

By GEOMETER

## Fitting piston rings

**O**BTAINING accurate gaps with square edges on piston rings, and refitting pistons to cylinders straightforwardly and without damage to rings, are two problems likely to be encountered in engine overhauls. The problem of removing rings from pistons and refitting-which should always be done from above, not down the skirt-except in the case of rings in the skirt is, of course, solved by using three strips of thin metal to bridge the grooves in pistons.

Before being filed for fitting, rings should be tried in their cylinders, well down towards the centre, and if necessary squared by pushing the pistons behind them. It will be seen if there is clearance at the gaps-and, if so, a check can be made with feeler gauges. Otherwise, a preliminary estimate must be made of the amount to be filed.

there is a risk of breaking thin rings; failing a good vice. two pieces of flat steel plate can be used as clamps. The file must be a fine cut pattern, in good condition, for minimum pressure to be applied in working.

The advantage of a jig over free-hand working lies in the facility with which accuracy can be preserved at the edges forming the gaps of rings.

Having been filed, rings are tried again in their cylinders, the gaps checked, and these, if insufficient, increased by further filing-a process taking considerable time in the case of a multi-cylinder engine, since whether working free-hand, or using an orthodox jig, it is not known how much has been removed from rings at their gaps.

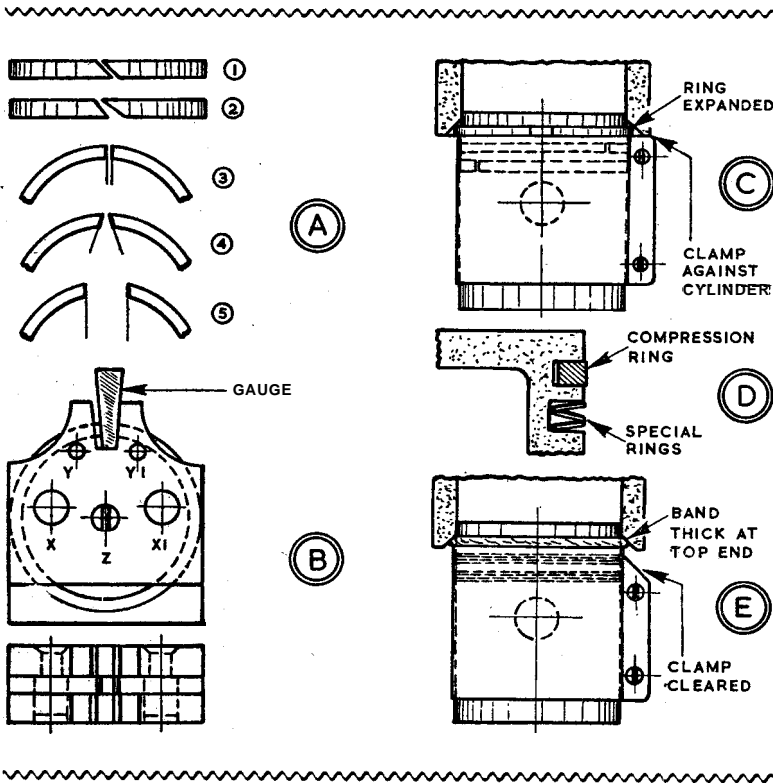
Employing, however, the special type of jig and gauge, as **B**, once a ring has been tested and the amount to remove discovered, work can proceed on this and other rings of the same batch, to give the required gap(s) at a single filing of each.

For butt-joint rings, two pieces of equal-thickness steel plate are located by stepped dowels X-XI with smaller dowels Y-YI to support the ring near the gap. A countersunk screw Z provides preliminary clamping, then the jig is held in the vice.

The slot for the file should be tapered to avoid the effect at **A4**; and the gauge should be about 0.015 in. narrower-this being the maximum amount removed at a single filing, but which can be reduced using a feeler gauge in with the gauge. In setting up, the ring is gripped to the gauge, this pushed to one side of the slot, then the screw tightened. Only the amount of ring projecting can be filed away.

For scarf-joint rings, the slot must be angled; and except if rings of only one width are filed, a thick piece of plate should be used for the guide, and a thinner piece, cleared in the slot, for clamping.

Because of restricted space: entering rings in cylinders of an engine from below usually requires a ring compressing device consisting of a band and clamp. With wide rings, this is successful; but with narrow rings, an effect as at **C** can occur-the clamp contacting the cylinder and pushing down before the ring has entered. This is the main difficulty in fitting special laminated rings, as a **D**, and is overcome by clearing the clamp, and thickening the top outside of the band with a ring of solder, chamfered to fit the cylinder, as at **E**.



For filing gaps of rings, there are various types of jigs, though often rings are simply held in a vice with only small portions near the ends projecting, and the edges filed to provide clearance. The vice must be an accurate smooth-jawed type, or

From the side, the edges should be parallel, as at **A1**, not diverging as at **2**; while, from above, parallelism should again obtain, as at **3**, avoiding an effect as at **4**-which can occur when a ring is closed after parallel filing in a well-opened attitude, as at **5**.