

## core plugs

BY GEOMETER

ON THE OUTSIDE of water-cooled engine cylinder blocks and heads are usually several bosses with circular recesses, giving access to the water jackets. The fillings in these are light domed steel discs and are variously called core plugs, welsh plugs or expansion plugs.

The function of the holes they fill is to admit that part of the sand mould called the "core" when the cylinder block or head is in the process of being cast. However, the holes do provide access for flushing later if the waterways get badly sludged and, on occasion, a plug will push out if the water freezes. Hence the term "expansion" plugs though this is quite incidental and no reliance can be placed on it.

On older engines it is not uncommon for core plugs to leak round the edges, and from the action of water, heating and cooling, complete rusting through can occur in time, necessitating renewal.

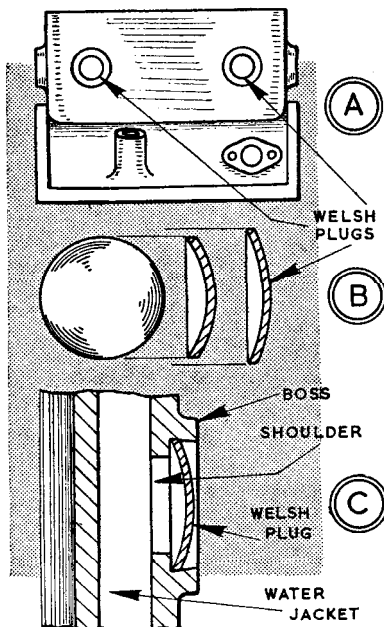
### Method of removing

Diagrams A, B and C show locations and details of typical core plugs, which are made in standard sizes and are obtainable ready to fit. The boss on the outside of the water jacket provides extra strength; it is machined circularly to leave an internal shoulder against which the plug abuts to be expanded into position by tapping centrally with a hammer or large diameter flat-ended punch.

To remove a defective core plug it can be drilled centrally, commencing with a small drill and opening out. Then a small sharp chisel can be used to cut and enlarge the hole across the diameter of the plug, after which it can be levered out with a screwdriver.

This is the method if the plug is not badly fretted by rusting. Should the plug be thin and weak a steel-cored screwdriver can be driven straight through, and the plug levered out. An alternative to a large central hole is several smaller ones drilled across the diameter to weaken the plug.

Any water in the cooling system should, of course, be drained before removing a plug. Afterwards the



recess and shoulder should be carefully scraped clean of rust and scale and wiped dry.

For fitting the new plug the recess and shoulder should be lightly covered with jointing compound; then a plug is entered which is of a size to fit comfortably. It is important for the perimeter to be free from burrs and flats otherwise the plug may not seal completely. Small burrs can be filed off, but a plug with flats should be rejected.

Holding the plug back to the shoulder the centre should be tapped to effect expansion. A large plug may tend to dent in the centre and should be tapped round in circles of increasing diameter or a flat-ended punch or drift should be used. Should there be slight local leakage, additional tapping in the area will stop it.

It will be realised that an important factor in successfully fitting a plug is accuracy of recess and shoulder. For this reason slight leakage round the edge of a plug should not be neglected or rusting may occur, resulting in a

depression which cannot be filled by fitting a new plug.

When this has happened and there is a permanent leak a repair can often be made by fitting a plate to the seat on the outside of the boss. If uneven the boss should be filed flat and the stiff circular covering piece attached by means of a stud and bridge piece inside the water jacket-D and E. A soft joint can be used between the plate and the boss, and a fibre washer or twist of asbestos string between the plate and the nut and washer.

A single small crack in a water jacket or plate can be repaired as at F. Commencing just beyond one end a hole is drilled and tapped not quite through (second tap) for a piece of studding (3/16 in or 1/4 in.) to be screwed in tightly. After cutting off, the piece is expanded by light hammering; then another hole is drilled and tapped for the next piece to overlap-and so on to the end of the crack.

