

# THE PRACTICAL ENGINEER 4



**Photo 1. Turning the O.D. of the backplate true.**

I expect an article on fitting a chuck to a backplate has been done several times before but I must admit that I have never seen an article about this, certainly not in Model Engineers' Workshop anyway.

At one time, my only workshop tool was an old secondhand Myford. I did not even have a drilling machine. The lathe had to do everything. Although I purchased a brand new four jaw with a threaded body, I could only afford a three jaw chuck with a separate backplate that needed fitting.

So, I had to turn the back plate on the lathe and find a method of drilling it

## Fitting a chuck to a backplate

without the use of a pillar drill. As a lot of readers may be in the same position, I decided that when it came to fitting a new chuck to my new (second hand but unused) Myford, I would use the same method although I now have a mill and also a drilling machine.

This particular chuck was only a small one and I intend it to be used with soft jaws as I already have a larger three jaw chuck and also a self centering four jaw chuck.

First, clean the chuck backplate thread and the mandrel nose. Fit the backplate and turn the outside diameter to clean up, **photo 1**. This diameter needs to be true so that you can clock it up if you need to use the chuck on the mill. I used an oversize backplate and deliberately left it large as I intend to drill it with a 24 hole circle so I can do simple dividing in the lathe. This simple dividing accessory will be described in a later article (when I have made it).

Carefully rough out the outside diameter making sure you do not take it undersize.

If you do make a mistake, there is usually enough material on the face of the backplate to have another go or even two goes. (Now, how do I know that?) What you are aiming at is a good fit in the chuck with no movement at all. With a three jaw chuck, the outside register of the chuck should fit against the turned step and the centre part of the chuck should be clear of the backplate. I believe on a four jaw chuck, the reverse is true. The turned backplate is shown in **photo 2**; the tool is set to 45deg. to lightly chamfer the outside diameter of the backplate.

## Drilling the backplate

Put the chuck onto the backplate and clamp an angle plate square onto the cross slide using the chuck as a parallel spacer, **photo 3**. Clamp the chuck to the angle plate, **photo 4** ensuring that one of the three mounting holes is in line with a drill shank in the lathe headstock, **photo 5**. A drill chuck in the mandrel will be



**Photo 2. Chamfering the backplate after turning the chuck register.**



**Photo 3. Setting the angle plate parallel to the chuck face.**



**Photo 4. The chuck mounted on the angle plate.**



**Photo 5. Lining the hole up with a drill shank.**

accurate enough if you don't have another three jaw. Notice the parallel to support the chuck. Use a bit of studding and a couple of washers through the centre of the chuck but remember that the backplate has to fit onto the back of the chuck while drilling it, **photo 6**.

First, centre drill the hole position to approximately the diameter of the clearance drill size, **photo 7**. Note the clamp to hold the backplate onto the chuck. Next, change to a clearance drill that is a few thou larger than the thread size. When we break through the backplate, it is all too easy to go too far

into the chuck and drill out some of the thread so what I do is to get a piece of metal the same thickness as the backplate plus 1mm to use as a stop spacer. Traverse the carriage so the drill is in the centre drilled hole and lock the carriage. Put the spacer against the cross slide and bring the stop up to touch the spacer and lock the stop in position, **photo 8**. Now you can drill through the backplate with no risk of the drill going through too far, **photo 9**.

Unclamp the backplate, rotate it and put a bolt through the hole just drilled but at the next hole, 120deg. around the chuck. Refit the clamp and drill the next hole.

Repeat for the third hole and you can now bolt the chuck to the backplate although you should lightly countersink both sides of the holes first; a variable speed pistol drill fitted with a countersink will do the job in no time at all, **photo 10**.

The finished chuck and backplate can be seen in **photo 11**. You can clearly see the oversize flange that I have left to drill for the simple dividing attachment. You could of course turn the backplate down to the diameter of the chuck if you wish but even if you don't want to drill for the dividing holes, the extra flange will be very useful for clamping the chuck down on the mill. ■



**Photo 6.** The chuck is bolted to the angle plate by a bolt through the centre.



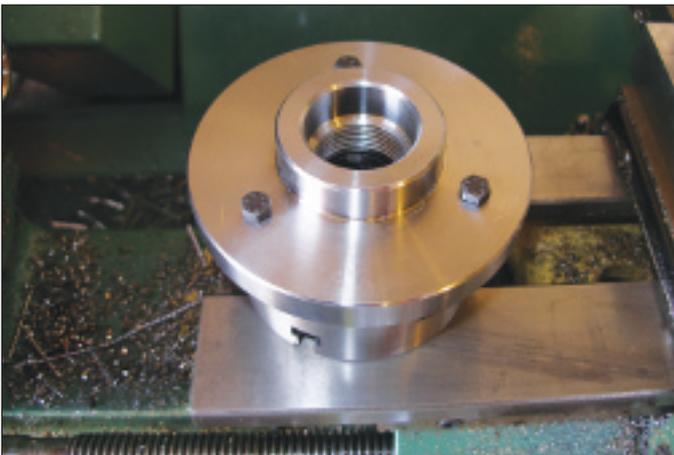
**Photo 7.** The backplate is clamped to the chuck.



**Photo 8.** Setting the stop so the drill can't go too deep.



**Photo 9.** The first hole drilled.



**Photo 10.** The backplate bolted to the chuck.



**Photo 11.** The assembled chuck on the lathe.