WORKSHOP HINTS and TIPS

Setting-up HOLLOW COMPONENTS

By GEOMETER

THE great variety of hollow parts which are encountered in general work calls for almost equally varied means-in detail at least-m order to set them up. Ordinary chucks serve for the simpler and more straightforward jobs when components can be gripped by their jaws on an internal or external surface.

There are definite limits to this means of setting-up. With facing operations alone, it may be necessary to true anything from a tiny nut to a piece of solid-drawn tube for a boiler barrel. At times the length as well as the ease of deformation of tubular parts can create problems in setting up; and there are many occasions when parts have to be set up for second operations in ways which ensure concentricity between their inside and outside diameters.

For parts with finished bores, the best means of setting up is a mandrel -to be certain of concentricity of diameters and squareness of ends. It can be turned in mild steel-though brass or duralumin may often be equally suitable-to run in the chuck, with or without support from the tailstock centre, or to mount between centres and drive by a carrier. Machined slightly oversize with a smooth surface, it can be finished with a small taper from the entering end, using a Swiss file and emery cloth.

Generally, it is advisable to smear the surface of a plain mandrel with thin oil before the part is twisted on firmly by hand. Then, if slipping occurs, the bore is not scored. Oil helps, too, when the part is being removed.

In machining, a series of light regulated cuts is recommended, particularly for facing the end of a part, like the cylinder, ***A,*** where the diameter may be large and the cut at imes intermittent.

For tapped or internally screwcut components, a threaded mandrel, ***B,*** can be made at a single setting in the chuck, undercutting it at the shoulder to clear the thread, and producing this by die from the tailstock or by screwcutting. A centre punch dot to No 1 jaw ensures accurate resetting in the same chuck, and a short plain diameter near the thread admits of truing to indicator in an independent chuck. All sorts of turning, facing and threading operations can be done on components on such a mandrel, without doubt about their accuracy.

Parts that are too narrow to align by pushing on a plain mandrel can sometimes be gripped between a shoulder and a washer by a nut at the end of a mandrel. With small piston rings this is essential, for the practice in home production is to slit each ring and compress it, as shown, on a mandrel, ***B,*** for turning the outside diameter. Then it has inherent springiness at its finished size; and if required, it can be machined with its inside and outside diameters eccentric to help in equalising thrust all round against the cylinder wall.

By comparison with plain mandrels, expanding types have the advantage of accommodating dimensional differences in the bores of components. A simple expanding mandrel, C, is made by first shouldering a piece of mild steel; then, gripped firmly in the chuck, it is centred, drilled, tapered, turned to size and undercut, and slit lengthwise by hacksaw. A cone on a drawbolt through the spindle expands it. On such a mandrel, a long tube can be faced, its free end supported by the fixed steady.

Components that can be set up by the steps of chuck jaws-but at the risk of wobble or jumping out can be given support in various ways. One way, ***D,*** is to use a centred plate kept up by the tailstock centre. For a mounting by the chuck itself, ***E,*** when a normal drawbolt cannot be used, a plate Y can be screwed to the chuck backplate, or one Z can be placed to pull against the chuck jaws when a bolt is put through the component.

For setting up a large tube, a turned block can be used in the chuck and a centred plug at the tailstock. Alternatively, the block can be turned after screwing to a board and bolting this to the faceplate, F.