

NOTE: Whilst the following is for a Riley 1.5 Litre "U" type pump and not a Bristol "UG" type pump, it does use the same repair kit and makes interesting reading, from which you may glean some useful hints and tips?

MAINTENANCE AND REPAIR OF A.C. FUEL PUMP (Type U)

Type and description

The A.C.-Sphinx fuel pump, type U, is operated mechanically from an eccentric on the engine camshaft. Fig. BB.4 gives a sectional view of the pump, the operation being as follows :—

As the engine camshaft revolves, the eccentric cam pushes the pump rocker-arm, and this operates the pull-rod, together with the diaphragm, downward by means of a link, against the pressure of the spring under the diaphragm, thus creating a vacuum in the pump chamber.

As a consequence fuel is drawn from the tank and enters the sediment chamber, from which it passes through the filter gauze and the suction valve into the pump chamber. On the return stroke the pressure of the spring pushes the diaphragm upwards, forcing the fuel from the pump chamber through the delivery valve and outlet passage into the carburetter. When the carburetter float-chamber is full the float will shut the needle valve, thus preventing any flow of fuel from the pump chamber. This will hold the diaphragm downward against the pressure of the spring and it will remain in this position until the carburetter requires further fuel and the needle valve opens. The rocker-arm only operates the connecting link when the diaphragm reaches its upper position, and this construction permits idling movement of the rocker-arm without actuating the link when the pump chamber is full and there is no movement of the fuel pump diaphragm.

The rocker-arm spring keeps the rocker-arm in

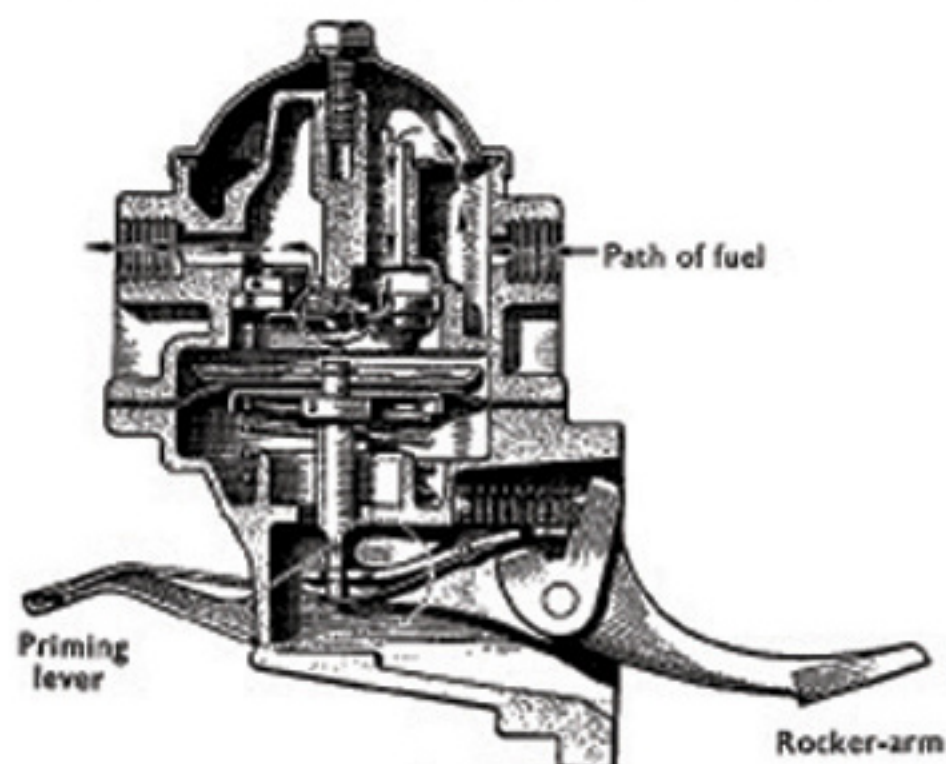


Fig. BB.4.

Section of the A.C. pump.

constant contact with the camshaft eccentric in order to eliminate noise.

Cleaning the filter

The filter should be examined every 6,000 miles (10,000 km.) and cleaned if necessary. Access to the filter is gained by undoing the retaining screw and removing the dome cover. The filter gauze may then be lifted off its seating and cleaned in an air jet or with petrol and a brush. All deposits should also be cleaned from the sediment chamber.

The cork gasket under the filter cover should be renewed if broken or if it has hardened.

Tighten the filter cover retaining screw only sufficiently to make a fuel-tight joint. Overtightening will either destroy the cork washer, crack the cover, or fracture the main casting.

Testing the pump on the engine

With the engine stopped and switched off, the pipe to the carburetter should be disconnected at the carburetter end, leaving a free outlet from the pump. The engine can then be turned over by hand, when there should be a well-defined spurt of fuel once every two revolutions of the engine.

Removing the pump from the engine

Disconnect the pipe unions and the two bolts fixing the fuel pump to the engine. Lift the fuel pump away.

Dismantling the fuel pump

Clean the exterior of the pump and make a file mark across the two flanges for guidance in reassembling in the correct relative positions. After separating the two main castings, further dismantling of the components is quite straightforward. The diaphragm and pull-rod assembly can be withdrawn by first of all turning it through 90°. No attempt should be made to separate the four diaphragm layers from their protective washers and the pull-rod, as this assembly is at all times serviced complete.

Inspection of parts

All parts must be cleaned thoroughly to ascertain their condition.

Wash all parts in the locality of the valves in a clean paraffin bath separate from that employed for the other and dirtier components.

The diaphragm and pull-rod assemblies should normally be renewed, unless they are in an entirely sound condition, without any signs of cracks and hardening.

The upper and lower castings should be examined for cracks or damage, and if the diaphragm or engine

mounting flanges are distorted these should be lapped to restore their flatness.

When the hand priming lever incorporated in the lower casting is broken, the parts should be renewed, the outer end of the spindle being riveted over after correctly locating the various components.

All badly worn parts should be renewed, and very little wear should be tolerated on the rocker-arm pin, the holes and engagement slot in the link, or the hole in the rocker-arm. On the working surface of the rocker-arm which engages with the camshaft eccentric, slight wear is permissible but not exceeding .010 in. (.25 mm.) in depth.

No attempt should be made to dismantle the valve and seat assemblies, both of which should be renewed unless in perfect condition.

The diaphragm spring seldom calls for replacement, but, when necessary, ensure that the replacement spring has the same identification colour and consequently the same strength as the original, as this controls the fuel feed pressure. The rocker-arm spring is occasionally found to be broken after service.

All gaskets and joint washers should be replaced by new ones.

To reassemble the fuel pump

The following procedure should be adopted, commencing with the upper portion of the pump:—

Place the paper "figure 8" gasket in position in the valve ports.

Place the inlet valve assembly in the partially restricted port, with the spring facing outwards (the

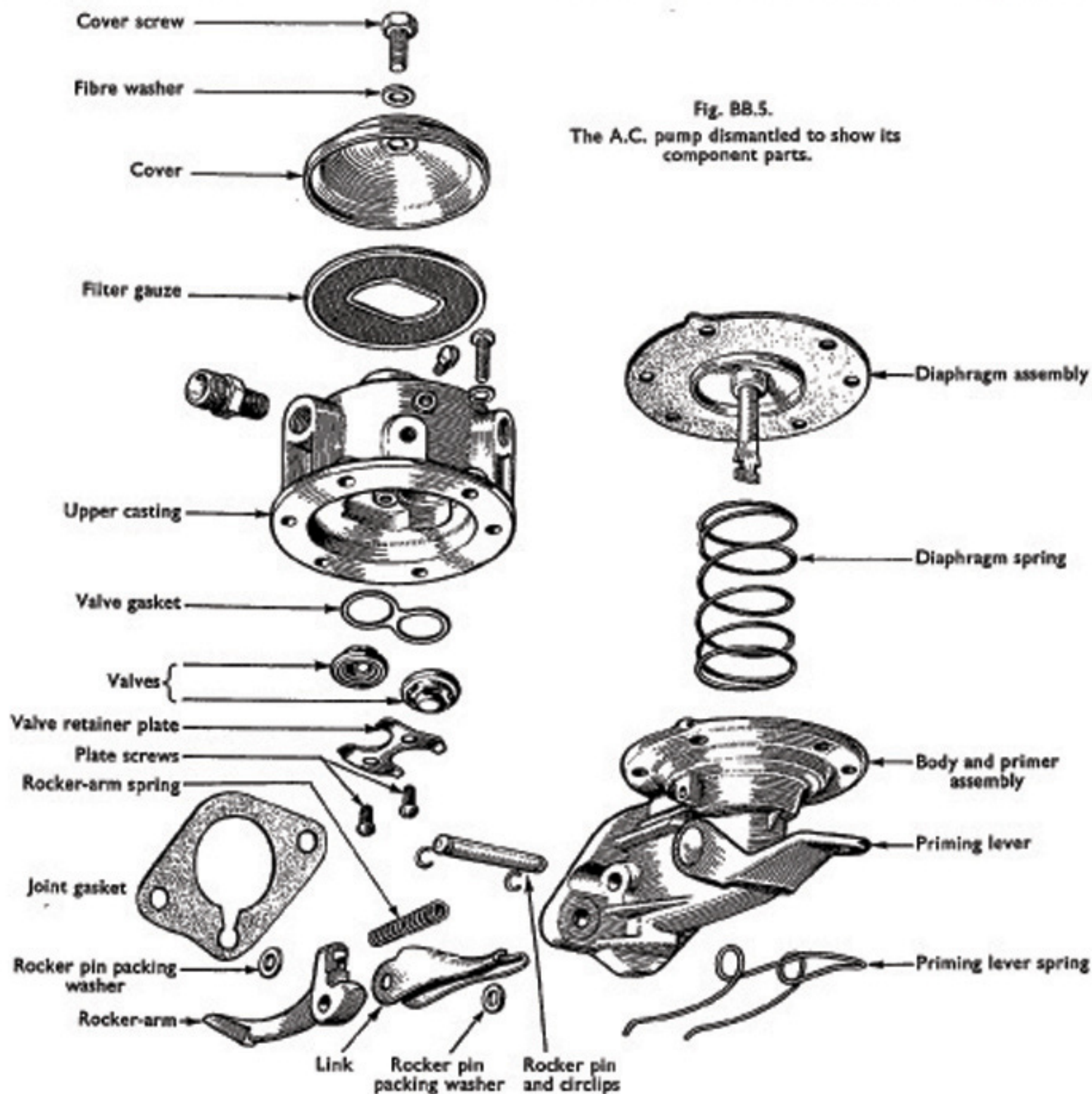


Fig. BB.5.

The A.C. pump dismantled to show its component parts.

restriction in the port actually prevents it being fitted the other way round). Fit the outlet valve assembly in the unrestricted port, with the spring inside the port itself.

The retainer should then be fitted and the two screws fully tightened.

Place the filter gauze in position on top of the casting, and make certain that it fits snugly.

Fit the cork gasket, cover, fibre washer, and retaining screw as previously detailed under "Cleaning the filter."

To assemble the lower half, proceed as follows :—

Assemble the link, packing washers, rocker-arm and the rocker-arm spring in the body.

Insert the rocker-arm pin through the hole in the body, at the same time engaging the packing washers, link, and the rocker-arm, then spring the retaining clips into the grooves on each end of the rocker-arm pin.

The rocker-arm pin should be a tap fit in the body, and if, due to wear, it is freer than this, the ends of the holes in the body should be burred over slightly.

Note.—The fitting of the rocker-arm pin can be simplified by first inserting a piece of $\cdot 240$ in. (6.096 mm.) diameter rod for enough through the pin hole in one side of the body to engage the rocker-arm washers and link, and then pushing the rocker-arm pin in from the opposite side, so that it pushes the temporary rod out as the pin takes up its proper position.

To fit the diaphragm assembly to the pump body :—

Place the diaphragm spring in position in the pump body. Place the diaphragm assembly over the spring, the pull-rod being downwards, taking care to centre the upper end of the spring in the lower protector washer of the diaphragm.

Press downwards on the diaphragm, at the same time turning the assembly to the left in such a manner that the slots on the pull-rod will engage the fork in the operating link. Now turn the assembly a complete quarter turn to the left, which will place the pull-rod in the correct working position in the link, and at the same time permit the matching up of the holes in the diaphragm with those on the pump body flanges.

When first inserting the diaphragm assembly into the pump body, the locating "tab" on the outside of the diaphragm should be at the 11 o'clock position. After turning the diaphragm assembly a quarter turn to the left, the "tab" should be at the 8 o'clock position.

The two sub-assemblies of the pump are now ready for fitting together as follows :—

Push the rocker-arm towards the pump until the diaphragm is level with the body flange.

Place the upper half of the pump into the proper position as shown by the mark made on the flanges before dismantling.

Install the screws for the upper casting and lock washers and tighten only until the heads of the screws just engage the washers.

Release and push the rocker-arm away from the pump so as to hold the diaphragm at the top of the stroke, and while it is so held tighten the cover screws alternately and securely in a diagonal sequence. On pumps fitted with rocker-arm stop screw this and the washer should be removed for the operation and afterwards refitted.

Testing the fuel pump after assembly

The best method of testing the pump is by using an A.C.—Sphinx bench-test stand, on which the suction side of the pump is piped to a tin of paraffin at floor level and the outlet side of the pump is connected to a stop tap and pressure gauge.

First, flush the pump through to wet the valves and seats, and then completely empty it again by continuing to operate the rocker-arm by hand with the suction pipe clear of the paraffin. Again operate the pump. Not more than twenty strokes, should be

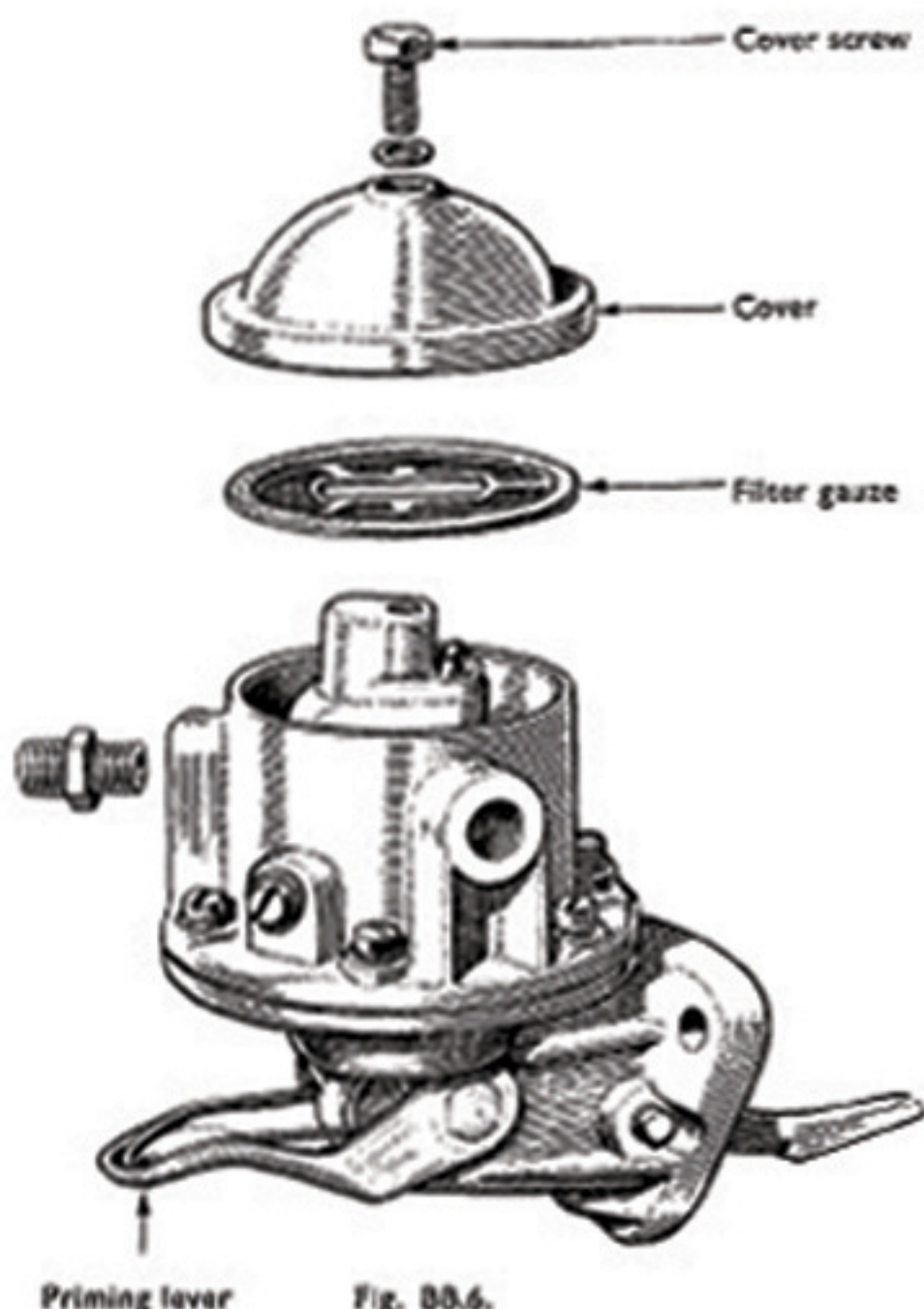


Fig. 88.6.
The A.C. pump.

necessary to secure delivery of paraffin from the pump outlet.

With the same apparatus a second test can be made by working the pump with the tap on the delivery side closed, pressure then being recorded on the gauge. After ceasing to work the pump it should take several seconds for this pressure to return to zero, thus denoting that the valves are seating properly. Also, while there is pressure, the outer edge of the diaphragm—visible between the two clamping flanges—should be carefully examined for leakage and the retaining screws tightened if necessary. When working the pump by hand a somewhat longer stroke is obtained and the pressure developed is apt to be higher than when fitted to the engine.

When the above apparatus is not available the pump should be tested, using a pan of clean paraffin, as follows :—

First flush the pump by immersing it in the paraffin and working the rocker-arm half a dozen times, then empty the pump by continuing to operate it while holding it above the bath. Then, with the pump clear of the paraffin bath, place a finger over the inlet

union (marked "In") and work the rocker-arm several times. Upon removing the finger a distinct suction noise should be heard, denoting that the pump has developed a reasonable degree of suction. Afterwards the finger should be placed over the outlet union, and after pressing the rocker-arm inwards the air drawn into the pump chamber should be held under compression for two or three seconds ; this should also be done with the pump immersed in paraffin and the clamping flanges of the diaphragm watched for any signs of air leakage.

Refitting to engine

Reverse the procedure outlined for removal from the engine but ensure that the rocker-arm is correctly positioned against the eccentric on the camshaft. When pumps are inaccessibly mounted there is a possibility of inadvertently getting the rocker-arm under the eccentric or to one side, causing damage when the pump bolts are tightened. The gasket between the pump and the crankcase must be renewed if unsound.