

# CENTRING and DRILLING methods

**I**N general work there are many ways of inducing the standard of accuracy required in operations of centring, drilling and boring which settle the positions and spacing of holes. For a simple job a centre punch and drill can suffice. For a special component or part of a jig, tool-maker's buttons may have to be used—unless one has access to equipment like a jig borer.

Between these two extremes, all sorts of dodges are possible to help in promoting the precision-dimensional, geometrical or both—which is so simple to specify but often not at all easily achieved.

To drill centrally through a round rod, a bush can be machined in the lathe to the diameter of the rod and centred and drilled at the same setting. For use, it is clamped on top of the rod in the machine vice, the jaws of which align them both. Larger work which is relatively short, like a disc or collar, can be set up on an angle plate on the faceplate, **A**.

The angle plate is mounted the required distance from centre, and the job clamped centrally to it. The central setting is obtained by using a surface gauge or indicator with attachment to equalise the diameter about the lathe axis. Alternatively, the setting can be done to scribed lines. With the angle plate located vertically from the lathe bed with a square, and using a surface gauge or pointed tool at centre height, a centre line is marked on the angle plate. The job is marked with a longitudinal line each side, in V-blocks, and these lines are set to the centre line on the angle plate.

This can be done on a rough-turned trunk piston when the longitudinal lines have been located to the gudgeon pin bosses. Careful centring is followed by drilling, in stages if necessary; and this in turn is followed by boring with a tool or by reaming.

For centrally drilling small pins, a jig is advisable; and the type at **B** is easily made, even in very small sizes. Two pieces of rectangular mild steel bar are draw-filed, clamped, drilled, and dowelled with rod. Cross-

wise on the face of each, where the pin is to be, a line is scribed and then deepened to a shallow V with a three-cornered file. With the pieces clamped, the Vs come together to guide the drill to make the hole for the pin, which is gripped when the faces of the pieces are again draw-filed.

Similar Vs guide the drill for the drill hole. This is drilled with the jig in the chuck, at which setting a round nose can be turned to facilitate re-chucking. The jig can be used in the chuck or vice-bench or machine type—with washers or a collar setting the pin.

When it is important for square or rectangular material to be drilled centrally, the job can be done as at **C** by machining a collar from round bar. Without unchucking the bar, it is centred and drilled, and the outside diameter of the collar is turned to the width of the bar to be centred. Two clamps hold the collar in place on the work—though one with a forked end

provides a secure hold and lets the drill through.

To guide a drill for a pilot hole, which is often all that is required for accuracy, a clamp can be as at **D**, made from mild steel bar and a pair of setscrews. The pieces can be draw-filed true, and their width checked with a micrometer. A clearance hole **W** can be drilled, and a collar **C** made for gripping in the clamp to drill the hole for the drill through the clearance hole. Scribed lines on the work locate the clamp.

Collars of definite size locate holes from the edges of work, or along a clamped straightedge. For example, a collar 1 in. dia. locates centres 1/2 in from an edge. Such a collar can be used as a gauge when bar is being faced to length, as at **E**, with the final cut on the line **X-XI**.

Parallelism over the edges of work is ensured by facing on the angle plate, **F**, setting either to the faceplate or to packing or gauges, as **Y-Z**. □

