

# CLAMPS for various purposes

**C**LAMPS usually provide the solution to the problem of holding work that cannot be gripped in the chuck or vice—when it is not of such a specialised character as to require a jig or fixture. Straight pieces of rectangular mild steel, drilled for bolts, serve many purposes in setting up work on the faceplate, angle-plate and slotted slide; and more specialised varieties of clamps can be either fabricated from standard section material or machined from it with features to suit those of the work.

Clamps with slots for bolts are often more convenient than those with drilled holes, particularly when the bolts themselves are in holes, not in slots. Quick adjustment is then

*By GEOMETER*

possible, and there is no call for the clamps to be just the right length. Slotting can be done by end milling, though, alternatively, holes can be drilled in line in the clamp material and then run together by filing.

Another method which avoids the machining and filing is to rivet, braze or weld together two pieces of light section mild steel leaving a space between them for bolts **A**. Such a clamp, moreover, is strong in relation to its weight, with the material taking the clamping forces edge on in the correct way for a beam. Small blocks or collars are used for spacing when riveting is the method of fabrication. Otherwise, the material is bent at the ends, by hammering over in the vice, and then filed true to take the bolts easily.

Brazing is done at the ends **X** with the pieces clamped to a distance piece—leaving a good fillet; but when a welding torch is available, the material can easily be bent and joined in one piece—like a chain link from flat material.

The lightness of such clamps is an advantage when outside work must be mounted on an angle plate—a problem likely to be encountered particularly on a small lathe. Then the only solution is to clamp over the work and the angle plate **B**, using

long bolts and clamps that are preferably light in relation to their size.

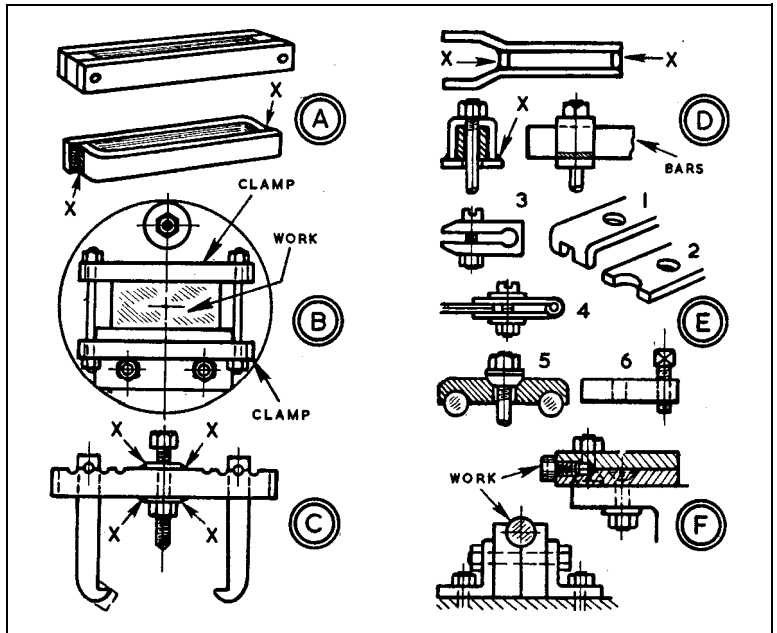
Using two pieces of rectangular material in a similar manner, a strong bar can be provided for a clamp or puller **C**; or a forked clamp **D** can be made to hold clear of positions where heat is applied in brazing or welding. In each case, plates are welded at **X**. Jaws for a puller are made from rectangular material, heating to red for bending by hammering, then sawing and filing to shape.

Straight pieces of rectangular bar

variety of Using wide material, turning down the end, rounding it and sawing and filing a gap, a clamp is made to grip at two points (1). For light clamping when parts have to be heated, it reduces heat-flow from the job—which can be important in soldering and similar work.

A clamp to grip on a flange round a component is best provided with a semi-circular cutaway (2), drilling or boring the material (according to size) before it is cut.

For gripping always the same limited thickness, a clamp (3) can be



material can be used for clamping, if a stirrup is made for each bolt **D**. Bars can then be cut to length for each job. To make a stirrup, flat material is turned U-shaped by hammering it over a block equal in thickness to the combined dimensions of the bars and bolt. After this, it is squared to length by filing, and brazed or welded to a plate **X**. Holes for the bolt should be easy, and the hole in the plate may be larger still, to allow for lengthwise tipping in adjusting and clamping.

Other clamps can be made in a

made by drilling holes in bar stock, chamfering the end for the jaws, slotting, then cutting off: A steel hinge (4) can be used in a like manner. Rod may be sweated to a clamp (5) to provide radiused gripping faces, and self-alignment obtained through a radiused hollow and washer. A tapped-in reaction screw (6) sets an ordinary clamp quickly.

For holding round work, clamps can be drilled, and if necessary tapped, at the centre-line **F**—as when screws have to be held for slotting, or a shaft set up for cutting a