

## HAND FITTING METHODS

### Reducing thicknesses and widths of distance washers and piston rings

**I**N HAND FITTING there is, on occasion, the problem of reducing the thickness or width of such parts as distance washers, collars, piston rings, etc.

A lathe and time being available, the solution is, of course, simple in the case of steel or brass washers, for they can be tinned and soldered on to the faced end of a piece of bar to hold in the three-jaw chuck, or even on to a piece of flat plate which can be mounted in the independent chuck to spin facially true. Machining will then reduce the thickness, picking up the depth of cut from the top-slide feed screw.

When such a part has to be thinned by filing, however, other methods are possible. If a piece of bar or plate is used as a holder, this can be tinned in the centre and, while it is still warm, the washer can be laid in place and some solder run in to adhere to the bar and form a spigot for holding the washer-which will lift off, but which will lie flat for filing with the bar held in the vice.

By GEOMETER

Another method, A, is to force the washer into the end-grain of a block of wood, where, with care, it will adhere during filing. The washer can be "tapped in" as is sometimes suggested-but at the risk of bending or defacing it. A better way, avoiding damage, is as at B, placing a piece of flat steel plate against the washer and squeezing the assembly in the vice, when a fairly deep indentation can be made. Alternatively, small nails or screws can be located inside or round the washer to hold it.

Should there be available a piece of rod the size of the washer, and a length of tube to slide over it, a quick set-up can be effected, C.

Way with piston rings

The normal piston ring (which is of cast iron) must be checked for gap in the cylinder, filed if necessary and on rare occasions, may require thinning to fit in the groove in the piston. To check gap clearance, the ring is entered well down in the cylinder and the piston pushed down after it, D, to ensure alignment for testing with a feeler gauge. Clearance being insufficient, the ring is gripped carefully in a smooth-jawed vice and one side of the joint filed, maintaining the correct angle to match the other side.

Should the ring require thinning, a sheet of fine abrasive cloth is laid on the surface plate and the ring rubbed on it. This can be done with the fingers-though it is better to employ a holder, maintaining even pressure on the ring.

Making a holder

A suitable design of holder, E, consists of a piece of flat steel plate with small cheese-head screws located in pairs to secure the ring. If necessary, the plate can be faced on the abrasive cloth on the surface plate, then the ring laid on the plate, compressed and scribed round. Positions can then be centre-punched for holes to be drilled, bringing the edges of the screw heads just clear of the scribed lines.

Lacking a smooth-jawed machine vice to hold piston rings and other

delicate parts (for new jaws of ordinary vices are sharp, and old ones not accurate), smooth pads can be made from rectangular mild steel bar, F, filed and rubbed flat. Holes drilled from the back and small ones from the top, enable wires to be hooked in and soldered for the pads to be clipped on.

Standard soft-fibre jaws can be used for most work, or pieces of cardboard or thick paper; but they are inadvisable for piston rings owing to the danger of breakage.

Important points in the hand fitting of bearings appear at G and H. Where a thick shim is fitted each side, this can be thinned by filing to reduce reasonable play, the shim being rubbed on the file, or held by tacks or screws or impressed in a wood block, A, for filing.

Where a bearing has been made too tight for the shaft, the method is to scrape each half at X and Y to eliminate nip, then fit the required number of foil shims, Z, to provide diametral clearance.

