Preventing nuts unscrewing

GEOMETER explains some of the better-known processes

for preventing nuts becoming loose on their bolts and studs

THE PROBLEM OF preventing nuts and threads slackening from vibration or other movement has been solved in various ways according to the requirements of assemblies, and, as usual, there are. the " do's " and " don'ts." Where rotation is in a particular direction, threads can be right or left-hand so there is a tendency for them to tighten. Spindles of cycle pedals, wheel hub nuts. of cars and on occasion the actual wheel nuts of lorries are examples of this method-and there are numerous' other applications. Naturally care must be taken in dismantling to turn in the required direction.

Split pins are perhaps the most common locking devices for nuts, whether on studs or bolts, and require the nuts to be either slotted or castle types, *A* and *B*. The slotted nut *A* needs less room where space is lacking, but is not so strong as the castle nut *B* with its circular portion on top incorporating the slots. Con-

sequently, slotted nuts must not be substituted for castle cuts in important fittings.

Split pins should fit the holes reasonably tightly, their heads be tapped into slots, then the legs opened round the ends of the bolts. Where there is continuous vibration (car big-end bearings), loose split pins will eventually wear so the legs break off and the pins fall out.

The lock-nut

Another common device is the lock-nut C on U-bolts of car springs. Usually, the thin nut is on the end or outside, though in this position some engineers declare it takes the load on the bolt, owing to slight slackness in the threads of the thicker standard nut.
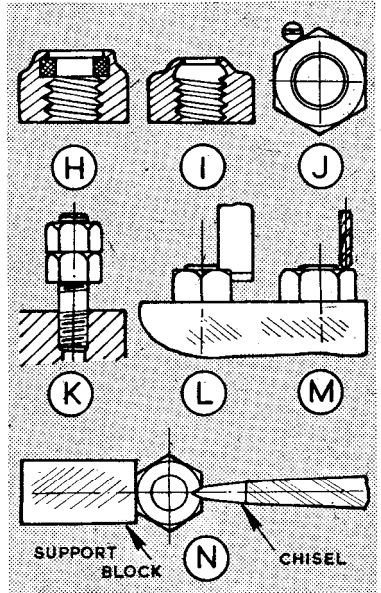
Plain washers do not prevent un-screwing, but they are used in pre-ference to others where firm pressure is required and it is desired to avoid scoring a metal surface by the under-side of nuts. There are two types of tab washer, however, to provide security-the single type D and the the multiple type fitting on two or more bolts or studs, with a tab at each position to turn up on the nut.

In final tightening of nuts, care is required on multiple tab washers not to twist them, and on single tabs not to turn them into a wrong attitude for locking.

Spring washer types

In general use, three types of spring washer provide security: single coil *E*, double coil (similar) and the serrated type with bore or outside cut. Spring washers should not be used where loads are heavy, or the undersurface can be scored from dismantling. Under pressure, a single coil washer will often break or splay; a double coil, splay, and a serrated type break. Coarse, sharp single coil washers can be much improved by slightly straight-ening-in the vice, using pliers.

Unless assembly is permanent, studs or bolts should not be burred. How-ever, the centre punch dot *F* **is** often used on aircraft sub-assemblies. For removal, the displaced portion is chiselled or filed off.

The multiple-tab washer G is used with keyed or splined shafts (car hub nuts). For unscrewing, the outside tabs must be fully released or the inner one will be sheared.

Nuts fitted with a fibre insert H provide security against unscrewing for two or three removals-after which they are not so secure. They should not be used where heat can dry or burn the fibre.

All steel nuts Z have an undersize piece at **the** end which grips the thread on the bolt or stud. These are a modem alternative for castle nuts on car big-end bolts. They avoid the difficulty of the split pin holes not being in line when. the nuts are fully tight-to overcome which,' castle nuts have to be removed and filed on the bottom. In many fittings, a normal nut can be held by a small screw against a flat J-motorcycle crankpins.

Studs can be fitted and removed by means of two nuts locked firmly together K-turning on the top one for fitting, on the bottom one for removing. Immovable nuts may be split *L* with a sharp chisel down one of -the flats, or a small drill down one of the comers M-then a chisel used for splitting. Alternatively, a chisel and support block can be used as N.