CENTRING operations

By GEOMETER

HAND tools offer several ways of marking centres on rods and bars for holes or centres to be drilled.

On round rods, one way is to use a bell centre punch, as at A1. A conical recess locates this device on the end of any round rod within its capacity. The centre punch is then given a tap with a hammer. For accurate location, the rod must be reasonably square at the end and its edge free from burrs.

In the days when small lathes were often not the well-equipped machines that they are now, the bell centre punch was a common workshop tool. At present it can be used for centring (ready for hand-drilling) rods which can be set up between centres on the lathe but are too long to centre drill from the tailstock.

Another simple self-centring device, employing a centre punch or round scriber, enables a centre line to be marked on flat parallel material, as at A2. It consists of a bar containing two locating pins, Y-Z, with a centre punch centrally between them. The device is twisted on parallel material for the two pins to locate, one at each edge.; with the punch pressed down, it is drawn along to mark a central line. Alternatively, a light centre can be made near each end of the material, and the two can be joined with the use of a straightedge and scriber.

Either device can be made of mild steel with the centre punch of standard silver steel rod, say 1/4 in. dia., hardened and tempered. Material for the bell centre punch can be chucked, faced, centred and drilled undersize. With the top slide at an angle of 45 deg., the conical recess can be bored, and then the hole for the punch can be completed by boring or reaming.

The three holes in the other device must be accurately spaced, though the actual dimension is not important. The work is best done with a jig, which need be only a piece of steel containing two holes at half the overall spacing. With the hole for the centre punch drilled first in the job, the jig is located by a plug, and turned and clamped, one way then the other, on a straight line, to drill holes for pins Y-Z.

For both devices, the point of the centre punch must be exactly central, a condition that is ensured by grinding, as at **B** or C. In each case, the punch is pushed through a reamed hole in a guide bar, and rotated against the side of a grinding wheel-although grinding on the periphery produces the same result. A collar is attached to the punch which can be slotted at the end to rotate by a screwdriver. The angle of the point can be 60 deg.

At **B,** which shows the set-up on a lathe, movement of the slide controls the cut. At C, with the set-up on a grinder, the cut is controlled by an adjusting screw in the collar. The screw bears on a sleeve rotating with the collar, and when it is turned out the collar enters deeper in the sleeve and the punch projects further from the guide bar.

Other ways of marking centres of round rods are shown at **D1** and 2 With the centre head of a combination square, lines can be scribed which cross at the centre of the rod, where the centre punch is then used. Alternatively, with the rod in a V-block on a surface plate, the centre can be found or boxed in by scribing lines with a surface gauge.

For this work, and for other jobs on the surface plate which require a rigidly-mounted scriber, the tool depicted at **E** is easily made. All parts can be mild steel except the scriber, which should be silver steel, hardened and tempered. The base is drilled and tapped for studs (1/4 in. BSF), and the bar for the scriber is drilled clearance to slide over them. A tapped hole in the bar takes a setscrew to grip the scriber, and three knurled nuts admit of vertical adjustment. This can be to steel rule, end gauges, or slip gauges. Alternatrve mountings for the scriber, for work near the surface plate, can be as at F.