WORKSHOP HINTS AND TIPS

MACHINING SMALL CYLINDERS

By Geometer

UNLESS special setting-up provision has been made, machining a cylinder for a small internal combustion engine can present something of a problem, at least on the first occasion,. or until experience has been gained. The difficulties encountered-more so when a thin sleeve has to be machined-are due to the relatively thin wall thickness of the part, and the need for a firm hold during the operation, with no distortion at the finish.

Even a heavy chucking grip over the base flange of a cylinder will not necessarily be a complete safeguard against movement during the boring, and may well cause distortion for the bore to be out-of-round when the cylinder is unchucked. A heavy grip for initial rough boring, followed by an easing of chuck jaw pressure-to minimise distortion for finishing-may on occasion prove successful, with some risk of movement when the pressure is eased.

Holding on the outside of cooling fins, whose diameter despite the thinness furnishes additional resistance against circular distortion, is another possibility at times, providing the fins are 'sufficiently thick and true at their outer edges, and providing also a grip can be obtained over several-which necessarily requires deep chuck jaws.

Another way-which, however, demands some extra machining-is to make provision on the pattern for a base flange larger and longer than functionally necessary, to serve for chucking, then to machine this surplus away after boring the cylinder-mounting it on a mandrel for the purpose. But when no such provision has been made, or when the component is a cylinder sleeve, other methods must be adopted.

For a cylinder with base flange and fins, or for a plain thin sleeve, the first set-up can be as at ***A,*** on a centred and threaded mandrel. This passes right through the bore cored in the cylinder or sleeve, and subject to clearance therein should be as substantial as possible for a powerful hold to be obtained through the nuts on the washers Y and Z.

Roughnesses at the ends where the washers abut should be smoothed off first by filing; and the total length of the mandrel should be such that a carrier can be applied one end to take the drive between centres. At this set-up, with discreet machining, the flange and spigot end of a cylinder can be trued; or a thin sleeve may be turned over its whole length.

In the case of a cylinder, the subsequent set-up for boring can be as at ***B.*** A locating ring is made from any suitably-sized piece of steel, brass or aluminium alloy, which is parallel, or can be faced parallel, and then bored to fit on the spigot, reasonably but not exceptionally tightly. This provides a backing for the cylinder on the faceplate, where it can be held by the- flange with clamps-four preferably for a square flange, locating one at each comer.

Following boring-as accurately and smoothly as possible-the cylinder can be mounted by the bore for finishing the ends-the face of the flange, the spigot to length and diameter. The end of the bore can also be chamfered at this set-up to give a lead-in for rings.

The mandrel can be a piece of material held in the chuck, centred, then turned and smoothed-with a fine file--for the cylinder to be an easy push fit most of the way, tight at the finish. Alternatively, expanson can be provided as at C, drilling a hole from the end, tapping for a coned screw, and slitting lengthwise; or the mandrel can be threaded, tapered, and a nut and split sleeve employed.

In the case of a thin sleeve or cylinder liner, a boring set-up can be made as at ***D,*** after machining the outside. Two sufficiently-long blocks are bolted to the angle plate on the faceplate, the lower one separately so as not to move after boring, when the upper is loosened to insert the liner. ❑