Service Instruction Manual

Fourth Issue

STANDARD VANGUARD

SERIES I AND II
and
TRIUMPH "RENOWN" MODELS

FUEL SYSTEM

SECTION P

THE STANDARD MOTOR COMPANY LTD., COVENTRY

FUEL SYSTEM

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ILLUSTRATIONS

Series II Supplement

FUEL SYSTEM

PETROL PUMP

TYPE AND DESCRIPTION

The AC fuel pump Type U (Fig. 1), used on all Vanguard Models made before Comm. No. V.85,001 and Type UE (Fig. 2), used thereafter, are mechanically operated by an eccentric on the engine camshaft. Figs. 1 and 2 give sectional views of the two types of pump, the method of operation being the same for both, as follows :—

As the engine camshaft (G) revolves, the eccentric (H) lifts pump rocker arm (D) pivotted at (E) which pulls the pull rod (F) together with the diaphragm (A) downwards against spring pressure (C) thus creating a vacuum in the pump chamber (M).

Petrol is drawn from the tank and enters at (J) into sediment chamber (K) through filter gauze (L) suction valve (N) into the pump chamber (M). On the return stroke the spring pressure (C) pushes the diaphragm (A) upwards forcing petrol from chamber (M) through the delivery valve (O) and opening (P) to the carburettor. When the carburettor bowl is full the float will shut the needle valve, thus preventing any flow of petrol from the pump chamber (M). This will hold diaphragm (A) downward against spring pressure (C) and it will remain in this position until the carburettor requires further petrol and the needle valve opens. The rocker arm (D) operates the connecting link by making contact at (R), and this construction allows idling movement of the rocker arm when there is no movement of the fuel pump diaphragm.

Spring (S) keeps the rocker arm (D) in constant contact with eccentric (H) to eliminate noise.

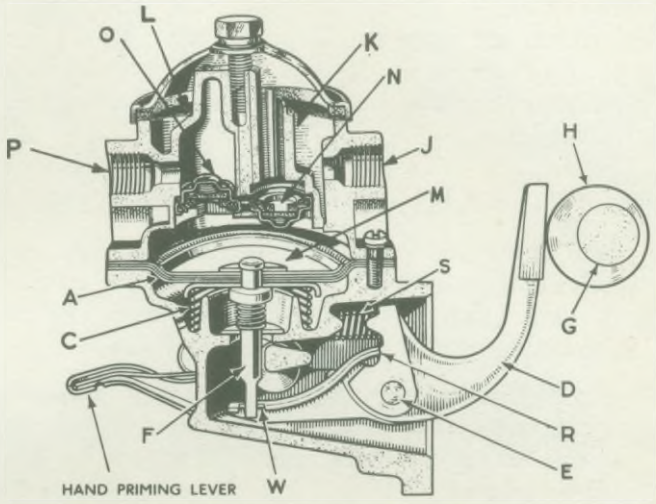

Fig. 1. AC Type "U" petrol pump in section

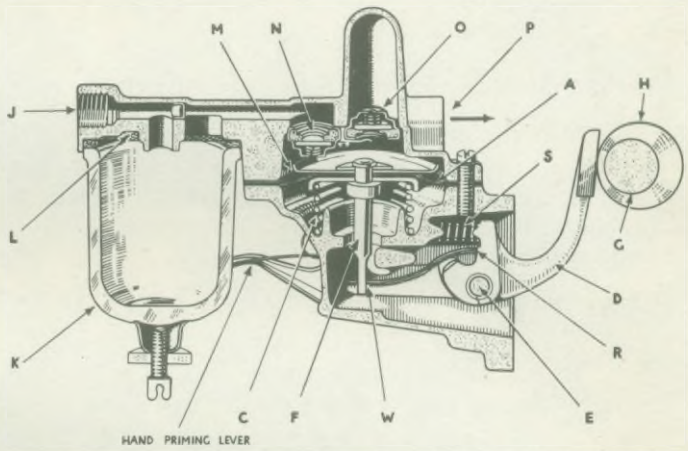

Fig. 2. AC Type "UE" petrol pump in section

PUMP PRESSURE

It will be seen that petrol is forced to the carburettor float chamber, by the spring (C) acting on the diaphragm. The pressure which the pump can exert depends on how much the spring is compressed by the cam and lever during the pump suction stroke. This pressure is balanced by the buoyancy of the carburettor float, which causes a corresponding pressure at the needle valve seat.

As petrol rises in the float chamber, the needle is forced up with greater pressure until it reaches a maximum, corresponding to the pressure of the spring (C) in its most compressed position. Conversely, as petrol is delivered by the carburettor, the petrol level in the float chamber begins to fall, reducing the buoyancy, and so enabling the spring (C) to operate on the diaphragm and force fresh petrol into the chamber.

Immediately this happens the lever no longer idles, but now pulls down the diaphragm filling the pump chamber ready to continue the supply. When the engine is running, this is a continuous process.

Due to the above reasons, it will be seen that the thickness of packing fitted between the pump and crankcase should not be varied,

otherwise the petrol level in the float chamber will vary. A thinner packing would cause the spring (C) to be more greatly compressed, requiring a greater buoyancy of the float to balance the pressure, thus resulting in a higher level of petrol in the float chamber. A thicker packing has the opposite effect, resulting in a lower level.

TO CLEAN "U" TYPE FILTER

The filter should be examined every 1,000 miles and cleaned if necessary. Under conditions of dust-laden atmosphere this mileage interval should be reduced as conditions dictate.

Access to the filter is gained by removing the dome cover, after unscrewing the retaining screw, when the filter gauze itself may be lifted off its seating.

Remove the drain plug and clean out the sediment chamber. Clean filter gauze in air jet or in petrol.

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

When refitting the cover, make certain that the fibre washer is replaced under the head of the screw. Tighten the filter cover retaining screw just sufficiently to make a petrol-tight joint. Overtightening will either destroy the cork gasket, crack the cover, or fracture the main casting.

Check setscrews securing pump to engine, for tightness, and petrol pipe unions.

For instructions on "Cleaning 'UE' type Filter," see page 14.

TO TEST IN POSITION ON ENGINE

With the engine stopped and switched off, the pipe to the carburettor should be disconnected at the carburettor 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 petrol at every working stroke of the pump, namely, once every two revolutions of the engine.

TO REMOVE FROM THE ENGINE

It is easier to clean the filter and sediment chamber with pump removed.

Firstly, the pipe unions should be disconnected. The two nuts fixing the fuel pump at the engine crankcase should then be unscrewed,

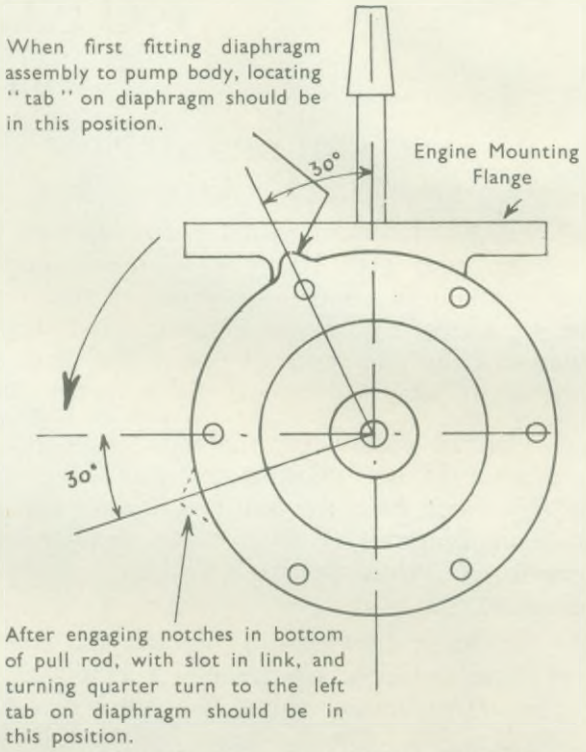

Fig. 3. Fitting diaphragm to "U" type petrol pump

after which the fuel pump will come away readily.

TO DISMANTLE PUMP

Before commencing dismantling, clean the exterior of the pump and make a file mark across the two flange edges for guidance in reassembling in the correct relative positions. After separating the two main castings the further dismantling of the components associated with each is quite straightforward. The diaphragm and pull rod assembly can be withdrawn by first of all turning it through 90° (see Fig. 3). No attempt should be made to separate the four diaphragm layers from their protective washers and pull rod, as this is at all times serviced as a complete assembly, being permanently riveted together.

For illustration showing "Fitting diaphragm to 'UE' type petrol Pump," see page 15, Fig. 9.

INSPECTION OF PARTS (TYPE "UE")

(Reference numbers apply to Fig. 4)

Firstly, all parts must be thoroughly cleaned 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.

Diaphragm and pull rod assemblies should normally be replaced unless in entirely sound

condition without any signs of cracks or hardening.

Upper and lower castings should be examined for cracks or damage, and if diaphragm or engine mounting flanges are distorted these should be lapped to restore their flatness. Where hand priming lever (12) incorporated in lower casting is broken, the parts should be replaced, the outer end of the spindle being riveted over by hand tools after correctly locating the various components.

All badly worn parts should be replaced, and very little wear should be tolerated on rocker arm pins (18), the holes and engagement slot in links (14), holes in rocker arm (15). On the working surface of the rocker arm which engages with the engine eccentric slight wear is permissible, but not exceeding 0.010".

The two valve assemblies (4) can be removed after undoing screws (6) and removing valve retainer (5). No attempt should be made to dismantle the actual valve assemblies, both of which should be replaced when a pump is overhauled, that is unless the existing ones are obviously in good condition.

Diaphragm spring (8) seldom calls for replacement, but where necessary ensure that the replacement spring has the same identification colour and consequently the same strength as the original. All gaskets and joint washers should be replaced as a matter of routine.

NOTATION FOR FIG. 4

Fig.	*Detail No.*	*Item*
1	52462	Body and Primer Assembly.
2	500420	Upper Casting.
3	59657	Valve Gasket.
4	501006	Valve and Seat Assembly.
5	59659	Valve Retainer.
6	59660	Valve Retainer Screw.
7	501005	Diaphragm.
8	52492	Spring, Diaphragm.
9	52490	Screw, upper casting.
10	57361	Washer Cover Screw.
11	52498	Spring,Priming Lever.
12	59654	Priming Handle Set.
13	52494	Spring Rocker Arm.
14	52479	Link.
15	59655	Rocker Arm.
16	52484	Clip, Rocker Pin.
17	52486	Washer, Rocker Pin.
18	52483	Pin, Rocker Arm.
19	500416	Clip for Bowl.
20	500417	Bowl.
21	500418	Gasket Filter.
22	500419	Gauze, Filter.

TO REASSEMBLE PETROL PUMP

(a) Upper portion.

The following procedure should be adopted, dealing with the upper portion of the pump first :

Be sure that the " Figure 8 " shaped gasket (3) is in position before fitting the valve assemblies (4).

The inlet valve fits into the partially restricted port with the spring facing outwards (the restriction in the port prevents it being fitted the other way round).

The outlet valve must then be fitted to the unrestricted port and with the spring inside the port itself.

Retainer (5) should then be fitted and the two screws (6) fully tightened.

Place filter gauze (22) in position on top of casting, making certain that it fits snugly.

Fit cork gasket, cover, fibre washer, and retaining screw as previously detailed (on page 2).

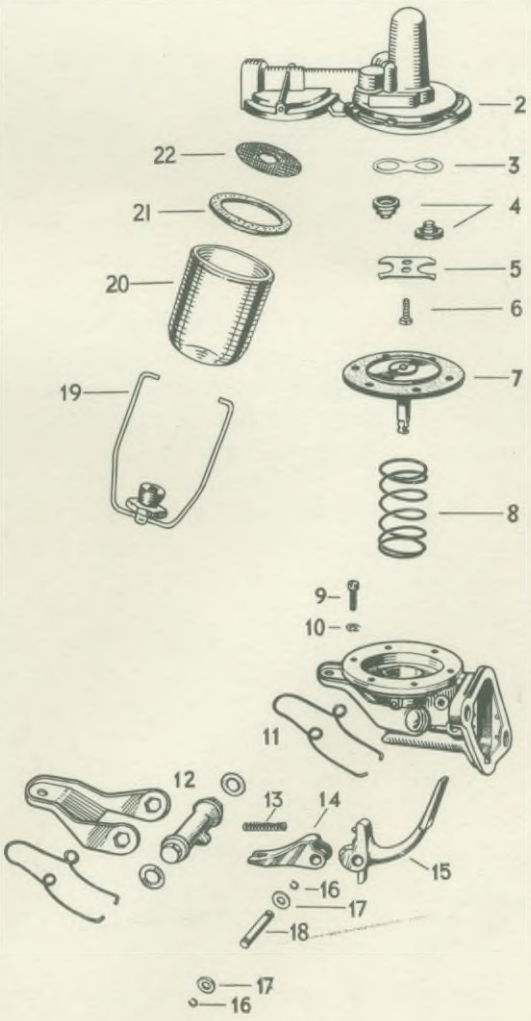

Fig. 4. Petrol pump details

(b) **Lower portion.**

To assemble, proceed as follows :—

Assemble link (14), packing washers (17), rocker arm (15) and rocker arm spring (13) in the body (1).

Insert rocker arm pin (18) through 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 0.240" diameter rod through the pin hole in one side of the body far enough to engage the rocker arm washers and link, and then pushing the rocker arm pin in from the opposite side, removing the temporary rod as the pin takes up its proper position.

(c) **To fit diaphragm assembly to the pump body.**

Place the diaphragm spring (8) in position in the pump body.

Place the diaphragm assembly (7) over the spring, the pull rod being downwards, and centre the upper end of the spring in the lower protector washer.

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 link, ultimately turning the assembly a complete quarter turn to the left, which will place the pull rod in the proper 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 4 o'clock position. After turning the diaphragm assembly a quarter turn to the left the " tab " should be at the 1 o'clock position. These positions are shown in Fig. 9, on page 15.

(d) **To assemble sub-assemblies.**

The two sub-assemblies of the pump are now ready for fitting together, and this is carried out as follows :—

Push the rocker arm (15) towards the pump until the diaphragm is level with the body flanges.

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

Instal the cover screws (9) and lock washer (10) 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 so held tighten the cover screws diagonally and securely.

TO TEST PUMP AFTER ASSEMBLY

(a) **With special apparatus.**

The best method is by using an AC-Sphinx bench 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 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 pump. Not more than 20 strokes should be 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 than 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.

(b) **Without special apparatus.**

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

Firstly, 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 held above the bath. Then with the pump clear of the paraffin bath place the 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 had 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.

TO REFIT TO ENGINE

Reverse the procedure outlined for removal from engine. *Ensure that the rocker arm is correctly positioned against the eccentric on the camshaft, as particularly when pumps are inaccessibly mounted there is a possibility of inadvertently getting the rocker arm under the eccentric or to one side, when damage will result after the pump setscrews are tightened.* The gasket between the pump and the crankcase should be renewed if unsound.

After refitting to the engine, the pump should be run for a short time and pipe unions and pump examined for the possibility of fuel leakage.

PETROL GAUGE

Description.

The petrol gauge fitted to the " Vanguard " is the Smith Type G.35, the instrument comprising two components, namely the dashboard meter and the tank unit.

The dashboard unit consists of a metal case, containing the coils and pole pieces which operate the gauge, and a bezel with a calibrated dial and indicator needle.

The dashboard unit has two coils wound on bakelite bobbins with soft iron cores and shaped pole pieces, which exert a magnetic force on a pivoted soft iron armature to which is attached the pointer. The magnetic effect of the two coils cause the armature (and, therefore, the pointer) to be deflected in accordance with the amount of petrol in the tank. The connections of these coils and a resistance mounted below the armature are shown in the wiring diagram. The voltage across each coil is varied according to the position of the tank unit float arm.

The tank unit consists of a float and float arm mounted in a zinc base die casting. The float arm carries a contact arm which travels over a resistance wound on a bakelite former. The contact arm takes up a position according to the quantity of petrol in the tank and, therefore, varies the current through the meter.

FAULT LOCATION

Sympton	*Cause*	*Remedy*
No Reading.	(1) Meter supply interrupted.	Reconnect.
	(2) Meter case not " earthed."	Connect case or fixing to earth.
	(3) Tank attachment cable " earthed."	Replace cable.
Meter reads full.	Tank unit cable broken or disconnected.	Reconnect.

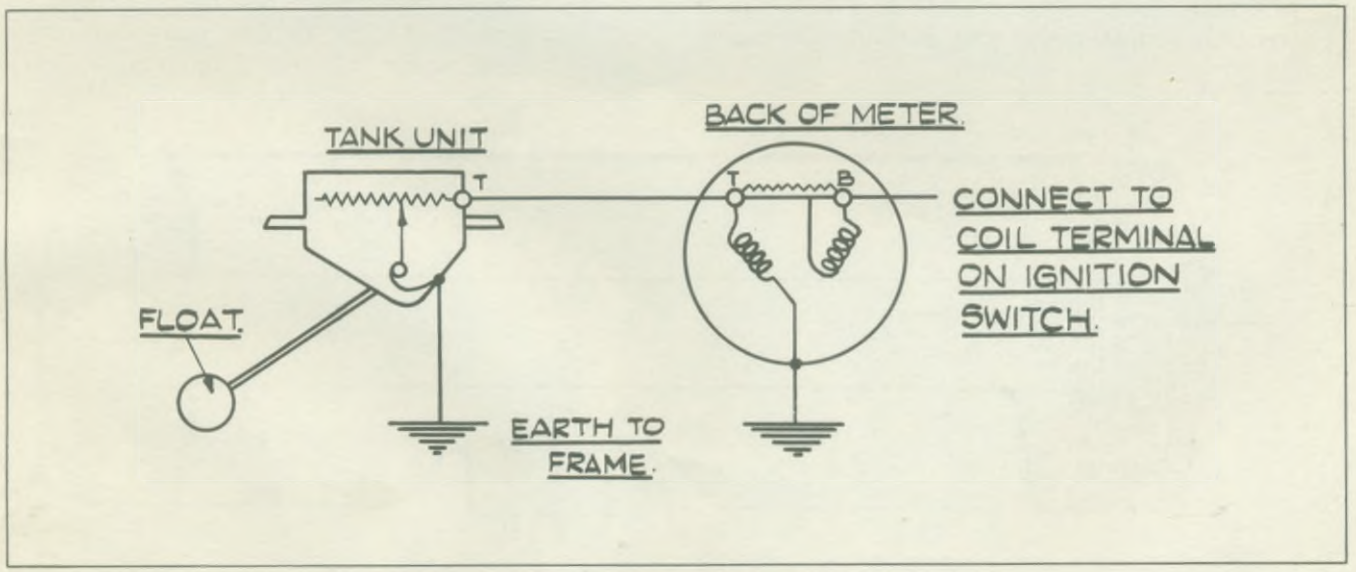

Fig. 5. Wiring diagram for fuel gauge

TO TEST METER

1. Disconnect wire from terminal " T." Switch on ignition. Meter should read " Full " or over.
2. With wire to " T " still disconnected, connect wire from terminal " T " to frame of car (*i.e.*, " Earth "). Meter should read " O " or lower.

   N.B.—The above tests will indicate whether the meter is functioning satisfactorily.

TO TEST TANK UNIT

1. Remove tank unit from tank after detachment of cover plate in spare wheel locker.
2. Check the float arm for free movement.
3. Connect terminal on tank unit to terminal " T " on meter.
4. Connect tank unit body casting to frame of car (*i.e.*, " Earth ").
5. Switch on ignition. The reading on the gauge face should vary according to the position of the float arm.

   N.B.—If the meter indicates " Full " irrespective of the position of the float arm, the tank unit is faulty and should be replaced.

Important precautions when carrying out adjustment or tests.

Under *no circumstances* should the battery supply be connected directly to terminal of tank unit.

On no account should the float arm be bent other than as it is when supplied. The float arm is provided with top and bottom stops which prevent the contact arm overrunning the resistance.

When communicating with ourselves or Messrs. Smith's Motor Accessories Ltd. always give particulars of year and model of car, also the code numbers of meter (on dial) and tank attachment (on top plate).

SERVICING INSTRUCTIONS FOR AC AIR CLEANERS AND SILENCERS

Home model (Fig. 6).

As a general guide the AC air cleaner and silencer fitted to the home model will in the home market need servicing about each 5,000 miles, although in any districts where roads are poor and considerable dust is present, servicing should then be carried out more frequently, say at half the above mileage—the procedure being as follows :—

Disconnect breather pipe from end of cleaner, undo clip holding cleaner to carburettor and remove cleaner assembly as a whole. The lower louvred end of the cleaner should then be rinsed in a bowl of paraffin, taking care that as far as possible the paraffin only swills the woven metallic mesh, and care should be taken not to submerge the whole end of the cleaner in paraffin, otherwise the internal sound absorption pads will become saturated.

After thoroughly rinsing the metallic mesh in this way, all surplus should be shaken or dried off, and the mesh should then be lightly oiled with engine oil, again allowing any surplus to drain away.

Finally, the cleaner assembly should be refitted to the engine, the procedure being the reverse for that for its removal.

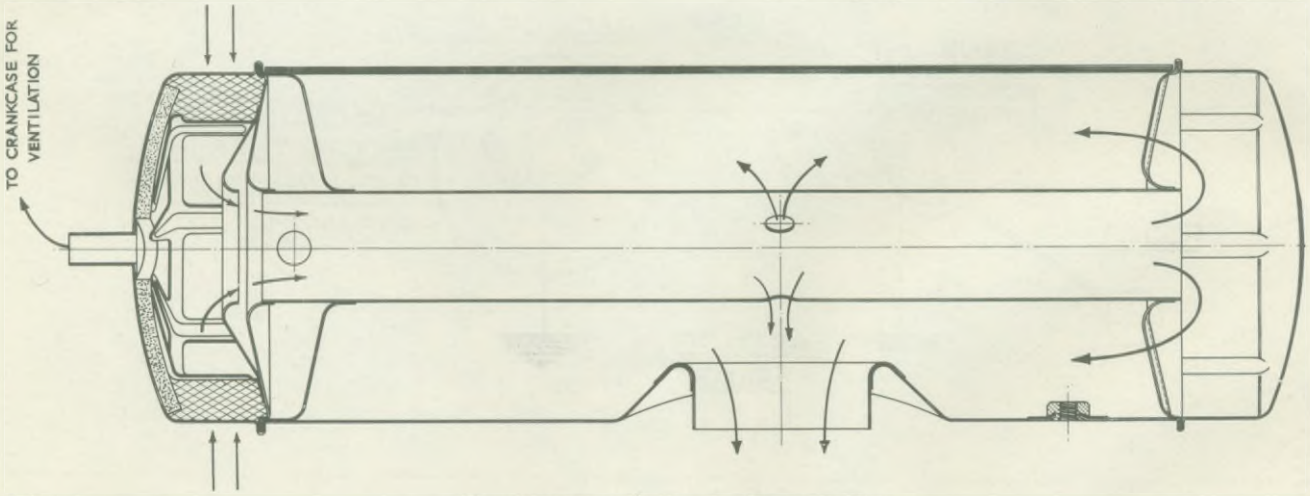

Fig. 6. **Air cleaner and silencer for normal use**

Export model (Fig. 7).

On this model an AC oil bath combined air cleaner and silencer is fitted, which gives high cleaning efficiency, combined with good air intake silencing.

As regards frequency for cleaning and re-oiling, each 2,500 miles can be taken as a general guide, although where cars are operating under extremely dusty conditions the frequency for servicing will need to be correspondingly increased.

Procedure is as follows :—

Undo centre wing nut and remove filter cover, filter element containing the woven metallic mesh—and the oil container. There is no need to remove the outer silencer assembly, which remains in position on the engine.

All dirty oil and sludge should be thoroughly cleaned out of the oil container, which then needs refilling with clean engine oil to the indicated level, and the oil container can then be replaced in position inside the silencing chamber.

The filter element should be cleaned by being thoroughly rinsed in a bath of paraffin—all surplus being afterwards shaken or dried off. The filter element can then be refitted inside the oil container, making sure that the cork sealing gasket located in the central tube of the element is in position and in good condition.

Finally, the cover needs to be replaced on the top of the filter element, again making sure that the corresponding sealing gasket is in position and intact, and then the wing nut is fitted and tightened in order to hold the various units together.

REMOVAL OF PETROL TANK

This is a perfectly straightforward operation which should be carried out, as far as practicable, with little petrol in the tank.

The procedure recommended for this operation is as follows :—

1. Disconnect tank to fuel pump pipe at the tank end, draining petrol off into suitable clean receptacle.

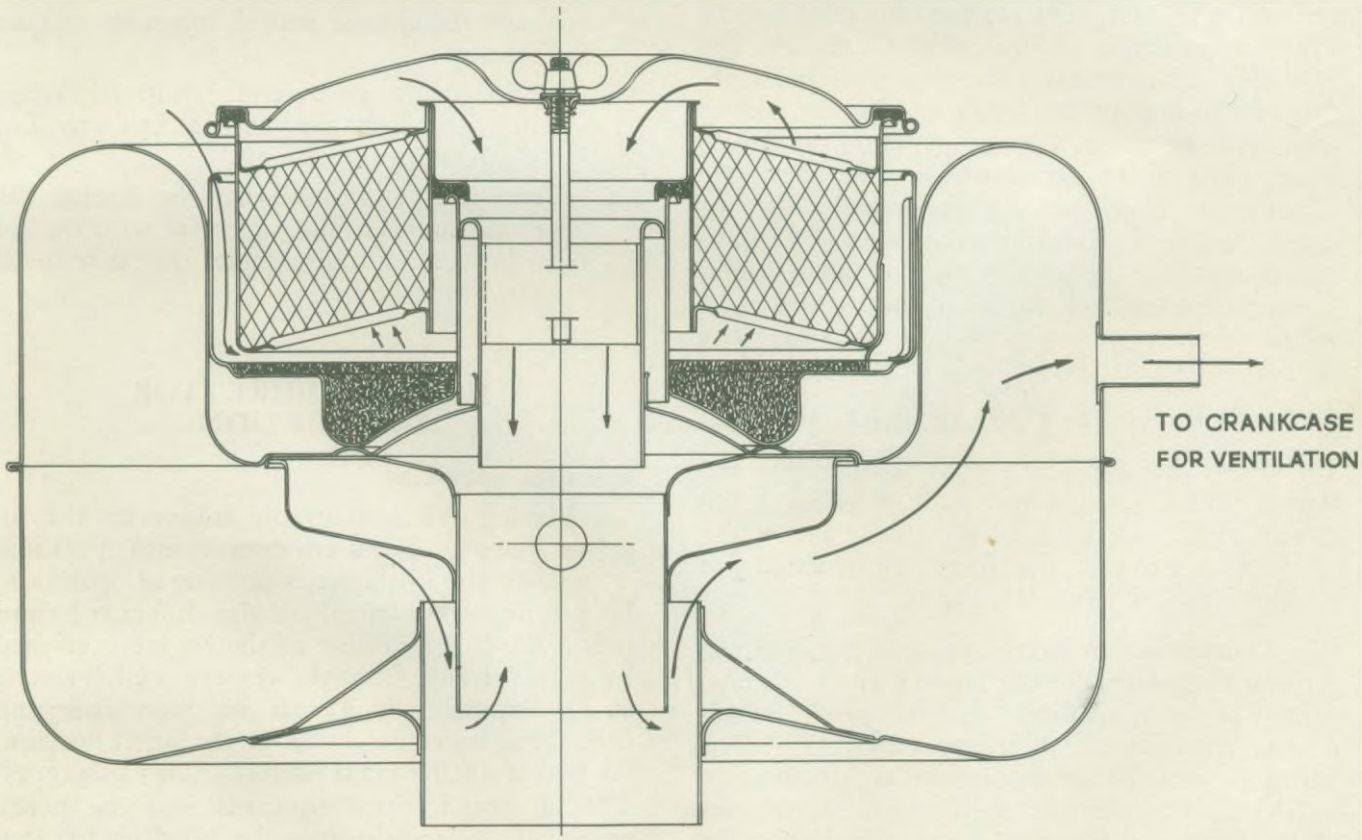

Fig. 7. **Air filter and silencer for use in dusty climates**

2. Disconnect the two electrical leads from the gauge tank unit.
3. Slacken the screws securing the rubber hose connections to the petrol tank and filter necks and slide hose off petrol tank. The freeing of the hose connections will be facilitated by the removal of the two screws securing the filler cap assembly.
4. Withdraw 12 securing setscrews and remove tank from below.

DOWNDRAUGHT SOLEX CARBURETTOR TYPE 32 B.IO
(See Fig. 8)

General description.

In effect this carburettor has two self-contained units, one which enables the engine to be started up from cold and subsequently warmed up, without the fear of overdosing, and the second one on which all normal running is done.

This carburettor is semi-dustproof; the air required for ventilating the float chamber, for the slow running mixture; and the emulsification of the main spraying mixture is all drawn through the air cleaner assembly, which is fitted to the carburettor. Only the starter unit, the use of which is limited, is open to atmosphere.

This arrangement has a double advantage, that of eliminating dirt or other abrasive matter and also ensuring *constant* mixture strength. Thus, even if the air cleaner is neglected and allowed to clog, petrol consumption is not directly affected. It should, however, be appreciated that the restriction of the air cleaner, when congested with dirt, will reduce the volumetric-efficiency of the engine and thus give rise to loss of power.

STARTER UNIT FOR 32 B.IO MODEL

When the dashboard control operating the starter unit is pulled out fully, the lever (sl) rotates the starter valve plate held on its seating by the spring (Y), so that holes of calculated size register with the tracts (D) and (C).

As soon as the electric starter is engaged, the turning engine creates depression in the channel (d). This is transmitted via the Solex starter mixing chamber to the starter well (SW). The petrol therein, partly emulsified by air entering at (sb) rises to the top of the well, passes over the partition and along the tract indicated by the dotted lines to the mixing chamber, and thence to the engine via the channel (d).

Meantime, the rise in engine revs. increasing the depression on the starter unit " sucks " inwards the starter plate T overcoming the pressure of the spring X. Air enters via the air jets Ga (one only shown) to further emulsify and weaken off the originally very rich mixture needed for starting at very low temperatures.

As a rule, within half a minute or so, according to atmospheric temperature, the engine is warm enough to allow the dashboard control to be pushed halfway in, when a marked resistance will be felt as the spring-loaded ball registers with a hole in the lever (sl). At this stage the valve plate will have rotated so that a smaller hole in it registers with the tract (D), reducing the flow of petrol which is, therefore, further well disintegrated and diluted by the air entering via the air jets (Ga).

The mixture is now of sufficient strength and volume to allow the engine to warm up to the point where the Solex starter can quickly be dispensed with altogether by pushing fully home the dashboard control.

To obtain full advantage of the Solex starting device, the following procedure is advised :—

1. Pull out the dashboard control fully and engage the electric starter, when the engine will start.
2. Drive straight away, and, whilst so doing, push in the dashboard control half way, *i.e.*, to the bi-starter position.
3. When it is estimated that the engine has warmed sufficiently to dispense with the aid of the starter unit, push the dashboard control fully home.

MAIN CARBURETTOR DESCRIPTION

Pilot jet operation

Having warmed up the engine on the bi-starter, the main carburettor comes into operation.

When the bi-starter is put out of operation, by pushing the control on the dashboard right home, the further idling of the engine is effected by petrol drawn from the reserve well (v) via a small channel which can be seen emerging therefrom, immediately above the larger horizontal lead from the main jet (G). This passage, it will be noted, turns upwards and the petrol eventually passes through the pilot jet (g) into the downwardly disposed channel, communicating with the idling orifice (10) controlled by the

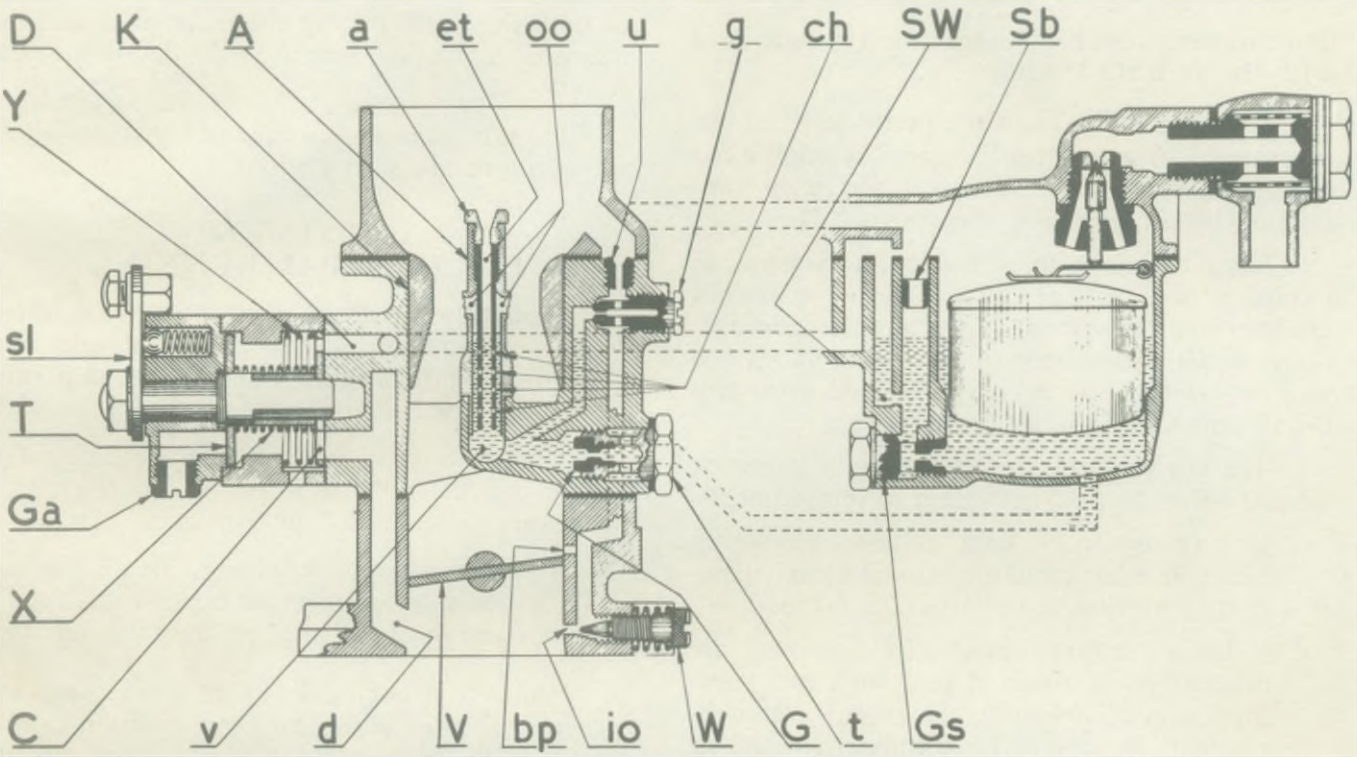

Fig. 8. Diagrammatic section of Solex Type 32 B.IO Carburettor

spring-loaded and knurled-headed taper screw (W).

It will be noted that the orifice (io) is on the engine and therefore suctional side of the throttle. A branch lead communicates with another orifice (bp) which enters the airway slightly on the atmospheric side of the almost closed throttle.

When the throttle is in the idling position, the duct in question, which we term the by-pass, acts as an air bleed upon the idling petrol supply, correcting any tendency towards over-richness when idling. Directly the throttle opens and the vane passes to the atmospheric side of this orifice, the orifice functions as an additional aperture for fuel delivery and proportionately enriches the output at the transfer position between the pilot and main supplies, and thus prevents a lean flat spot which might otherwise arise.

Main jet operation.

The petrol is delivered through a passage from the float chamber to the annular space around the main jet carrier (t) and thence through drillings in this holder to the metering jet (G). From the metering jet the petrol passes into the well (A) where it meets air drawn downwards via the calibrated air connection jet (a). This passes out through the small holes (ch) into the annulus, where an emulsion is formed with the petrol, and the resulting mixture rises to the four large spraying orifices, of which two are shown (oo) in the waist of the choke tube. Here the emulsion is caught up in the main air current and passes down to the manifold via the throttle valve (V).

DISMANTLING THE CARBURETTOR

It will be seen that with this carburettor the pilot jet (g), the main jet (G), and the starter petrol jet (Gs) are accessible from the exterior of the carburettor without dismantling. (The two starter air jets (Ga) are also fitted externally.

Access to the interior is easy and obvious. The air cleaner should be removed and the top casting may be withdrawn with its packing after screwing out the three slot-headed securing bolts. The removal of these items will expose the float chamber, the pilot jet air bleed (u) and the air correction jet (a).

The float can be lifted out quite easily, and the removal of the air correction jet (a) and the pilot jet air bleed (u) necessitates the use of a well-fitting screwdriver when it is required to clean these jets.

ADJUSTMENT OF THE CARBURETTOR

The starting device (there are two air jets with the 32 B.IO Model).

The air jets (Ga) and the petrol jet (Gs) are determined by experiment to suit the engine for which the carburettor is issued and it is very seldom that an alteration is required.

Should adjustment be needed, however, due to change of climate or altitude, the air jet should never be altered without consulting the manufacturer of the carburettor or one of their service stations, as this has been determined once and for all time on a cylinder capacity basis.

The correct procedure is to use a larger or smaller petrol jet (Gs) according to symptoms :—

1. If starting from cold is not practically instantaneous, or the engine stalls immediately after starting, a size larger (Gs) is required.
2. If black exhaust fumes occur, or there are other signs of over-richness, such as " hunting," immediately after the engine is started, particularly when the dashboard knob is pushed in halfway, a smaller (Gs) should be fitted.

MAIN CARBURETTOR

The idling or pilot jet (g) provides the necessary output for idling.

The slow-running screw mounted on the abutment plate of the throttle lever limits the closing of the throttle and thus fixes the idling speed of the engine. By screwing in this part the engine speed will rise and vice versa.

The mixture screw (W) permits the richness of the idling mixture to be varied. By turning this screw in an anti-clockwise direction enrichment takes place, up to the limit of the pilot jet's output and conversely, by clockwise rotation, the mixture is impoverished.

Poverty of mixture is recognized by the irregular behaviour of the engine and the tendency to stall. Over-richness will cause the engine to " hunt " and tend to " stall " when the " hunt " becomes excessive.

In order to perfect the slow running, adjust first the screw on the abutment plate, so as to fix approximately the speed of the engine. Then experiment with the adjustment of the screw (W) until even running is obtained.

As this operation will generally alter the speed, it will be seen that finally a nice adjustment of both the screw on the abutment plate and the mixture regulating screw will determine the result.

Do not make the mistake of trying to adjust the idling to too slow a speed.

ADJUSTMENT FOR GENERAL RUNNING

Generally speaking, the choke tube fitted to the carburettor is correct and should not, therefore, require altering unless a special performance is needed.

The main jet is determined by " tuning in " to the correct choke tube size and corrected by selection of a suitable " air correction " jet.

To determine what change from " standard " is necessary, it must be understood exactly how correction of the main jet output is effected.

When the engine is at rest, the spraying assembly is filled with petrol to a position closely approaching the spraying orifice (oo), but directly the throttle opens and creates a draught in the choke tube (K) two things happen :—

The petrol output from below increases by virtue of the rising depression in the choke tube waist, and if not corrected would do so by a gradually rising curve. In other words, it would become automatically richer as the speed rose. It is, therefore, the function of the emulsion tube (et) to adjust this mixture to the needs of the engine and it is done by varying the size of the correction jet (a).

The bigger the correction jet, the greater is the volume and velocity of the correctional air which passes vertically downwards and out into the annulus.

In the annulus, the correctional air meets with the petrol, which it emulsifies, and reduces the mixture strength by a curve which runs in direct opposition to the rising curve of an uncorrected output, in virtue, partly on account of its relieving progressively the air depression and partly on account of the mechanically obstructive effect which it exercises on the petrol flow.

The main virtue, however, of this layout is that, whereas by ordinary correctional means the whole of the curve is affected, the opposite directions which the fuel and air respectively follow in this assembly, have the effect of making

each member—*i.e.*, the main jet and the correction jet—more or less independent within their own particular sphere of operation.

Thus, if a rich area at the lower part of the curve is required, it is necessary to increase the main jet size without touching the correction jet.

If, on the other hand, it is wished to cut down, or increase, the mixture strength at the top of the curve, without interfering with the bottom end, it is necessary to increase or decrease the size of the correction jet above.

To give a practical illustration, let us suppose that an engine has been rebored (and in such a case a reconditioned carburettor should be fitted), and after running in with the standard carburettor setting, results from the carburation point of view are open to criticism. The possible defects will, almost certainly, be classified under two headings : (a) consumption not as good as expected or (b) poor " bottom end " performance, perhaps accompanied by a flat spot.

The normal main jet size for the Vanguard is, of course, 135 and the air correction jet 190. Dealing with (a) therefore, the first step is to reduce the main jet to 130. A try out may then show that, although the m.p.g. is satisfactory, power has fallen off, indicating an insufficiently rich mixture at the " top " end of the throttle curve.

To enrich the mixture at major throttle openings, it is only necessary to " correct " the main jet output, and it will be found that fitment of air correction jet 170 or thereabouts will restore power to normal.

(b) Poor pickup and " bottom end " flexibility, indicate the need for a richer mixture, so fit main jet 140. This will correct the fault, but a test may show a drop of 1 or 2 m.p.g. indicating an over-rich mixture at half to full throttle. This can be corrected by fitting say, size 200 or 210 correction jet.

All these adjustments to the carburettor must be carried out when the engine is at normal working temperature.

It will be appreciated that the departure from standard described above calls for experienced handling, as otherwise a considerable time can be spent on fruitless trial and error, experimental work which can be very expensive. It is best, therefore, in such circumstances to seek the aid of a Standard Agent, or to consult an officially appointed Solex Service Station.

It should be emphasized that when an engine reaches the stage where resleeving is necessary, the carburettor will be worn badly too. Consequently, we advise that a reconditioned carburetor, available from Standard Agents and Solex Service Stations, should be fitted when the engine is overhauled.

All adjustments to the idling and main mixture must be carried out when the engine is at normal working temperature.

Under no circumstances should an attempt be made to ream jets.

GENERAL NOTES

During cold weather, when the engine has remained at rest for a lengthy period, it is advisable to break the oil film by turning the engine over by hand, before switching on the ignition and before pulling out the dashboard mixture control for the starter device.

In cases where an engine has led a long period of disuse, the petrol pump priming lever should be used to fill the carburettor float chamber. If this is not done, the pump may not supply sufficient petrol to the carburettor to enable the engine to start until the output of the battery has been seriously depleted.

Similarly, if the car has been standing for some time, say two or three days, the petrol in the float chamber may have become stale. Difficult starting may result during cold weather, and it is well, therefore, to pump in a fresh supply before attempting to start the engine.

The auxiliary carburettor forming the starting device, as already explained, provides :—

1. A mixture which is richer proportionately as the temperature is lower, thus ensuring instantaneous starting from cold.
2. A means of weakening off the mixture rapidly by pushing in the dashboard control halfway as soon as the engine can " take it," thus avoiding all possibility of " piling up " as the temperature of the engine rises.

   N.B.—For absolute cold starting, the dashboard control is pulled out fully and the main carburettor throttle is allowed to remain closed in its normal idling position. On the other hand, when the engine is only partially warm, at the *most* it should only be necessary to pull out the tube to the halfway position.

The starting device has a secondary function, *viz.*, to assist the main carburettor when driving

away immediately after starting the engine, and should not be put out of action until the engine is sufficiently warm to function satisfactorily on the main carburettor, usually within half a mile of driving away.

Thus, there are three stages in the use of the starting device :—

(a) Dashboard control pulled fully out to start.

(b) Dashboard knob pushed in halfway as soon as possible. This stage is best effected whilst driving away.

(c) Dashboard control pushed fully " home " after driving a few hundred yards.

Under no circumstances should the dashboard control be used for starting the engine when hot.

DIAGNOSIS OF FAULTS

There can never be any question of definite failure with this carburettor. It is merely a question of finding the mistake in either fitting or adjustment.

It is well always to approach the diagnosis systematically and to avoid doing more than one thing at a time, for in that case it is impossible to ascertain from the eventual results which was the successful factor.

EXTERNAL LEAKAGES

Loose joints.

It is easy to see whether any of the exterior joints are loose. This should be the first possibility which is explored in cases of flooding from the carburettor.

Grit on the needle seating.

This is an unusual complaint and where it does arise it is experienced shortly after fitting and is then explained by stray particles of packing material, or pieces of solder or oxide which are apt to get loose inside the petrol pipe. To deal with such a difficulty remove the needle valve and clean same by carefully blowing it out and noting by suction test that it is hermetic, after which replace it and be sure that the washer is perfect and the tightening adequate.

Never attempt to " grind in " a needle valve. In cases where damage to seating is only small, a new seating can be made by removing the complete needle valve assembly from the carburettor, placing it on a hard surface, and lightly tapping the needle " home " rotating it between every two or three taps.

Punctured float.

If any petrol gets into the float its weight is, of course, increased, with the consequence that the level is raised and flooding occurs via the jets. In such a case, one must either change the pilot or locate, if possible, the point of leakage and repair this by soldering as a temporary measure. To locate the leakage point, immerse the float in boiling water and the emergence of bubbles will disclose the puncture and cause the petrol to evaporate. The repair of a leaky float, as described above, is only an emergency remedy, as the solder will unbalance and overweight the part. A new part should be obtained and fitted as soon as possible.

Excessive fuel pump pressure.

In rare cases it is possible for the pump pressure to be excessive and to cause flooding or high petrol consumption.

In such cases the correct procedure, of course, is to have the fuel pump tested and adjusted if delivering at above the prescribed pressure, but the difficulty can sometimes be more easily overcome by fitting a needle valve one size smaller than standard.

Stoppage in petrol supply.

It is advisable at the commencement to assure oneself that there is petrol in the tank and that the tank to fuel pump and fuel pump to carburettor pipework is clear of obstruction. It often happens especially in the ordinary way, either by removing and priming same or by the temporary application of air pressure to the filler cap.

A frequent cause of difficult starting is leakage at the pipe unions connecting the fuel pump with the petrol tank. Do not overlook this possibility when endeavouring to diagnose the cause of difficult starting.

Bad slow running.

Ascertain that the adjustment is correct. If, even then, a good slow running is not obtained, air leakage is indicated at some point of the induction system, probably via worn inlet stems and their guides, try a slightly larger auxiliary jet, but do not overdo the increase in jet size, as such would cause the engine to " hunt " when idling. When there is any choice between two jets which give approximately the same result, always use the smaller one. Before making any jet alteration ensure that the difficulty is not explained by jet obstruction.

If, in spite of trying various auxiliary jets, regular slow running is not possible, excessive induction leakage is certainly indicated, always assuming that the ignition and valve timing are in order. The engine in this case will not idle regularly and when one attempts to reduce the idling speed, the engine will stall.

Where excessive leakage to the induction system is occurring, proper slow running is impossible, as the engine is inspiring through various points of leakage, a greater quantity of air than that entering by the proper channels, thus the correct mixture for slow running becomes unobtainable.

BAD ACCELERATION

Bad adjustment.

Ensure that the carburettor jet settings are those specified in the " General Data " section and that the carburettor is otherwise in proper adjustment.

If the performance is still bad, in spite of attention to the precautions set out in the previous paragraph, a larger main jet than is normally necessary may, in some cases, be required owing to the individual " characteristic " of the engine, but the choke tube as a rule should not be changed.

Defective ignition.

Ensure that the accumulators are in good order and the sparking plugs functioning properly and correctly set to the gap specified in the " General Data " section.

Complete impossibility of acceleration.

Assuming that starting and idling are possible, this can only be caused by obstruction of the main jet, weak ignition, or other engine irregularities.

LACK OF MAXIMUM SPEED

Butterfly not opening fully.

Note that when the accelerator is depressed fully, the butterfly opens to its greatest extent. This can be checked by observing the position of the limit screw which should be in contact with the boss case on the outside of the throttle chamber.

Insufficient ignition advance.

This is a prevalent cause both of heavy petrol consumption and insufficient top speed, and can usually be recognized by inability to make the engine knock on a hill when slowing up with fully advanced spark. In such cases, the ignition should be slightly advanced, as indicated in the " Engine " section, until just short of " pinking " point.

Defective petrol supply.

This can always be recognized by standard acceleration up to a certain speed at which periodic hesitations and back-firing occur, curable always by a slight throttle reduction. For confirmation, make a special test with an independent test tank placed as high as possible so as to ensure a good head.

Silencer choked.

In certain designs of silencers this trouble can easily occur after the car has covered a fair distance. It is generally easy to recognize it by the absence of a clearly marked exhaust note at the tail pipe and instead a steady rush of hot gas. To confirm, make a test with the exhaust pipe disconnected from the silencer.

OVERHEATING

It is seldom that the carburettor is the cause of this, and it is practically impossible for this unit to be responsible.

Too much petrol, or on the other hand, an excessively weak mixture can certainly raise the temperature a little, but in no case should it nearly approach the margin of cooling that is provided by the water cooling under normal conditions.

Apart from a major examination, the most likely direction in which to work are reducing the mixture, but not to an unduly weak condition, and advancing the ignition as far as possible, consistent with an absence of pinking. A retarded spark will always raise appreciably the temperature of the engine.

A very frequent and often unsuspected cause of overheating is furred radiators and water jackets.

When overheating develops insistently from no external cause that can be located, obtain from a steam engineer a supply of ordinary boiler de-furring compound with instructions how to use it, and this will almost certainly effect a cure, especially if the car has been used in a district where the supply water is very hard.

KNOCKING

Knocking is usually the result of various causes which as a rule have nothing to do with carburation.

When knocking is actually caused by carburation it can only be due to weak mixture, and if not curable by one size larger main jet other causes must be sought.

EXCESSIVE CONSUMPTION

Note first that there is no leakage either at the carburettor, the pipe line or in the petrol tank. Take steps to ensure that excessive petrol consumption is being experienced by carrying out a test with a calibrated test tank.

Insufficient ignition advance.

This is a most frequent cause of heavy consumption, as already mentioned, and it is always well to run with the spark as far forward as is consistent with the avoidance of knocking.

It is well, of course, to note that there is no sign of misfiring and that the carburettor is not flooding, or petrol being lost through other sources of leakage.

Bad condition of engine.

The state of the motor has, of course, a considerable effect upon economy.

It is easy to realize that if compression is lost via worn piston rings or pitted valves, quite an abnormal amount of fuel can, in some cases, be used to obtain a normal performance. An increase of as much as 100 per cent in consumption can easily result from this cause.

The latter difficulty, however, is readily recognized owing to the general lack of power exhibited and in such cases it is useless to attempt to remedy matters at the carburettor.

MECHANICAL FUEL PUMPS

Fuel wastage can result if for any reason the pump is developing too much pressure. The trouble can generally be presumed when flooding occurs whilst descending a hill against the engine and there will be a distinct smell of petrol from the driver's seat.

If ordinary tests fail to disclose any leakage, a short run with a pint or quart test tank, and the pump out of action, will confirm or otherwise whether the pump is to blame.

There is also a possibility of air leaks between the rear tank and the pump, which will delay the delivery of petrol to the carburettor.

DIFFICULT STARTING WHEN ENGINE IS HOT

In practice, whilst the engine, when warm, usually starts readily, immediately the electric starter is engaged, without using the Solex Rich Mixture (" Starter ") device, in certain circumstances, such as when endeavouring to start a hot engine within a few minutes after stopping it, some little difficulty may be experienced.

This is explained by the fact that when the engine is stopped, the petrol spray in the induction system is deposited on the " floor " of the induction passages. The cessation of the fan-draught causes a rapid rise in temperature with the result that the deposited spray almost instantaneously evaporates, and temporarily fills the cylinders with a slightly over-rich and not readily combustible mixture.

To render this mixture combustible, more air is required. Therefore, if, when attempting to start after a short stop, the engine does not spring into life when the electric starter is engaged, depress the accelerator pedal to the full extent and, within a few seconds, the extra air thus admitted to the cylinders will " correct " the mixture content and the engine will start.

TO CLEAN " UE " TYPE FILTER

The filter should be examined every 1,000 miles and cleaned if necessary. Under conditions of dust-laden atmosphere this mileage interval should be reduced as conditions dictate.

With reference to the exploded diagram, Fig. 4 on page 3 of this Section, access to the filter gauze (22) is gained by unscrewing the serrated wheel at the bottom of the cradle (19) underneath the glass filter bowl (20), whilst holding the latter in position until it is completely free to be removed after cradle (19) has been swung rearwards.

The cork gasket (21) and the filter gauze (22) can then be carefully peeled away from the upper casting (2).

The filter bowl should be washed out with petrol and wiped clean and the filter gauze cleaned with an air jet or washed in petrol.

The cork gasket should be replaced if broken or if it has hardened.

When replacing the above components, first carefully locate the gauze over the central delivery spigot on the upper casting and position filter bowl with the cork gasket resting on its upper rim. Swing the retaining cradle into

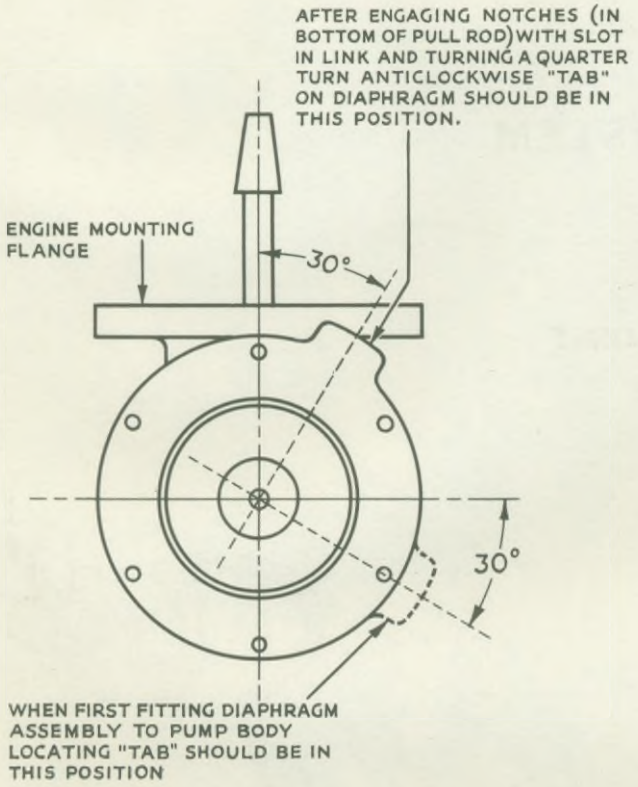

Fig. 9. Fitting diaphragm to "UE" type petrol pump.

position and tighten the serrated wheel just sufficiently to make a petrol tight joint. Check the petrol pipe unions, the nuts securing pump to crankcase and the setscrews holding the upper and lower castings together for tightness, then prime the system with the hand primer until the bowl is full.

FUEL SYSTEM

SUPPLEMENT

Removal of petrol tank.

See "Coachwork," Series II Supplement, page 8.

Fuel tap.

With the "bolster" type fuel tank fitted to the Series II saloons, the fuel level is now higher than the petrol pump feed union when the tank is full.

In order that it may be possible to disconnect this pipe from the pump without having first to drain the fuel tank, a fuel cock has been fitted to a special bracket welded on to the chassis frame just to the rear of the left-hand front damper.

Fig. 1 shows the "ON" and "OFF" positions of this petrol tap.

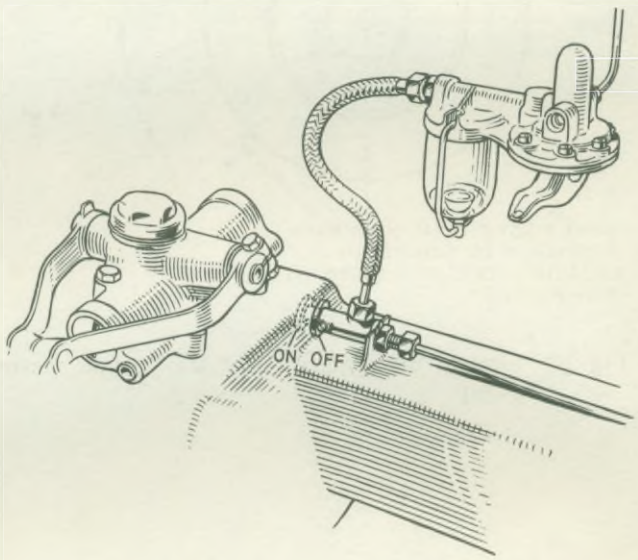

Fig. 1. Location of fuel tap.