Collet and cotter fittings

By GEOMETER

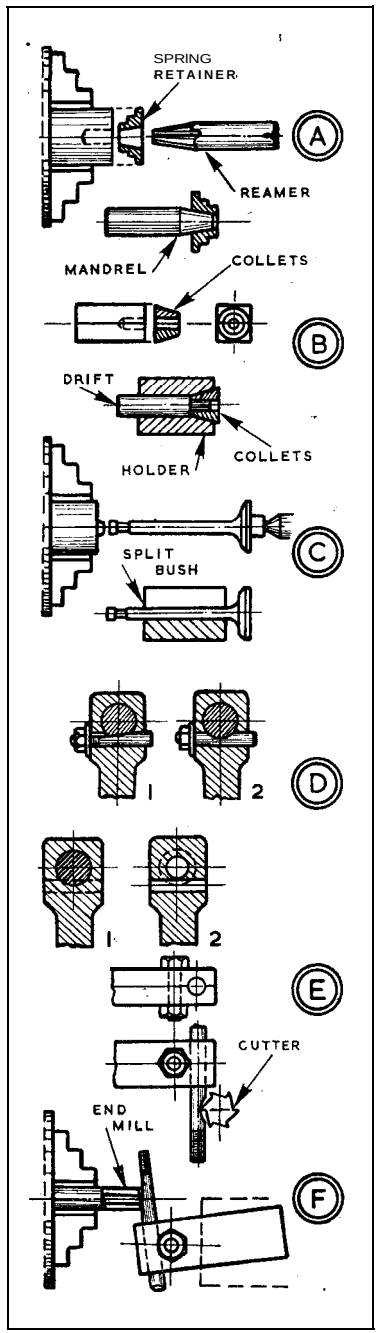
ALTHOUGH collets and cotters are only detail items, there are often no satisfactory substitutes for them in assemblies in which they are used.

In particular, collets provide perhaps the best possible means for attaching spring retainers to valve stems, which in the course of turning can each be machined with a suitable groove. Substitute fittings would be a cross pin in a drilled hole, and a flat key in a slot in the valve stem-the one lacking in strength, the other offering constructional difficulties in small dimensions.

Substitutes for cotters (which can be used for securing levers to shafts, tools in holders, anvils in gauges) are grubscrews and setscrews, taper pins, rivets, etc., each of which in certain circumstances could be deemed to have drawbacks.

Machining of spring retainers and split taper collets can be done as at A and B, using a taper reamer and a mandrel for the spring retainers, and-if required-a holder for the collets so that each pair can be faced off squarely to functional length. The reamer is made from silver steel and used to taper out the drilled holes in the spring retainers, instead of attempting to bore them with a tool. Even in quite small sizes, reamers can be given cutting teeth by careful sawing and filing, though five equal flats, as on a broach, will serve as well, except that the corners produced will cut less fast than orthodox teeth.

Taper turning of the reamer blank and the mandrel (in mild steel) can be performed with the same turning tool at the same top slide setting, so that both are alike. Afterwards, at any time, the mandrel held in the chuck serves for picking up the taper again with a tool on the top slide, which is useful when the split collets come to be turned., if the top slide setting has meanwhlle been disturbed.



Any rectification needed to a spring retainer after it has been parted off can be done with it on the mandrel. Collets can be made from two pieces of flat bar in the independent chuck, centred, drilled, turned and parted off carefully. With a holder, tapered by the reamer, they can be tapped in for facing-tapped out with a drift. Valves can each be machined, as at C, with support from the tailstock, and finished gripped in a split bush.

Two types of cotters which can be used for securing spindles are as at Dl and (2). The flat-sided type engages a flat on the shaft and thus provides location, while the grooved type grips on the diameter and so admits of sliding or turning adjustments. If instead of the diameter being plain, it is threaded, the gripping surface of the cotter can be threaded too, which admits of adjustment and firm locking afterwards, without the threads being damaged. This cotter must be fitted before the shaft or inside part, and can only be removed after it.

Keeping in line

As the hole for the inside part is crossed at a tangent by that for the cotter, production methods must obviate the tendency for the second one, whichever it is, to run out of line. As at ***El,*** the main hole can be plugged with similar material for drilling the cotter hole; or the-cotter hole can be plugged and the main one drilled and reamed. Alternatively, as at E2, the cotter hole can be drilled, then the other undersize-not to run -and opened out by careful boring in the chuck.

If the main hole is threaded by tapping, and a grooved cotter used, this can be carefully drawn by its nut to the tap, as the latter is turned -forming vee grooves to fit the thread.

The ordinary groove in a grooved-type cotter can be made by filing with a round file, or more accurately on the lathe, usmg a reamer in the chuck. The rod, already threaded, can be set up in various ways, such as clamped to a piece of angle iron on the top slide, or mounted in a split clamp on the vertical slide. Such a clamp, mounted on the top slide, may he employed, too, for milling a flat-sided cotter, as at ***F.*** ❑