Removing and fitting bushes

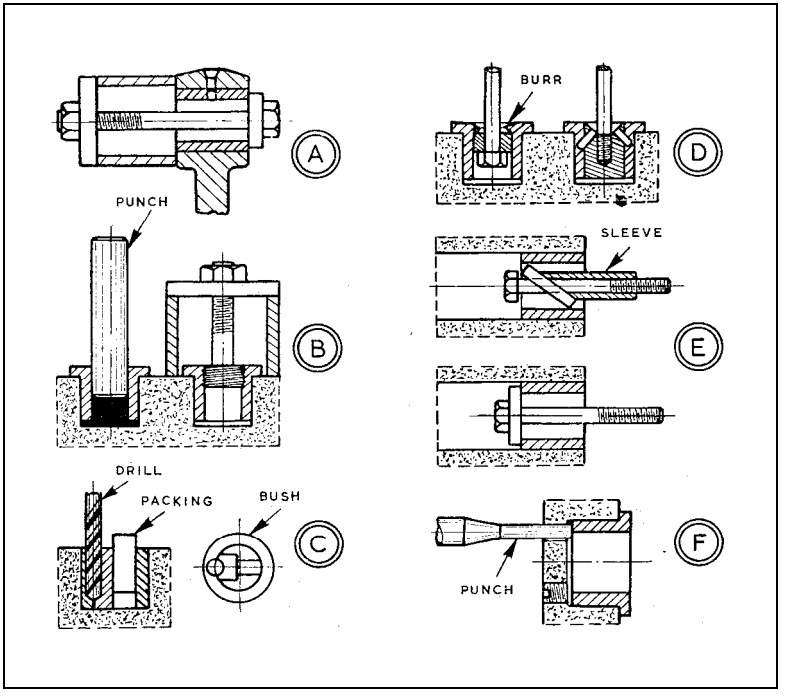
By GEOMETER

With wear in engines and machines occurring only on areas subject to movement, it is essential to be able to make renewals without replacing major components. Maintenance would otherwise prove expensive, particularly as all parts which move are not subject to the same loading and rubbing speed; and the higher these are, the greater wear is likely to be.

Removable bushes are often the means for making renewals. They also enable a choice to be made of the most suitable materials to mate with shafts or pins in particular locations-whatever materials may be used for constructional parts. Thus, bushes may be of white metal, brass, phosphor-bronze, gunmetal, or hardened steel.

Except for special circumstances where it is required to be " floating," a bush is pressed or forced tightly into the surrounding housing or boss, and its removal requires an application of force corresponding to that in fitting. If the bush is a plain parallel type with free access to both ends, as employed in a spring eye or for the small end of a connecting rod, removal as at A is standard practice.

A stout piece of tubing into which the bush will slide and slightly longer than the bush is required. Also needed is a stiff collar to bridge the end of the tubing; another collar slightly smaller than the outside of the bush to bear on the end; and a bolt threaded about half its length to pass through all. These may be used to draw the new bush into position without risk of burring, which is always present with tapping or hammering. A parallel-jaw steel vice will do the job quicker when a component can be brought to it, and it is a good amateur substitute for a mandrel press for fitting bushes quickly and squarely.



The most difficult bushes to remove are those fitted in " blind" holes where there is access only to one end -and according to type, size, and material! various methods of removal are possible. If the surrounding metal is aluminium it can be expanded by heating, and a steel bush may drop out if the component is tapped sharply on a block of wood. The heating may be carried out in hot water or oil, or carefully in the flame of a blowlamp.

If the bush is a flanged type, it will most likely not be fitted right to the end of its bore; and in the absence of oil grooves it can be removed " hydraulically." As at ***B*** (left), it is half filled with thick grease, and a well-fitting punch driven into it. Pressure at the lower end then forces the bush out. A bush capable of being tapped can be removed (right) using a special stud made by turning the hexagon from a suitable bolt and cutting a thread on it. This is the method used for some swivel pins on car steering.

Removing **force-fit bushes**

Difficulty in removing bushes occurs, of course, because they are force or interference fits in their housings and their material is in a state of compression. Release this and removal is much easier. Where possible, the best way of doing it is as at C. Material the same as the bush is roughly shaped to its bore radius and wedged in with packing. Then a drill can be run down to cut away the wall and reduce the grip.

With the packing pulled out with pliers, the bush can be drawn with its top burred over a collar on a bolt. For a flanged bush, as at ***D*** (left), this method. without the drilling proves in most cases a successful substitute for the orthodox tapping and headed stud, as at ***B*** (right). Another method which avoids tapping a bush is to drill obliquely through the head of a plug and fit pins into the bush, as at ***D*** (right).

Given clearance behind a bush, removal can be effected by entering a slotted plate on a bolt, as at ***E,*** a sleeve cut at an angle aiding in entering the plate. It is then withdrawn from the bolt for a tube, bridge-piece and nut to be fitted. Where drilled holes are permissible in a bush housing, as at ***F,*** a punch can be used for removal and the holes filled with grubscrews. ❑