

**A**S COMMON FIXING DEVICES, screws are often taken for granted. Yet on their correct choice and fitting depend the good appearance and soundness of construction of work in which they are used.

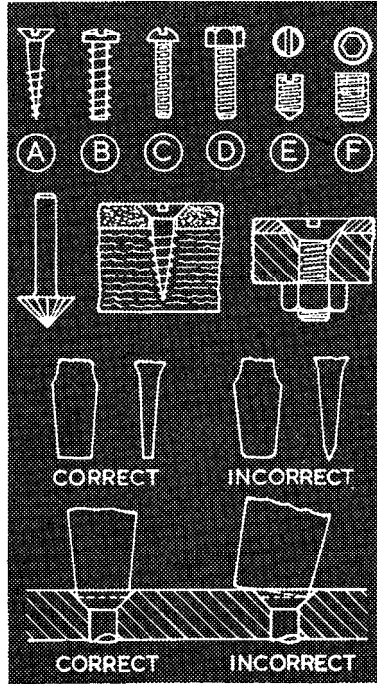
As is well known, they are of various sorts, shapes and sizes, those illustrated being the most frequently used. The woodscrew **A** may be in steel or brass, with a countersunk, round, or cheese head, or with a raised head, partly countersunk, partly round—often used in fixing interior panels and fittings in cars, when the head is chromium plated. The countersink angle is 90 degrees. Large screws with square spanner-heads are screw bolts, or coach screws; dowel screws have a thread each end and no head.

**GEOMETER** continues his series for the novice model engineer by describing the various types of screws and their uses. Each week he discusses one workshop operation

The self-tapping screw **B** is in hardened steel, and can only be shortened by grinding. It may be provided with a countersunk, round, or sun head—partly rounded. This screw is used for fixing sheet metal panels. The outer panel (or part) is drilled clearance for the screw, and the interior panel drilled the core diameter. The screw is then forced through, cuts its own thread and pulls tight. It is often used for minor fittings in motor bodies. In other than sheet metal, it can only be driven a limited distance.

The ordinary metal screw **C** has a thread like a bolt, and a countersunk, round, or cheese head. It can be in steel or brass. When provided with a hexagon head **D**, it is a set-screw or sometimes a set-pin. Its uses are widespread.

The grubscrew **E** has a 120-degree pointed end and a screwdriver slot. It is commonly used for fixing collars,



pulleys and small wheels to shafts, the bosses being drilled and tapped to take it. It has the most neat appearance when just flush with the boss.

The headless socket screw **F** has a hexagon socket to take a key or spanner to tighten it. It is used much like a grubscrew, but can be obtained with a variety of ends—pointed, oval, hollow, flat, and with a small plain point, when it is termed a dog point. It is in hardened steel.

### Choosing the screw

The choice of screws is narrowed by the materials being fixed, their thickness, and where the screws will be placed. Woodscrews can only be used in wood, suitable plastics, or similar materials. Self-tapping screws can be used on occasion in these materials and in sheet metal. Metal screws and setscrews can be employed in tapped holes, or in clearance holes, and for wood, etc., when nuts and washers are fitted.

The length of screw is often governed

by the thickness of materials—a woodscrew, for example, should not penetrate a panel for the point to emerge. Similarly, the size is frequently governed by the thickness of the material into which a screw enters edgewise, both from the point of view of splitting the material, and to obviate the head of the screw over-lapping the edge.

In the case of grubscrews, they should be large enough to secure the pulley or collar firmly, but not so large as to distort or split the boss.

### Countersinking

Two countersinking drills (or rose bits) are required, one for metal, one for wood. The one for wood will not cut metal, and the metal one may chatter in wood. Drills with only two flutes may be used with discretion in metal, when the angle has been altered.

Before countersinking a clearance hole should be drilled, then the countersink run in so the head of the screw will just lie flush—for which operation care is required to produce neat, uniform work. The continuing hole for a woodscrew may then be made with a bradawl, if the screw is small; if lame, a core drill should be run in. This is important for hardwoods in which screws can be wrung off in fitting—particularly brass.

In larger sizes, woodscrews are smeared with grease when fitting—to enter and remove easier.

When a metal panel is being fixed with countersunk screws, a countersink with a more acute angle can be used on occasion; the screw head will then bite on and hold the panel more firmly. An altered drill can be used for this type of countersinking.

### Correct screwdriver

The width of the blade of the screwdriver should be almost the diameter of the screwhead, and its thickness so as just to enter the slot in the screw. The blade should be square and flat, not rounded at the ends, or sharpened like a chisel. A blade which is too narrow will damage the screw head, and may be twisted or broken itself, while one which is too wide will not drive the screw properly, and will score the surrounding surface. □