Methods of SUPPORTING and CLAMPING

By GEOMETER

Most jobs in the workshop require preliminary work for the real operations which follow, and the preparations usually include support and clamping of components. They may vary greatly, of course, according to the work in hand. One occasion may demand simply the support of a casting on a surface plate for it to be marked off. Another time a component may have to be clamped firmly to withstand the thrust of a machining cut.

Support for a casting on a surface plate can sometimes be arranged through two plates, bolted one each end. Their bottom edges should be straight for the casting to stand firmly. It can be levelled by surface gauge, and set upright to a square, before the plates are finally tightened. Then marking off can follow, in the certainty that the casting cannot alter its relationship with the surface plate, as might happen were it merely supported on packing.

A casting for a steam cylinder provides an example of this method of support, when a steel plate is clamped each end by a bolt through the bore, as at ***A.*** The plates can be cut from thick rectangular strip, and set up in the four-jaw independent chuck for their bottom edges to be trued by a facing cut. Two adjacent right-angular edges can also be faced true, so that, if required, the plates can be turned through 90 deg. on the surface plate.

Two pieces of angle steel may be used for supporting components in this way, with the advantage over flat plate that their flanges admit of clamping to a machine table. An example of their use is in setting up a cylinder to drill holes for studs in the port face, as at ***B***. The port face is levelled by surface gauge on the surface plate; and the angles are clamped securely. Paper packing can be used between them and the ends of the cylinder to avoid scratches. The steamchest, already drilled, is used as a template, aligned carefully, and then clamped by two flat strips and bolts.

Many jobs can be supported in a machine vice,. and there are various ways of makmg substitutes for this useful tool. One way, as at C, employs steel angle material for the base, and square and rectangular steel bar for the jaws. These are fixed jaw X, sliding jaw Y, and abutment Z for the screw. Sizes of material should agree with dimensions of work which is normally undertaken. The screw can have a Whitworth or BSF thread, either of which is capable of good service, and the screw can easily be renewed, with the abutment, when wear occurs. There is usually only one screw to a vice, but if a wide example is made two can be fitted. Then a pivoted jaw will admit of firm clamping of non-parallel material.

Fixed and sliding jaws, and the abutment, are faced to length in the independent chuck; and the fixed jaw and abutment are drilled and tapped for screwing firmly to the angle side pieces. The sliding jaw can be drilled and countersunk for screws which hold a packing piece and plate to the underside. To admit of clamping the vice on a machine slide, slots may be drilled and filed (or milled) in the side pieces. Then the ends of clamps can be entered.

Small work brings problems of its own for holding it securely without damage, besides which the ordinary bench vice lacks convenience for tiny parts. A pin-vice is the solution to many problems; or a small vice can be made on the principle of a tool-maker's clamp, as at D, to hold in the bench vice for handwork. Its construction needs only two pieces of square steel bar and two BSF setscrews.

For supporting round work on the drilling machine table, two pieces of angle material make a substitute vee-block, as at ***E.*** Two bolts clamp them with washers, the thickness and number of which give a spacing according to the diameter of the work.

Facing of the base on angle material can be done by mounting it on the angle plate on the faceplate, and it can be machined to width, as at ***F***, bolted directly to the faceplate. ❑