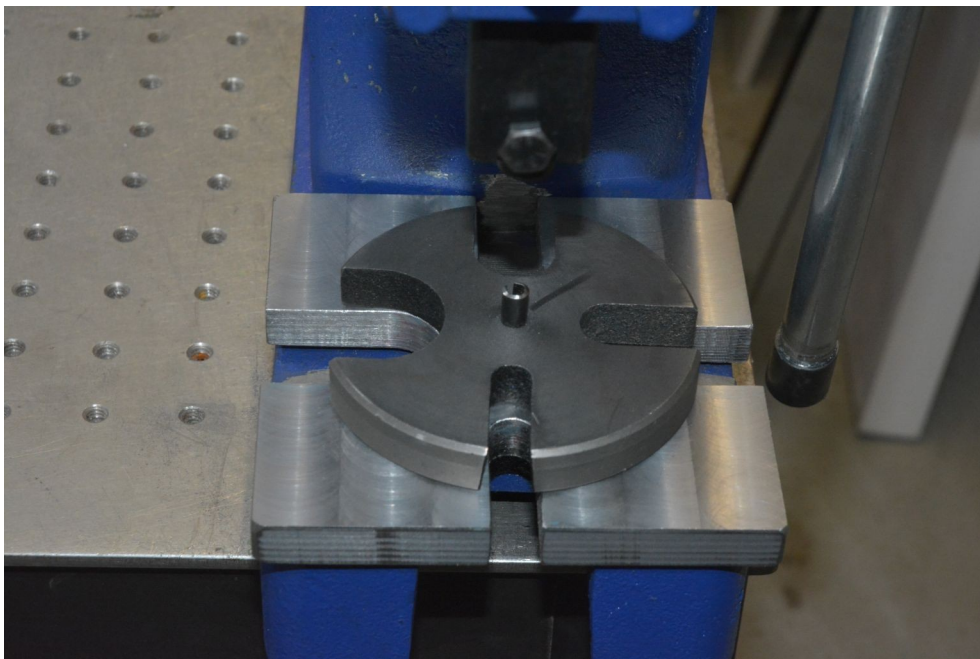
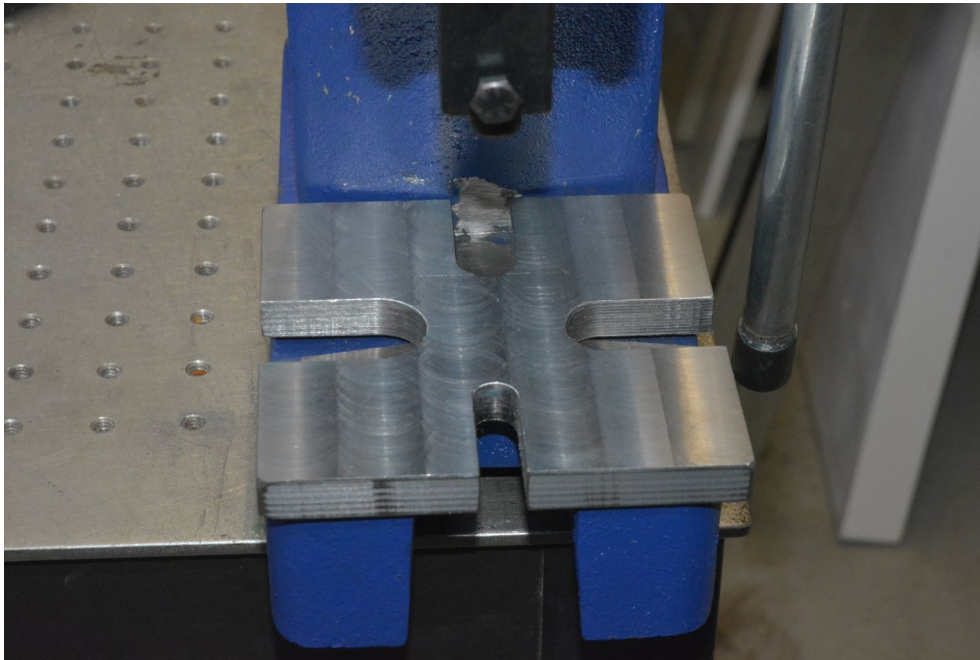
The slots in the plate are to allow for long workpieces to pass through, for example when pushing a shaft out of a bearing. Most such shafts will be round, square or hexagon, in any case they will be axi-symmetric and so there is no point in making the slot any longer than $\frac{1}{2}$ the width of the slot beyond the centre of the ram axis. For one of the slots that is indicated by the cross lines drawn on the stock plate in the next photo. Making the slots any longer only weakens the plate. Of course the wider slots will need more length.



Update.

I have made the steel press plate. It is larger as suggested above but I have made it square to give the maximum possible support to the workpiece. I ignored the width of the slots in the original plate and made them to suit what I expect to be most used. I wanted to clear shafts of 10 mm, 12 mm, 15 mm, 17 mm, 20 mm and 25 mm. So I cut slots of 11, 16, 21 and 26 mm each with the minimum necessary length to match the widths.

The following photos show the new plate, firstly just the plate and secondly the plate with the original for comparison.



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