

Machining small collets

EXCEPT for slitting to permit contraction, the collet or jaw portion of a collet chuck requires only straightforward machining operations which can be performed on any lathe. The various external features can be turned holding the material in a three-jaw or four-jaw chuck, and the inside drilled and bored up from the back, and a thread provided for draw tube or rod.

At this stage, the collet is solid at the front end where, after boring, it will grip the work. The boring or drilling and reaming, or careful drilling alone in very small sizes—is done with the collet mounted in the nose-piece in which it will be used, held securely back by the draw tube or rod.

Slitting

There remains the slitting which can be done either on a lathe set-up using a cutter or metal saw, or by hand with the collet in a jig using a fine hand-saw. If the slitting is done on the lathe, it is convenient to leave an extension at the front end of the collet, for locating on a mounting

and holding the free ends of the jaws until slitting is completed.

Silver steel, cast steel, or good mild steel rod can be used for collets according to choice. The initial set-up of a piece is as at *A*, well back in a three-jaw or four-jaw chuck, and spinning truly. First it is faced, then centred and drilled up to where the jaws will finish. A large collet may be bored inside beyond the thread to provide springiness for the jaws. A small one is merely drilled. If a draw rod is used, the drill size will be the core diameter of the thread. Otherwise, it is simply a clearing hole, and the thread is provided on the outside for a draw tube.

Forming the threads

The usual methods of tapping, cutting with a die, or screwcutting, can be employed for threads. When a die is used, the full diameter of the material can be reduced as shown, if necessary, to clear the front of the die holder.

Before the material is loosened in the chuck and drawn out for the second set-up, as at *B*, the end of the bore should be coned at 60 deg., either with a centre drill or a boring

tool, depending on the size of the collet. Then the tailstock centre is used for support, while the collet is turned on the outside, setting the topslide round for the cone angle, which should be the same as that in the nose-piece.

For the third set-up to finish the bore of the collet, the nose-piece and backplate of the chuck are mounted on the lathe. Then the collet is faced, centred, and the bore finished. If slitting is to be by hand in a jig, the end of the collet can be finished to a large radius by free-hand turning and filing. But if slitting is to be in the lathe, the end should be bored out, as at *C*, in preparation for supporting on a plug in a fixture, as at *D*. The bore and the plug can be plain—a good push-fit together, though an alternative is a thread, which can be screwcut on each.

By GEOMETER

The fixture, which is mounted on the vertical slide, consists of a base-plate with two angle pieces, held by countersunk screws and nuts, and drilled at the same height for mounting the collet between them. Indexing to three or four positions can be to marks on the edge of the plug, matching to a mark on its angle piece. At the other angle piece, the collet is held by a nut, or a stud and nut in the case of an internal thread. In many instances, of course, these angle pieces can go directly on the vertical slide. Holes are drilled in the collet in which the slits will finish.

Using a jig

A jig for slitting collets by hand is as at *E*. Two pieces of flat steel are used, dowelled together near one end, and separated by packing which is slightly thicker than the saw. Then they are bored out for the collet. For sawing, the packing is cut down, and the jig with collet gripped in the vice.

For a collet with a tiny bore, slitting on a lathe operation can be as at *F* (left) with the final cutting by hand-saw (right) for gripping faces to be left on the jaws.

