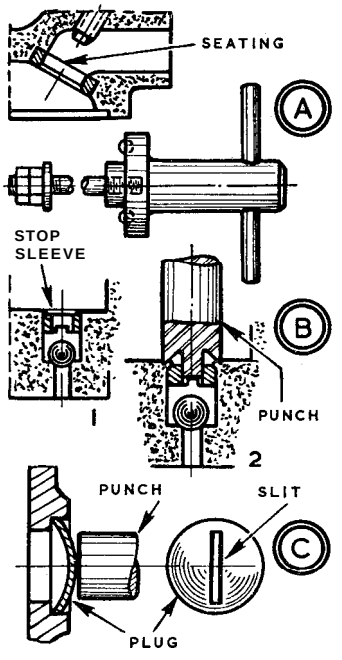
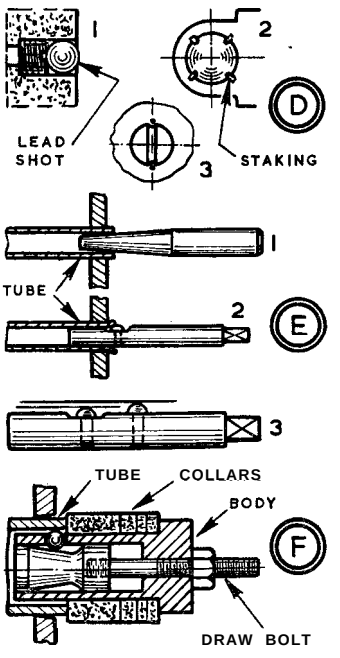
PEENING and other SECURING methods



WORKSHOP HINTS and TIPS



By GEOMETER

IN the normal or annealed state, most metals and alloys stretch and flow under impact or heavy pressure, which makes possible a huge range of manufacturing processes, from beating small articles in sheet metal to cold forging heavy components-besides subsidiary operations from simple riveting to expanding the skirts of worn pistons by shot-blasting the interior.

On the principle of displacing metal, parts can be secured against movement and light assembly performed. Thus, a nut can be prevented from unscrewing by judicious use of a centre punch at one or two positions on the end thread of a bolt-which will not prevent the nut from being removed later; while to secure a hard steel ball in the end of a screw to take thrust (or spring-load in a housing as a lock), the end of the hole can be lightly peened to contain the ball.

Another application of peening is as an additional security for a shrunk-in seating for a poppet valve as at A. When shrinking-in alone is relied upon, the seating can be straight-sided and fitted in flush with the surrounding metal. But when the seating is to be additionally secured by peening, its extreme outer corner should be slightly chamfered, then the surrounding metal can be carefully hammered or displaced over the chamfer.

Instead of performing the peening by hammering, a tool for the work can be made by machining a holder in mild steel with three hard steel balls let into the face at a radius slightly greater than that of the seating. There should be a spigot to locate in the seating, a central stud with locknuts and a cross handle for turning. Grease holds the balls in drilled dimples for fitting the tool and screwing on the locknuts. A light tap at the end of the shank indents the balls. Then with the locknuts tightened, the tool can be turned to peen the metal over the chamfer on the seating.

On occasion, a ball valve will be fitted, as at Bl, with a stop or sleeve limiting its lift. When the sleeve is not screwed in, it can be secured by peening. A tool for the work is a hollow punch, B2, with a short guide-the guide being turned from the solid, or provided by drilling up the punch and fitting a piece of rod. Cast steel heat-treated, or mild steel case-hardened, can be used for the tool, and for others used for peening thrust balls, or spring-loaded balls, into the ends of screws or housings.

Metal flow in another way is employed to secure core plugs or Welch plugs in the jackets of many water-cooled engines. As at C, a plug is a mild steel concave-convex disc, which is placed in a machined recess and tapped centrally with a punch to expand it. When it rusts through, or for other reason begins to leak, removal can be effected by making a central slit with a small sharp chisel, and then levering the plug out. Alternatively, three or four holes can be drilled in line. For fitting a new plug, the recess should be carefully scraped clean and coated with jointing compound.

In certain assemblies, a lead shot may be fitted in a hole after a screw which is not normally to be removed, or which provides a pre-set adjustment. Such a shot, Dl, is fitted by punching like a Welch plug. A plain plug may be secured by staking the end of its hole, D2, with a small rectangular-ended punch; while a flush-fitting screw, D3, can be held by centre-punching metal into its slot.

For expanding ends of tubes, a taper punch, El, can be used, followed by a mandrel, E2, with a let-in ball or hard rivet. The tool can be turned with a tap wrench or brace. The projection of a rivet, E3, can be varied by fitting directly in the mandrel or to a filed flat.

Other expansion tools may be on the principle of that at Here the body contains a hard steel cone operated by a draw bolt to expand a number of steel balls. Washers or collars outside the body allow for adjusting working distance of the balls from the ends of tubes. ❑