

COLLET CHUCK FITTINGS

By GEOMETER

AMONG equipment appreciated by owners of expensive precision and toolroom lathes are sets of collet chucks, supplied either as original equipment or as optional extras. The facilities provided by such equipment are not exclusive to these machines. They can be enjoyed by most users of lathes—even the inexpensive models—given that the spindles are hollow type.

For any lathe with this type of spindle, the necessary fittings suitably proportioned, are easily made. They consist of a backplate to screw on the spindle nose, a nose-piece (or nose-pieces) to attach to the backplate, the collets themselves, and draw tubes or rods to operate the collets from the rear of the spindle. If the lathe is a screwcutting type, all the work can be done on it, including turning and

threading the backplate. Otherwise, a backplate must be obtained ready bored and screwcut, or adapted from a standard pattern supplied by the lathe makers.

The general layout for a collet chuck fitting for an ordinary lathe is as at **A**. The backplate can be in cast iron or steel (from bar), machined inside like other backplates to screw on the spindle nose, with radial holes to take a tommy-bar for tightening and loosening, and with the front face machined with a locating step, and drilled and tapped for screws to hold the nose-piece. This part too, can be in cast iron or steel, machined with a recess to match the step, provided with plain holes matching the threaded ones in the backplate, and bored and tapered for the collets.

A draw tube for operating collets can be as at **B**. It is a limiting factor, of course, for it must pass through the bore of the spindle and screw on the

external thread on the collets. Small diameter rods then pass right through. But if the rods to be chucked are of moderate length, a threaded sleeve can be used on the collets to connect to a solid rod through the spindle, with a handwheel (or nut) on the back. For a draw tube, as shown, the front end is threaded for the collets and a collar is brazed on the back, so that a handwheel of convenient size can be fitted by screws.

In small sizes there are three possible types of collets: the type for rods, as at **A**, and the internal and external stepped types, as at **C** and **D**—the stepped types, of course, only being used for short-length jobs. The internal stepped type which contracts to grip, can be used in the same nose-piece as the ordinary collets; but the expanding collet requires a nose-piece which is tapered on the outside, so that being drawn back, it expands. Either stepped type collet can be operated by a draw rod screwing into its rear end.

To prepare for mounting on the backplate, a nose-piece can be machined in the self-centring or four-jaw chuck, at two settings as at **E** and **F**. First the solid material is held well in the chuck for facing and centring, then drawn out and supported by the tailstock centre for turning down to a flange. Following this, the material is reversed in the chuck for the rear end to be faced and the recess machined to match the step on the backplate. Hole centres can be marked on the flange, drilled tapping size for the screws; then the flange can be used as a template on the backplate before its holes are enlarged to clearing size.

Mounted on the backplate on the lathe, the nose-piece can be drilled and bored for the rear ends of collets to enter as a good sliding fit. Then the front end is machined taper in agreement with the angle on the collets, which may be between 22 and 30 deg., an angle that can be the same for expanding collets. In this case, for a nose-piece which may be rather thin, mild steel is a better material than cast iron.

Unless collets are bought, silver steel, cast steel or mild steel can be used according to choice, the final boring being done with the collets in the nose-piece, before slitting twice at right angles.

