Fitting Lathe Chucks

By "Duplex"

To ensure that a chuck is accurately fitted, the chuc backplate should always b f in ally machined after it has been screwed into place on the lathe mandrel. Chucks supplied and delivered with the lathe by manufacturers of machine tools can be relied on for accurate fitting. However, the beginner may find that he needs an extra chuck for some of his lathe work.

Where an additional chuck is fitted to the lathe after delivery, then either a backplate casting can be bought and machined or, as the inexperienced worker may prefer, a backplate already machined to fit on to the mandrel nose can be obtained from the makers of the lathe, and it then remains to carry out the much easier job of turning the backplate to fit into the back of the chuck.

The machined backplate will be found to fit accurately on the plain, parallel portion of the mandrel nose, but before starting to machine the chuck seating, it is advisable to make sure that the backplate makes contact with the abutment face formed by the mandrel shoulder. Before making this check, however, the threaded bore of the backplate should be thoroughly cleaned with an old tooth brush dipped i paraffin, in order to remove any particles of swarf from the threads, as these would prevent the backplate screwing properly into place.

Next, the face of the abutment shoulder on the mandrel is evenly smeared with a light coating of marking paste, and the backplate is screwed right home by giving it a final jerk forward.

As shown in Fig. 1, the marking may possibly be transferred to, a portion only of the backplate abutment face. Should this happen, the high-spot must be attacked with a hand scraper, and testing and scraping are continued until it is found that the two surfaces make continuous contact. Where this precaution is neglected, there is always the possibility that the chuck will later run out of truth when wear has taken place at the contact surfaces. Remember, too, that the mandrel nose must always be kept clean and well oiled if wear is to be avoided, and chucks should always be stood with the jaws downwards ,s o as to keep particles of swarf from falling on to th backplate threads.

nMachining the Backplate

Reference to Fig. 2 will show that, when fitting a self-centring chuck, the backplate is machined so that the outer rim of its front face makes contact with the outer, bolting face on the chuck body, and the central portion forms a register to engage in the recess already turned in the chuck body. But this register must be kept well clear of the bottom of the chuck recess; otherwise, the bolting faces would not meet and the backplate might be distorted when the attachment-screws were fully tightened.

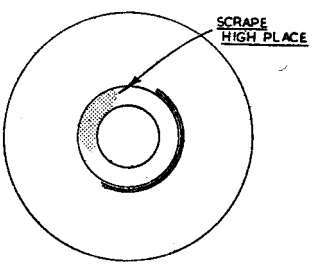

Fig. 1. *Correcting the abutment face of the backplate*

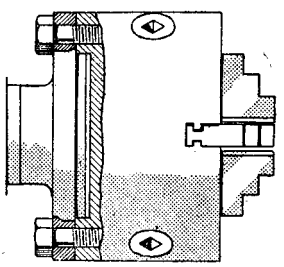

Fig. 2. Method **of** *mounting a self-centring chuck on a backplate*

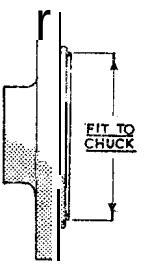

Fig. 3. Turning a trial register on the backplate

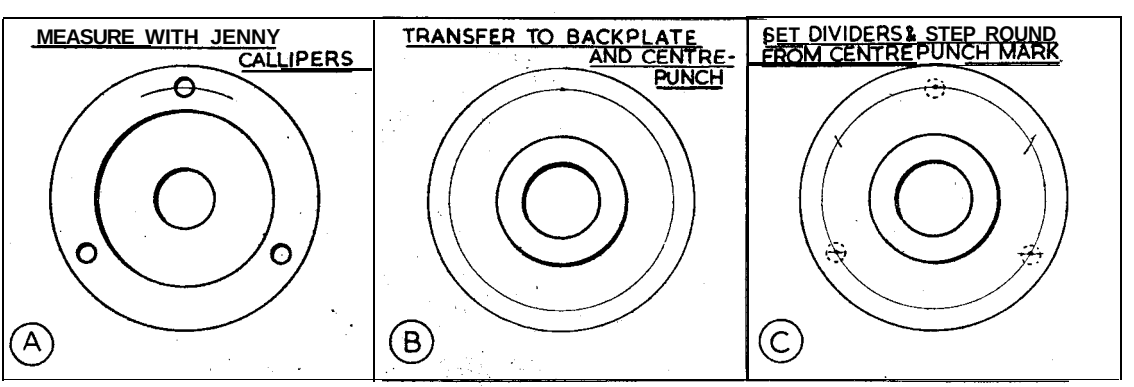

Fig. 4. *Marking-out the screw-hole centres on the backplate*

The first operation is to machine the backplate to the same outside diameter as the chuck bodv. Although an ample thickness of metal is usually provided in the machined backplate, there may not be enough to allow of a second attempt if an error is made when turning the register to size. It is, therefore, advisable for those who have any doubt in the matter to turn a narrow, trial register to fit the chuck, as is represented in Fig. 3

When the correct diameter has been found, the remaining portion of the register is turned to form a

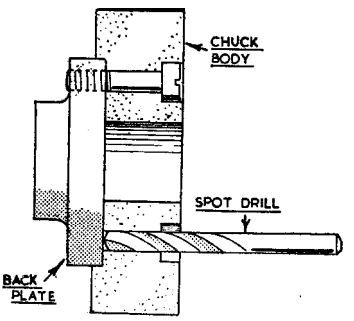

Fig. 5. Showing a four-jaw chuck mounting and the method of marking the screw-hole centres

close push-fit in the chuck body; any ill-fitting part of the register is machined away, and the finished register is made some 1/16 in. less in length than the depth of the chuck recess.

Fitting the Attachment-screws:

Self-centring chucks are usually designed so that the attachment-screws are inserted from the back, and the centres of the screw holes are, therefore, transferred from the chuck to the backplate; unless, of course, the chuck is dismantled to expose the threaded holes passing through the back portion of the body. Set the jenny calipers with one leg against the outside of the chuck body and the scriber point to the centre of one of the screw holes. Next, as represented in Fig. 4A, the calipers are worked round the periphery of the backplate to mark the pitch circle on which the screw centres lie. Make a centre punch mark on the pitch circle, Fig. 4B, and then. with the dividers set as nearly as'possible to the radius, by a process of trial and error step off three equidistant points on the circle, as in Fig. 4C.

An alternative and quicker method is- to scribe the pitch circle with a pointed'tool while the work is still mounted in the lathe; for this purpose, the point of the tool is set to a mark scribed with the jenny calipers at a measured distance from the periphery of the backplate. The hole centres can now be set out by making use of a change wheel, secured to the lathe mandrel, for dividing the pitch circle into three.

The screw holes are next drilled well oversize to ensure that the screws do not bind and so keep the backplate from seating evenly; l/64 in. oversize will usually be found sufficient, but if there has been an error of working, it may be necessary to draw over the holes with a round file. When mounting the finished backplate, make sure that it and the chuck are quite clean; then push the chuck into place on the register and tighten the screws a little at a time to draw the parts evenly together.

Mounting **Four-iaw Chucks**

As shown in-Fig. 5, small, independent four-jaw chucks are usually mounted on the type of backplate that bottoms against the floor of the recess formed in the chuck body, and the periphery of the backplate then serves as the register.

Moreover, when, as shown, the attachment-screws are inserted from the front face of the chuck, the centres for the screw holes can be spotted with a well-fitting drill after the chuck has been mounted in place. However? the attachment-screws are sometnnes put in from behind, and the corresponding pitch circle will then have to be transferred from the chuck body.

Instead of making a rather difficult direct measurement, a reliable way

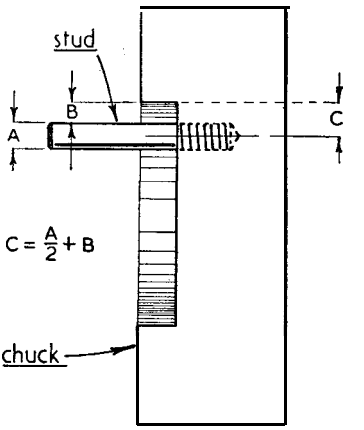

Fig. 6. Using a stud for measuring the screw-hole centres

of determining the distance between the hole centre and the periphery of the backplate recess is that shown in Fig. 6.

After a plain stud or a length of threaded rod has been screwed into one of the holes, the necessary measurements are easily made. The pitch circle and the screw-hole centres are then marked-out as in the previous example, and the drilled holes must, again, provide ample clearance for the attachment-screws.

When drilling a backplate from the front, it should be supported on two blocks of equal height, so that the boss is kept clear of the drilling table and there is no tendency for the work to tip when the drilling pressure is applied.

TWIN SISTERS

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That is the main outline, and as so defined, gives a picture and view of the future that is very far from the impossible. Already, many of these features are common-place amongst the true enthuiasts in the movement. What about the weeny injectors, ejectors, pressure gauges, sanding gear, brake gear and all the. delightfully made components that we see only too seldom? What about the rustless-steels, super free machining at that, the Do-it-at-home stoving enamels, the reasonably priced, but still accurate tools and machines now available to most workers ? The small locomotive builder of today is far, far better off for help, tools and materials, than his unfortunate predecessor who struggled away on his treadle lathe. He has longer hours of leisure, better lighting, better heating and premises, and everything except the will to go ahead in a big way.

You may not agree with the policy of " the search for perfection," or have time for it yourself; but how on earth can anyone condemn it as useless, and a waste of time ? A small locomotive ***can*** be built to do a perfect job of work, and go on doing it; so let us find a place for the engine that has all this, and the looks and realism to go with it.

(To be continued)