Notes on clamps

By GEOMETER

ORDINARY workholding clamps are items of equipment that can be made easily from mild steel bar of suitable section. An example is shown at the top of diagram ***A***.

Cut off the number of pieces you need, deburr them, then face, singly or in pairs, in the independent chuck.

To drill the faced lengths on a machine, hold them one at a time in a machine vice. If you use the lathe for drilling, mount each length in the independent chuck.

To finish the clamps, remove the burrs from the edges of the holes with a larger drill, chamfer all the outside edges with a small file, and drawfile the clamping faces.

If you have a power drill and require several clamps all the same size, you can adopt a different procedure, providing the parent bar is not too long to handle easily. Otherwise, you cut it into manageable sections.

Grip the end of the bar in the bench vice, mark the length of the first clamp and centre-punch the position of the hole (or holes). Hold the bar for drilling, and when you have hacksawed the piece off, clamp it on the bar, with toolmakers' clamps or self-locking pliers, to use as a template for drilling and cutting the second piece.

Use the first piece as the template for the third and every subsequent piece, so that they are all the same. Face all the pieces in pairs in the independent chuck, locating each pair by a short length of rod in the holes. Finish the clamps as before.

In accordance with the dictum "for every force there is an equal and opposite reaction," reaction blocks are necessary with ordinary clamps. They can be oddments of material-pieces of round and square mild steel, faced off-cuts, nuts and so forth. Make them the same height as the faces on which the clamps bear. Then the clamps will hold firmly.

Various dodges enable work to be held on a face for the initial fitting of clamps. To hold work to the faceplate, you can bring up the tailstock with a flat centre or a pad centre in the barrel. Alternatively, you can remove the faceplate and lay it flat on the bench, or hold it by its boss in the bench vice. A support block or bar can be bolted to a faceplate or slide. Sometimes C-clamps can be used to hold work.

A fault of ordinary clamps and bolts is their obstruction to safe and close approach to the work. It is usually worst when a turret carries several tools. Sometimes, a longer-than-normal boring tool must be used-which is a disadvantage because of the spring. To reduce these difficulties, you can use special clamps with studding, like the example at the bottom of diagram A. The step on each clamp you machine by turning, milling or planing, and you tap a hole for the studding, which projects behind the faceplate.

Diagram ***B*** illustrates other ideas for improving clamps. By using studding, you can hold a plate U with a countersunk screw on which washers ***V*** and a nut ***W*** take the reaction. The washers give quick setting. A spring can be fitted to the main stud. If you tap a second hole in a clamp, you can use studding, nuts and washers as a pillar.

Further methods are shown at C. A tapped clamp can be fitted with a reaction screw for quick setting; an adjustable pillar can be made from a tapped sleeve (1) with a set-screw (2) to take washers (3).

There are times when it is advantageous to use slotted clamps. As at ***D,*** a pair can be employed to hold a bush for slitting with a milling cutter. They are clamped to the vertical slide. For quick-change repetition work on a mandrel, a slotted clamping washer can be used with a clearing nut.

To start knurled nuts and wing nuts easily, El and E2, counterdrill them or leave plain parts on studs. Bolts for T-slots you can make with countersunk screws and rectangular plates, E3.

In making studding for clamps, you work best in overlapping stages, as at ***F-XYZ***. Draw out the rod after partly screwcutting each stage, and finally size the whole length with a die. ❑