COLLET CHUCK FITTINGS

By GEOMETER

THE main advantages of collet chucks, over other types, are the firmness and the accuracy with which small diameters are held. It is why the normal equipment of instrument lathes and precision lathes includes sets of collet chucks covering ranges of standard sizes. Work and tools rods, drills, spindles and cutters can all be set up without difficulty.

Production lathes which are used for repetition machining of small components from barstock, are also fitted with collet chucks; and many toolroom lathes have them as standard or as additional equipment.

When lathes are not fitted with collet chucks, other means of holding work and tools must often be contrived-like split bushes, or halved blocks which can be gripped in jaw chucks; or split mandrels with taper threads at the nose ends which can be closed by ring nuts. All these are satisfactory for one-off jobs or for short runs of several components. Within their limits, they equal collet chucks and show the advantages these have over other types.

Often from such an example comes the determination to fit the lathe with a proper set of collet chucks-when time permits. For the project is seen as one involving a considerable amount of precision work. This is true if one goes about the job in the usual way: but by following the method described here, the result is the same for practical purposes, with much less time and effort expended.

The idea is to use a holder for collets in a small., four-jaw independent chuck, in which it can be quickly set to run truly. The holder can be in mild steel, left normal, or case-hardened. Alternatively, cast steel can be used, unhardened-or hardened, then tempered to dark-straw colour. In each case, treatment is to choice.

If the lathe has a hollow spindle, the holder can be as at *A*, with a parallel diameter to grip in the chuck, a shoulder to abut to the jaws, and a reduced nose end which can be set true by indicator. In machining, important work should be left until the chucking diameter is finished and the material has been rechucked nose' end outwards. This end is reduced, faced and centred. Then a drill is run through the material, followed by a boring tool-and a reamer if to hand. After this, the bore is opened for a short distance, then the end is tapered with the topslide at 15 deg. If the holder is hardened, grinding and lapping operations follow.

At their front ends collets are tapered to suit the holder; and their rear ends are threaded so that each will take a sleeve into which is screwed the drawbolt passing through the lathe spindle. Pulling on the drawbolt by a nut or a handwheel draws the collet into the holder.

Collets can be in good mild steel, and much work can be avoided by using bolts, left normal, or case-hardened. Using a bolt, it is set true at the neck in the independent chuck, as at *B*. With the topslide at 15 deg., the head is machined to angle V. If the collet is to be hollow, the bolt is reversed in the chuck and centred and drilled from the back. Otherwise, it goes straight into the holder to finish the front end for the job. Centred from the tailstock, it is drilled, then reamed or bored, according to circumstances. Then it is cross-drilled and slit. If rod is used, the collet can be turned and threaded on a set-up as at C.

If the lathe has a solid spindle, a holder for collets must be as at *D*, threaded for a nut, through which the nose of the collets can extend. Screws WX and a plate should be fitted, as collets sometimes stick. Then they can be easily loosened.

Outside machining or grinding operations can be done at any time to a holder on a mandrel as at E; and collets can be slit in a pair of blocks as at *F*. For boring, the blocks are held in the independent chuck; to form a slot, their faces are filed. In use, the blocks are gripped in the vice at positions YZ. El