# PIN AND-C-SPANNERS

Beginner's Workshop

By GEOMETER

APART from the screwdriver slot, the external hexagon, as on bolts, nuts and other components, is the most common means of effecting tightening and loosening.. Yet, of course, it cannot meet all requirements and alternative means to the same end are pin holes, multiple slots and sockets, which add nothing to the length or bulkiness of components and, in some cases, are more easily produced than hexagons.

For grinding in a cone or poppet valve, two holes may be 'provided 'in the head for a pin tool-as an alternative to a slot requiring milling with a circular cutter. On a large screwed,, flush-fitting plug two holes again drilled in the face provide means for tightening or loosening with a pin spanner. Round' the outside of a gland nut six or eight shallow radial holes admit a shaped-pin spanner; and the same number of longitudinal slots take the usual C-spanner. Two or four slots are usual on locking rings or thin nuts for such parts as cycle freewheels and camera lenses.

Thin ring nuts for C-spanner use have a number of advantages over those with normal hexagons. Reduced space may be the main consideration, since the outside diameter of such nuts need be little (if any) more than the distance across the flats of hexagon nuts. Then, again, ring nuts can be machined from round bar (or circular castings), followed by simple drilling or slotting operations, which, in large sizes, are quicker and easier than milling required for flats.

**Causes** distortion

In circumstances, too, where it is impossible to use an enclosing box spanner, slotted or drilled ring nuts can generally be pulled much tighter and far more easily loosened than thin hexagon nuts. This is because application of an open spanner to a thin hexagon causes distortion and the nut to grip the thread; whereas, with the other types, a circular pull is obtained. Should, however, this sort of grip be experienced with a thin hexagon nut, applying the spanner to other flats may be helpful in getting the nut to work round.

A pin tool for use as a light spanner or grinding in a valve, ***A,*** can be made by bending a piece of stiff wire or rod U-shape to fit into the holes, then slot-sawing the end of a larger rod for the stem, followed by soldering or brazing the U-piece into the slot, and finally cross-drilling the stem for the handle.

A powerful pin spanner, where it can be used on a large flush-fitting plug, ***B,*** can be made by drilling a flat bar at the required centres, driving in pins (from silver-steel rod) or tapping holes to screw them in.

For a radially-drilled gland nut, C, plate for the spanner, ***D,*** must be thick enough for a hole to be drilled for the pin; and where the internal curve for the spanner may be produced by drilling the spanner plate and a piece of same-thickness scrap can be clamped or held in the vice for drilling. The pin should be smaller than the holes in the nut or chamfered at the end for the spanner to be fitted. On a radially-drilled nut which is thick (and has not to be pulled too tight), a rod like a tommy bar may be used.

For a slotted gland nut, ***E,*** the spanner, ***F,*** can be thin, having its internal curve formed by filing with a half-round file and leaving the tongue at the end.

For slotted nuts to which end-on application must be made, the type of spanner at G is used, having the requisite number of lugs to engage with the slots. On occasion such a spanner can be made from steel tubing by careful filing-then drilling a cross-hole for a tommy bar and case hardening if required.

Square-socket spanners

Square-socket plugs on car gearboxes and axles can be manipulated with a short length of square rod and a spanner, H, or the tool, I.

For B.M.C. cars, rod turned 21/32in. dia. is filed hexagon one end for a standard 9/16 in. across-flat ring spanner and 7/16in. square the other end for the plugs. If desired, a plain 9/16 in. diameter is convenient for holding in use. ❑