CARBURETTERS AND FUEL SYSTEM

SECTION B

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CARBURETTERS (Cars not fitted with automatic enrichment device)

PETROL PUMP

CARBURETTERS AND FUEL SYSTEM

CARBURETTERS

2.8/4.2 Litre Power Units
(Cars fitted with SU.HD8 Carburetters)

DESCRIPTION

The early 2.8 and 4.2 litre power units were fitted with SU.HD.8 carburetters for all countries except U.S.A. and Canada.

The Routine Maintenance and Servicing details remain identical except where otherwise stated.

The enrichment device for starting is in the form of an auxiliary carburetter attached to the front carburetter.

The jet, which is fed through its lowest end, is attached to a synthetic rubber diaphragm by means of a jet cup and jet return spring cup, the centre of the diaphragm being compressed between these two parts; at its outer edge it is held between the diaphragm casing and the float chamber arm. The jet is controlled by the jet return spring and the jet actuating lever, the latter having an external adjusting screw which limits the upward travel of the jet and thus controls the mixture adjustment; screwing it in (clockwise) enriches the mixture, and unscrewing it weakens the mixture.

Idling

The carburetter idles on the main jet and the mixture is conducted along the passageway, connecting the choke space to the other side of the throttle disc.

The quantity of the mixture passing through the passageway and, therefore, the engine idling speed, is controlled by the slow-run valve. It follows that, when idling, the throttle remains closed against the bore of the carburetter.

DATA

(4.2 Litre)

Type	SU.HD8 (twin)
Size	2in. (5.08cm)
Jet needle type	UM
Jet size	.125in. (3.17mm)
Auxiliary starting carburetter needle type	425/8

(2.8 Litre)

Type	SU.HD8 (twin)
Size	2in. (5.08cm)
Jet needle type	U.V.V.
Jet size	.125in. (3.17mm)
Auxiliary starting carburetter needle type	425/8

Note: The jet needle is stamped on the side or top face of the parallel portion of the needle. The auxiliary starting carburetter needle is stamped with the large number on the shoulder of the needle with the small number on the parallel portion of the needle.

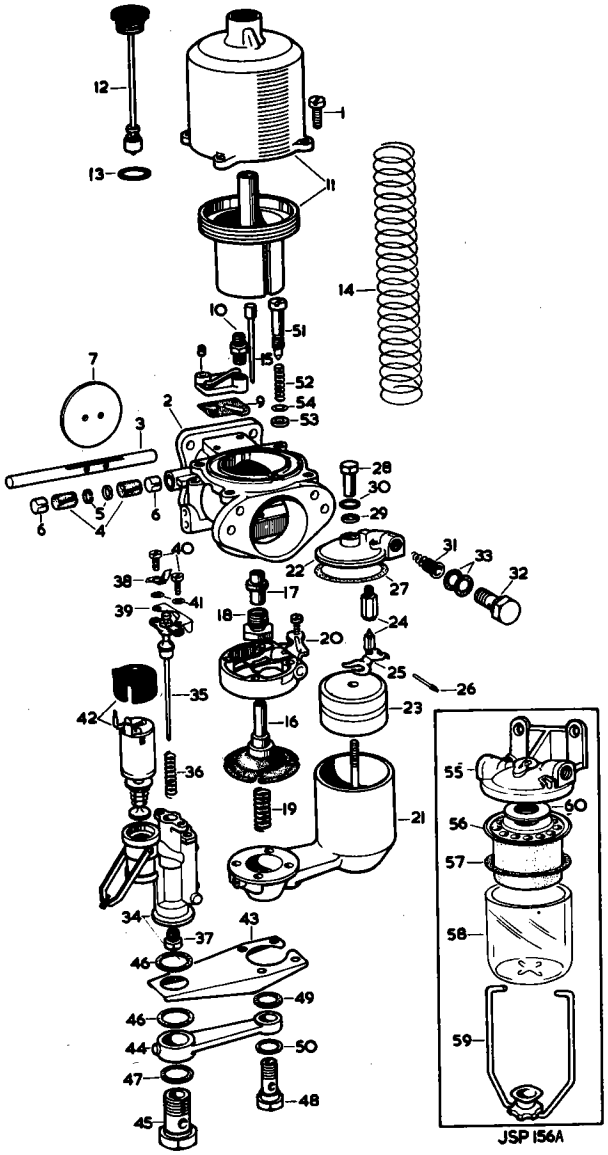


Fig. 1 *Exploded view of the S.U. Carburetters*

1 Screw
2 Body
3 Throttle spindle
4 Bush
5 Retaining ring
6 Retaining ring
7 Throttle disc
8 Adaptor
9 Gasket
10 Ignition union
11 Suction chamber
12 Damper assembly
13 Washer
14 Spring
15 Jet needle
16 Jet assembly
17 Jet bearing
18 Nut
19 Spring
20 Jet housing
21 Float chamber
22 Lid
23 Float
24 Needle and Seat
25 Lever
26 Knurled pin
27 Gasket
28 Cap nut
29 Serrated washer
30 Aluminium washer
31 Filter
32 Banjo bolt
33 Fibre washer
34 Starter Carburetter body
35 Acceleration needle assembly
36 Spring
37 Jet
38 Spring plate
39 Dust shield
40 Screw
41 Shakeproof
42 Solenoid
43 Bracket
44 Connecting arm
45 Banjo bolt
46 Washer
47 Washer
48 Banjo bolt
49 Fibre washer
50 Aluminium washer
51 Valve
52 Spring
53 Gland washer
54 Dished washer
55 Filter head
56 Filter element
57 Seal
58 Bowl
59 Clip
60 Seal

ROUTINE MAINTENANCE

EVERY 3,000 MILES (5.000 KM.)

Lubricate Carburetter Piston Damper

Each carburetter is fitted with an hydraulic piston damper which, unless periodically replenished with oil, will cause poor acceleration and spitting back through the carburetter on rapid opening of the throttle.

To replenish with oil, unscrew the cap on top of the suction chambers and lift out the damper valve which is attached to the cap. Fill the hollow piston spindle, which can be seen down inside the bore of the suction chamber, with S.A.E.20 engine oil.

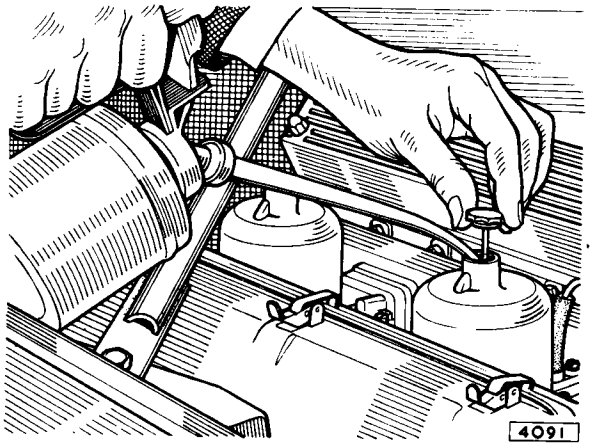


Fig. 2 *Topping up the hydraulic damper*

Check Carburetter Slow Running

(A) Cars fitted with synchromesh Gearbox

The idling speed of the engine when fully warmed up should be set at 700 r.p.m.

If the idling speed is less than 700 r.p.m., or if the engine is not idling smoothly, chatter from the constant mesh gears may be noticeable.

(B) Cars fitted with automatic transmission

The idling speed of the engine when fully warmed up should be set at 600 r.p.m., with P. or N. selected—there will be a slight reduction of idling speed when D or 2 (D1 or D2—4.2 litre) is engaged.

Every 6,000 Miles (10,000 Km)

Filter Element (Pre 1973 cars)

The filter is attached to the right hand wing valance on early cars and in the luggage compartment adjacent to the spare wheel on later cars. It is of the glass bowl type with a renewable filter element.

An 'ON/OFF' tap is provided in the top of the filter body. Turn the tap fully clockwise to close the petrol line, slacken the locknut and swing the retaining clip to one side. Remove the filter bowl and discard the element.

Note: On later cars, a guard is fitted and this must be swung to one side to gain access to the filter.

Wash the bowl in petrol and refit with the new element and sealing washers.

Note: The filter bowl should be cleaned and the element changed more frequently if sediment build-up is excessive.

Carburetter Filters

Remove the bolts securing the petrol pipe unions to each float chamber and withdraw the filters.

Wash the filters and clean in petrol; do not use a cloth to clean the filter as particles will stick to the gauze.

When refitting, insert the filter with the spring first and ensure that the fibre washers are replaced, one to each side of the banjo union.

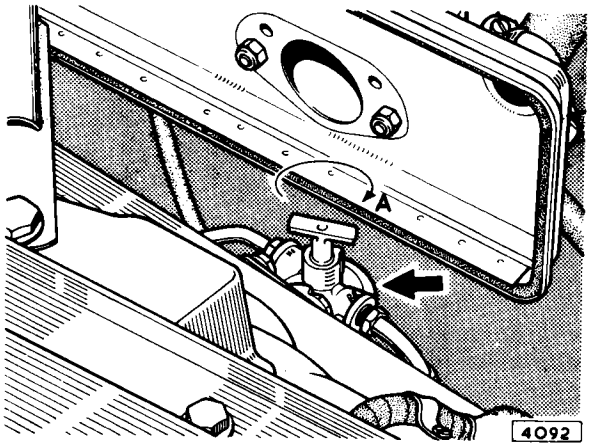


Fig. 3 *Fuel feed line filter (Early cars)*

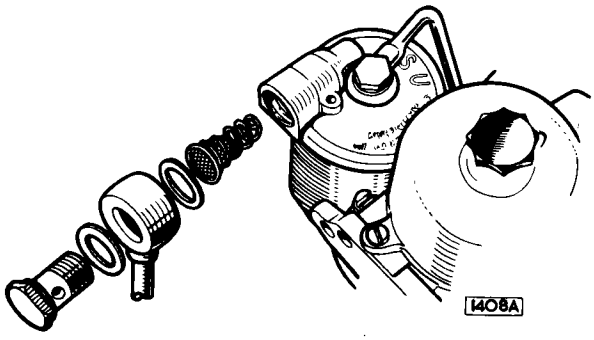


Fig. 4 *Carburetter filter removal*

CARBURETTERS

Removal

Remove the air cleaner cover, back plate and element.

Close the petrol tap on the filter and disconnect the banjo unions from the carburetter float chambers. Collect the filters and fibre washers.

Remove the distributor vacuum advance pipe completely.

Disconnect the petrol feed pipe from the auxiliary starting carburetter.

Disconnect the cables from the choke solenoid.

Disconnect the throttle cable from the accelerator pedal, remove the nut securing the outer casing and withdraw the cable through the bulkhead up to engine numbers 7G.3146, 2.8 litre and 7L.5176, 4.2 litre only.

On automatic transmission cars, remove the spring clip securing the kick-down link located at the rear of the rear carburetter.

Disconnect the throttle return springs.
Remove the four nuts securing each carburetter to the inlet manifold and withdraw the carburetters.

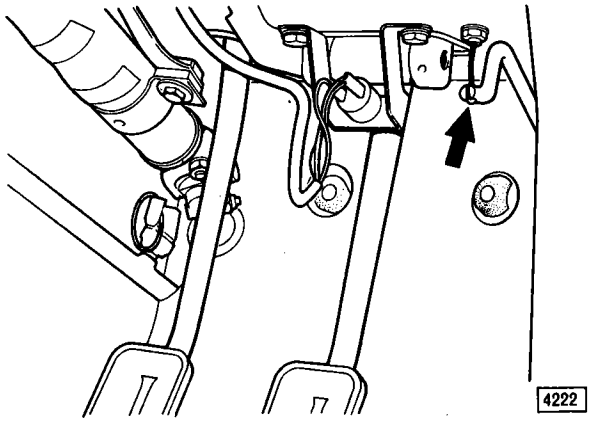


Fig. 5 *Throttle pedal cable connection and securing nut (Early cars only)*

Refitting
Refitting is the reverse of the removal procedure. Renew the carburetter/manifold gaskets. Two gaskets are fitted to each carburetter, one either side of the heat insulator pads. On later cars, 'O' rings replaced the gaskets.

CLEANING THE SUCTION CHAMBER AND PISTON

This should be done at approximate intervals of every twelve months, or if the carburetter is dismantled for any reason. After detaching, clean the main inside bore of the suction chamber and the two outside diameters of the piston with a rag moistened in petrol or thinners, and then reassemble in a dry and clean condition with a few spots of thin oil on the piston rod only. Do NOT use metal polish to clean the suction chamber and piston.

CARBURETTER TUNING

It is useless to attempt carburetter tuning until the cylinder compressions, valve clearances, sparking plug gaps and contact breaker point gaps have been tested, checked and adjusted, if necessary. The distributor centrifugal advance mechanism and vacuum advance operation should be checked and ignition timing set to the correct figure. For final road test, adjustment of not more than six clicks of the micrometer adjustment at the distributor to either advance or retard is permitted. The ignition setting is important since, if retarded or advanced too far, the setting of the carburetters will be affected.
Only two adjustments are provided at the carburetters: (i) The slow running volume screw (A) (Fig. 6) governing idling speed, and (ii) the mixing adjusting screws (B) governing mixture strength. Correct setting of the mixture strength at idling speed ensures that the carburetters are correctly adjusted throughout their entire range.
Ensure that the needles are correctly located in the pistons, that is, with the shoulder of the needles flush with the base of the pistons. Check over the carburetters and ensure that pistons are free in the suction chambers, petrol filters clean, and hydraulic piston dampers topped up with the recommended grade of engine oil. Lubricate the throttle controls and check for free operation and full travel.

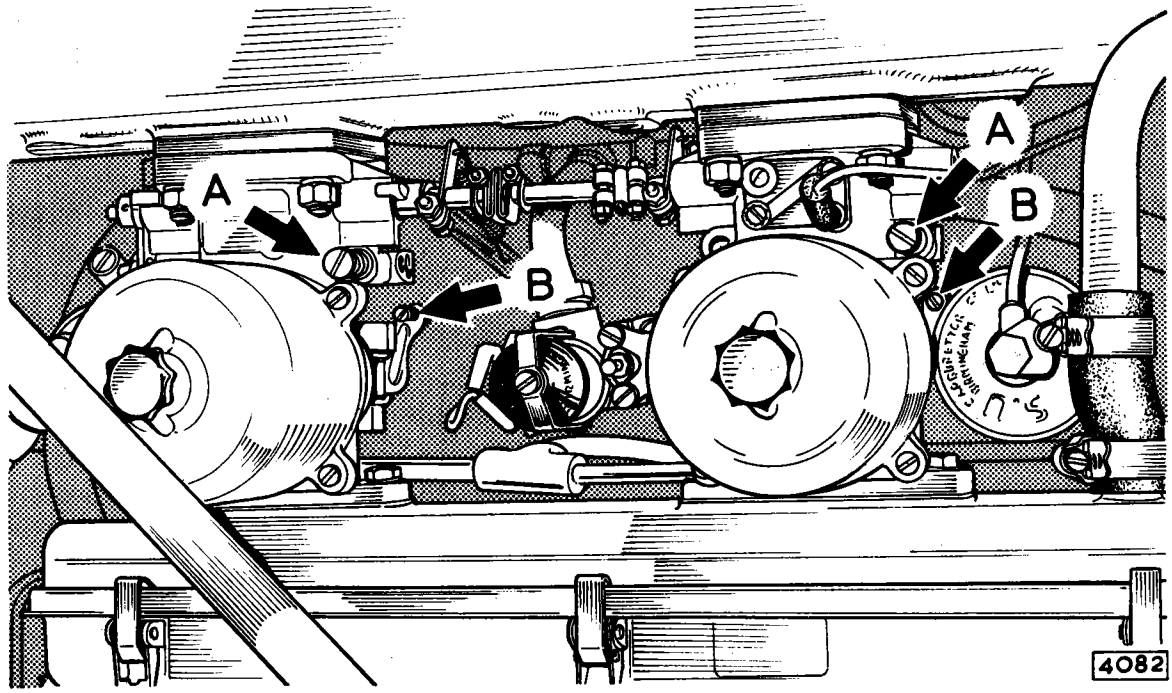


Fig. 6 *Carburetter tuning—"A"—Slow running screw, "B"—Mixture adjusting screw*

Before carrying out the instructions which follow, it is desirable to ensure that the mixture strength of both carburetters is correct. To do this, screw out both mixture screws until the tops of the jets are flush with the jet bridge in each carburetter body; this can be observed through the piston chamber after removal of the suction chamber and piston. Screw in the mixture screws until the jets start to move and then rotate screws a further 3½ turns.

Slacken one clamp bolt on the coupling between the throttle spindles, check that both butterfly valves are fully closed by rotating both spindles clockwise when viewed from the front. Tighten the coupling clamp bolt. Screw in (rotate clockwise) the slow running volume screws until they are down fully in their seatings. Unscrew each screw 2½ turns.

Run the engine until the normal operating temperature is reached and check that both carburetters are sucking equally by placing one end of a length of rubber tube to the ear and the other end inside each carburetter intake in turn. Rotate the slow running volume screws until the carburetters are synchronised, that is, are sucking equally and the engine is idling at approximately 600 r.p.m. on cars fitted with automatic transmission, 700 r.p.m. manual transmission cars.

Recheck that both butterfly valves are fully closed by rotating the throttle spindles (in a clockwise direction looking from the front) and noting if any change in engine speeds results; no change in engine speed or note should result if the butterfly valves are fully closed.

Recheck the mixture by screwing the mixture screws up (weaker) or down (richer) by the same amount until the fast idling speed consistent with even running is obtained. As the mixture is adjusted, the engine will probably run faster and it may be necessary to adjust the slow running screws to retain the correct idling speed.

Check the mixture strength by lifting the piston of the front carburetter by approximately 1/32in. (.08mm) if when:—

(a) The engine speed increases and continues to run faster, the mixture is too rich,
(b) The engine speed immediately decreases, the mixture is too weak,
(c) The engine speed momentarily increases very slightly, the mixture is correct.

Repeat the operation for the rear carburetter and, after adjustment, re-check the front carburetter as both are inter-dependent.

When the mixture is correct, the exhaust note should be regular and even. If it is irregular with a splashy type of mis-fire and colourless exhaust, the mixture is too weak. If there is a regular rhythmical misfire in the exhaust note with a blackish exhaust, then the mixture is too rich.

Float Chamber Fuel Level

When the fuel level is correct a 7/16in. (11.1mm) test bar will just slide between the lid face and the inside curve of the float lever fork when the needle valve is in the "shut-off" position.

If the float lever fails to conform with this check figure, it must be carefully bent at the start of the fork section in the necessary direction for correction. Take care to keep both prongs of the fork level with each other and maintain the straight portion of the lever dead flat.

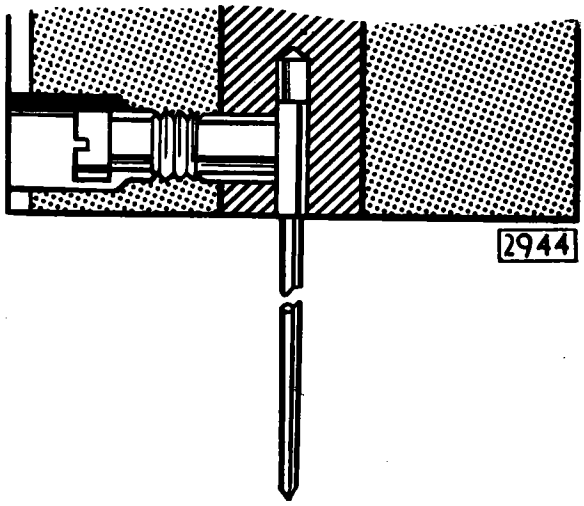


Fig. 7 *Positioning the jet needle*

It is not advisable to alter the fuel level unless there is trouble with flooding; although too high a level can cause slow flooding, particularly when a car is left ticking over on a steep drive. It should also be remembered that flooding can also be caused by grit in the fuel jamming open the needle valve; undue friction in the float gear; excessive engine vibration, or a porous float.

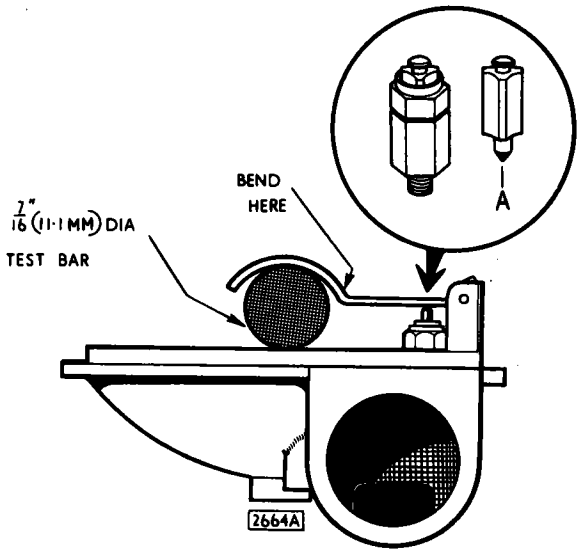


Fig. 8 *Checking the float lever setting*

CENTRING THE JET

Warning: Take care not to bend the carburetter needle when carrying out this operation.

Remove the carburetter from the engine as described on page B.5.

Remove the four setscrews securing the float chamber to the carburetter body. Remove the float chamber, jet housing and jet. Remove the hydraulic damper.

With a ring spanner slacken the jet locking nut approximately half a flat. Replace the jet and diaphragm assembly. The jet is correctly centred when the piston falls freely and hits the jet "bridge" with a metallic click. To centre the jet, push the jet and diaphragm assembly as high as possible with the hand, and with a pencil or rod gently press the piston down on to the jet bridge; centralisation will be facilitated if the side of the carburetter body is tapped lightly.
Tighten the jet locking nut.
The actual centring must be carried out with the setscrew holes in the jet diaphragm and carburetter in alignment. After tightening the jet locking nut, the jet diaphragm must be kept in the same position relative to the carburetter body; the simplest way to do this is to mark one of the corresponding jet diaphragm and carburetter body setscrew holes with a soft pencil. Failure to do this may cause the centralisation to be upset.
Check that the centralisation is correct by noting if there is any difference in the sound of the piston hitting the jet bridge with the jet in its highest and lowest positions. If there is any difference in the sound, the procedure for centralising the jet will have to be repeated.
If difficulty in centring the jet is encountered after carrying out the above procedure, the jet needle can be lowered slightly in the piston to make the centralising effect more positive. The needle must, however, be restored to the normal position when checking the centralisation.

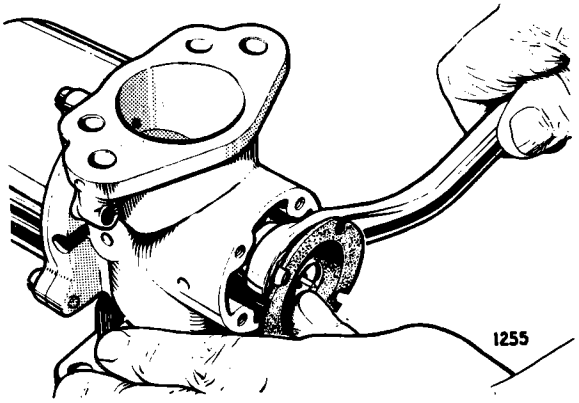


Fig. 9 *Centring the jet*

THE AUXILIARY STARTING CARBURETTER

Description (Fig. 10)
The enrichment apparatus for starting is, in effect an auxiliary carburetting system. The main body casting (1) containing a solenoid-operated valve and fuel metering system is illustrated as a separate unit attached by means of a ducted mounting arm to the base of the main carburetter fuel inlet.
The auxiliary carburetter forms, therefore, a separate unit additional to the normal float chamber retained by the hollow cross-drilled bolt.
Fuel is supplied to the base of the jet (9), which is obstructed to a greater or lesser degree by the tapered slidable needle (10).
When the device is in action, air is drawn from atmosphere through the air intake (7) and thence through the passage (8), being carburetted with fuel as it passes the jet (9). The mixture is thence carried upwards past the shank of the needle (10) through the passage (14) and so past the aperture provided between the valve (3) and its seating (2). From here it passes directly to the inlet manifold through an external feed pipe.
The device is brought into action by energising the winding of the solenoid (5) from the terminals (6). The centrally located iron core (4) is thus raised magnetically, carrying with it the ball-jointed disc valve (3) against the load of the small conical spring and thus uncovering the aperture provided by the seating (2).

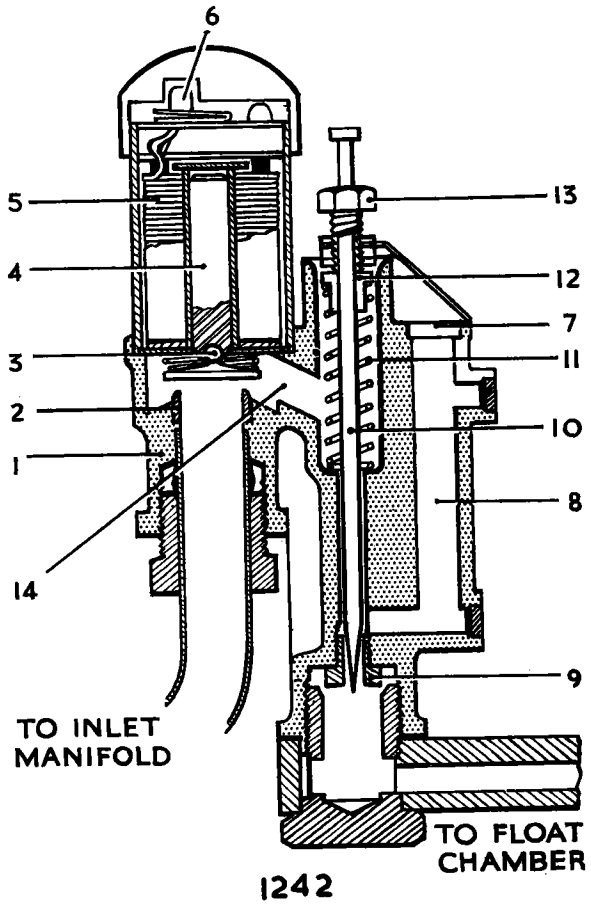


Fig. 10 *Sectional view of the auxiliary starting carburetter*

Considering the function of the slidable needle (10), it will be seen that this is loaded upwards in its open position by means of the light compression spring (11) which abuts against a disc (12) attached to the shank of the needle. The needle continues upwards through the vertically adjustable stop (13) in which it is slidable mounted and it finally terminates in an enlarged head.
Depression within the space surrounding the spring (11) is directly derived from that prevailing in the induction tract, and this exerts a downward force upon the disc (12), which is provided with an adequate clearance with its surrounding

bore. This tends to overcome the load of the spring (11) and to move the needle downwards, thus increasing the obstruction afforded by the tapered section which enters the jet (9).
The purpose of this device is to provide two widely different degrees of enrichment, the one corresponding to idling or light cruising conditions and the other to conditions of open throttle or full-power operation. In effect, under the former conditions, the high induction depression prevailing will cause the disc (12) to be drawn downwards, drawing the tapered needle into the jet (9), whilst under the latter, the lower depression existing in the induction tract will permit the collar to maintain its upward position with the needle withdrawn from the jet.
The tuning elements concerned in this device are the size

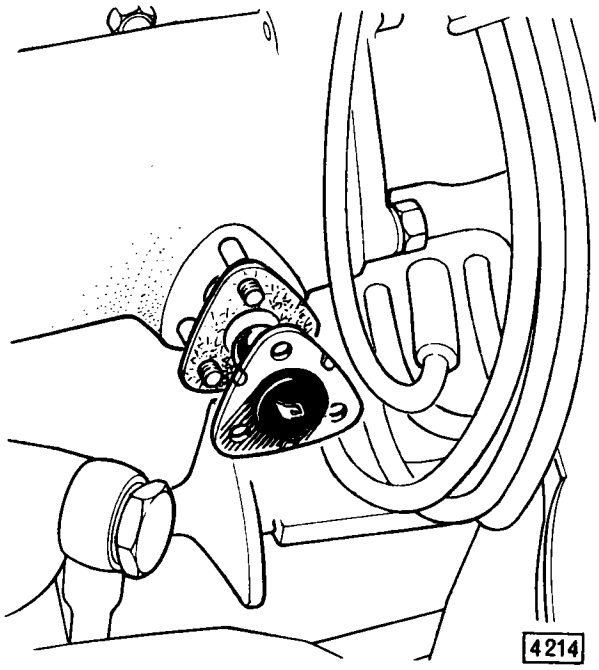


Fig. 11 *The thermostat switch*

and degree of taper of the lower end of the needle (10), the diameter of the disc (12), the load provided by the spring (11) and the degree of movement permitted to the needle assembly, as determined by the adjustment of the stop(13). The solenoid (5) is energised by means of a thermostatically operated switch housed in the inlet manifold water jacket. This is arranged to bring the apparatus into action at temperatures below about 30-35 deg. C. (86-95 deg. F).

Adjustment
The engine must be at its normal running temperature before any attempt is made to tune the auxiliary enrichment device.

As it can generally be assumed that the tapered form of the needle (10), the strength of the spring (11), and the diameter of the disc (12) have already been appropriately chosen, tuning is generally confined to the adjustment of the stop screw (13). It will be appreciated that the main purpose of this adjustment is to limit the downward movement of the needle, the head of which abuts against the upper surface of the stop screw at the lower extremity of its travel. The final downward movement of this needle determines, as has been described, the degree of enrichment provided under idling conditions with the auxiliary carburetter in operation. An appropriate guide to its correct adjustment in this respect is provided by energising the solenoid when the engine has already attained its normal temperature. The stop screw (13) should be then so adjusted that the mixture is distinctly, although not excessively, rich, that is to say, until the exhaust gases are seen to be discernibly black in colour, but just short of the point where the engine commences to run with noticeable irregularity.
Anti-clockwise rotation of the stop will, of course, raise the needle under these conditions and increase the mixture strength, while rotation in the opposite direction will have the opposite effect. In order to energise the solenoid under conditions when the thermostatic switch will normally have broken the circuit, it is merely necessary to short-circuit the terminal of the thermostatic switch directly to earth with a screwdriver and flick open the throttles when a starting device will be heard to come into operation with a pronounced hissing noise.

THERMOSTATIC SWITCH

Removal
The thermostatic switch which controls the operation of the auxiliary starting carburetter is situated at the front end of the inlet manifold water jacket.
Remove the electrical cable from the Lucar connection on the switch.
If the radiator filler cap is securely tightened, no appreciable amount of water will escape when the auxiliary starting carburetter switch is removed. Alternatively, a small amount of water can be drained from the radiator.
Remove the three securing setscrews and washers and withdraw the switch and the cork gasket.

Refitting
Refitting is the reverse of the removal procedure. A new cork gasket must be fitted when the switch is replaced. If any water has been drained from the radiator or has escaped during the removal of the switch, the radiator should be topped up to the correct level.

THROTTLE CONTROL LINKAGE SETTING

If the carburetter has been removed and the throttle linkages have been disturbed, check before reconnecting the control rod and cable, that the clearance 'B' indicated in Fig. 12 is available when lever 'A' is in contact with the stop plate 'C'.

No adjustment is provided for. If the clearance is not correct check the lever assembly for damage or wear.
Before connecting the control rods and cable check that both carburetter butterflies are fully closed.

After reconnecting check that the full movement of the accelerator pedal is available when the butterflies are fully open.

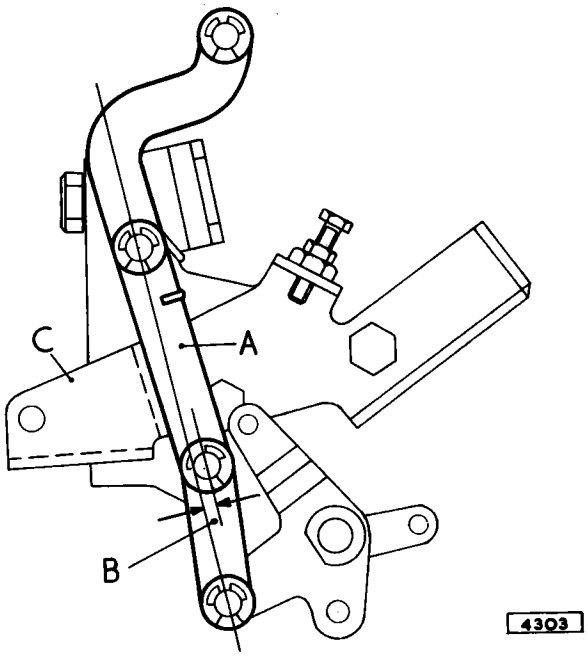


Fig. 12 *Throttle control linkage setting 'A' Lever, 'B' Clearance 1/8in. (3.2mm.), 'C' stop bracket*

PETROL TANK

Removal

Disconnect the rear number plate lamp and remove the rear bumper as detailed on page N.8, Section N.
Withdraw fifteen setscrews and detach the petrol tank cover panel (Fig. 7, Section N) from the body.
Remove the drain plug and drain away the petrol into clean containers.
Withdraw the exhaust tail pipe as detailed on page N.19, Section N.
Remove four setscrews and detach the petrol filler assembly from the body. Disconnect the rubber hose from the overflow pipe.
Disconnect the petrol pump feed pipe from the union at the base of the tank.
Remove the cover plate from the aperture in the wheel arch at the rear, and disconnect the two cables from the tank unit.
Note the location of the cables for reference when refitting.
Remove the petrol tank securing bolts from the following points:—

(1) Wheel arch.
(2) Luggage compartment side panel.
(3) Lower rear edge of petrol tank (accessible through the tail pipe aperture).
(4) Self-locking nut from the suppor rod at the lower front edge of the tank.

Remove the tank.

Note: If the tank is not to be refitted immediately, cover the filler aperture and the feed pipe connections to prevent the entry of foreign matter.

Refitting

Refitting is the reverse of the removal procedure.
Check the sealing joint on the filler assembly, and renew if worn or damaged.

IMPORTANT: When refitting, it is essential that the filler assembly and the tank are aligned with each other before fitting any securing screws or bolts.

THE PETROL PUMP

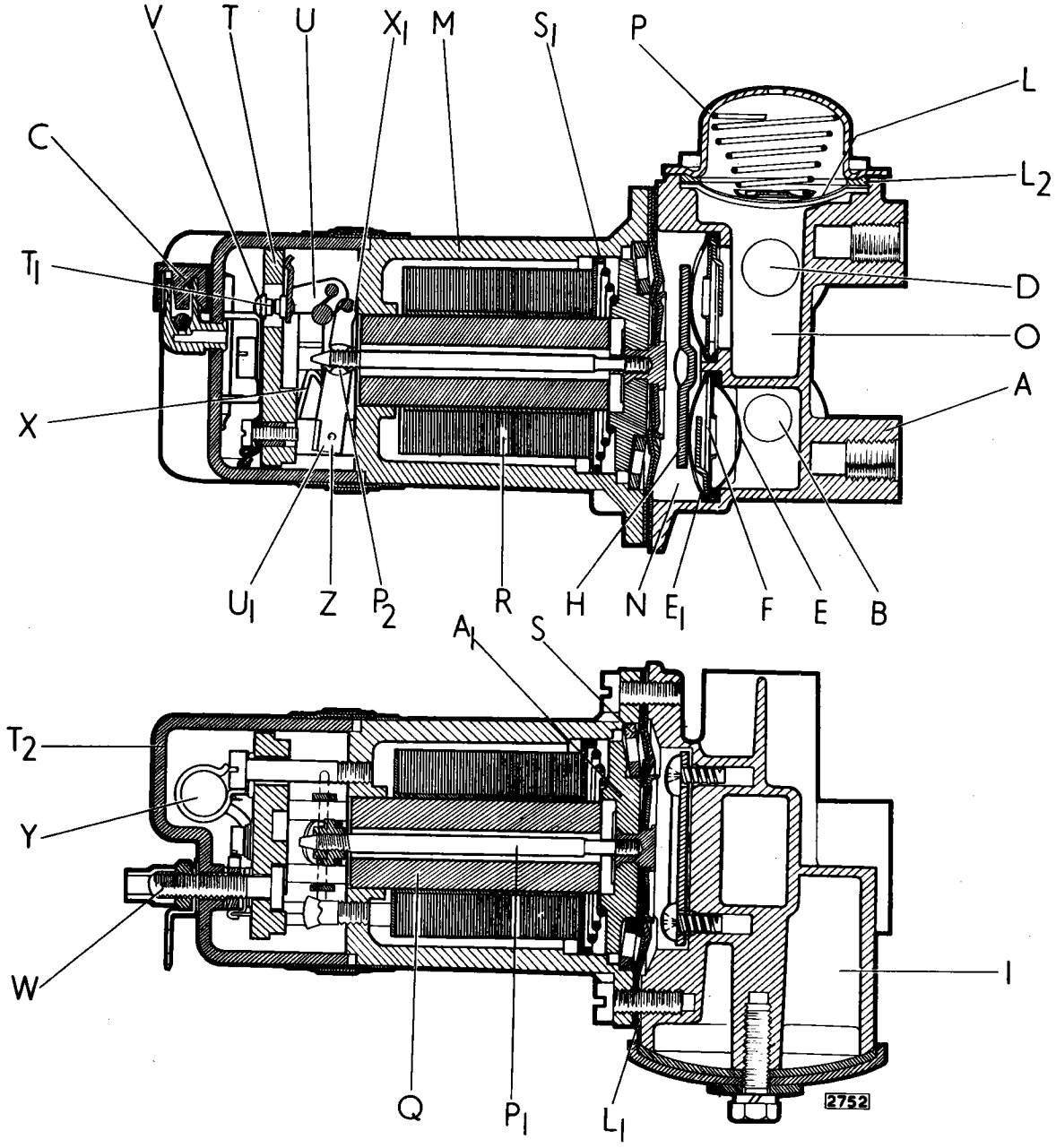


Fig. 13 *The petrol pump:*
Warning: *If at any time it becomes necessary to blow through the fuel feed pipes, the outlet pipes must be disconnected from the pumps. Failure to observe this procedure will cause the Melinex valves to be displaced or damaged.*

DESCRIPTION (Fig.13)

The pump consists of three main assemblies, the main body casting (A); the diaphragm armature and magnet assembly (M) contained within the housing; and the contact breaker assembly housed within the end cap (T2). A non-return valve assembly (C) is affixed to the end cover moulding to assist the circulation of air through the contact breaker chamber.

The main fuel inlet (B) provides access to an inlet air bottle (I) while access to the main pumping chamber (N) is provided by an inlet valve assembly. This assembly consists of a Melinex valve disc (F) permanently assembled within a pressed steel cage, held in position by a valve cover (E.1).

The outlet from the pumping chamber is provided by an identical valve assembly which operates in the reverse direction. Both inlet and outlet valve assemblies together with the filters are held in position by a clamp plate (H). The valve assemblies may be removed by detaching the clamp plate (H) after removing the self-tapping screws. A Filter (E) is provided on the delivery side of the inlet valve assembly. The delivery chamber (O) is bounded by a flexible plastic spring loaded diaphragm (L) contained in a vented cover (P). Sealing of the diaphragm (L) is provided by the rubber sealing ring (L.2).

The magnetic unit consists of an iron coil housing, and iron core (Q), and iron armature (A1) provided with a central spindle (P1) which is permanently united with the diaphragm assembly (L1), a magnet coil (R) and a contact breaker assembly consisting of parts (P2), (U1), (U), (T1), (V). Between the coil housing and the armature is a plastic armature guide plate (S). This locates the armature (A1) centrally within the coil housing and permit freedom of movement in a longitudinal direction.

The contact breaker consists of a bakelite pedestal moulding (T) carrying two rockers (U) and (U1) which are both hinged to the moulding at one end by the rocker spindle (Z). The rockers are interconnected at their top ends by means of two small springs arranged to give a throw-over action. A trunnion (P2) is carried by the inner rocker and the armature spindle (P1) is screwed into this trunnion. The outer rocker (U) is fitted with two tungsten points which contact with corresponding tungsten points which form part of the spring blade (V) connected to one end of the coil. The other end of the coil is connected to a terminal (W) while a short length of flexible wire (X) connecting the outer rocker to one of the screws holding the pedestal moulding onto the coil housing, provides an earth return to the body of the pump. It is important that the body of the pump be effectively earthed to the body of the vehicle by means of the earthing terminal provided on the flange of the coil housing.

WARNING: If, at any time, it becomes necessary to blow through the fuel feed pipes, the outlet pipes must be disconnected from the pumps. Failure to observe this procedure will cause the Melinex valves to be displaced or damaged.

OPERATION

When the pump is at rest, the outer rocker (U) lies in the outer position and the tungsten points are in contact. Current passes from the Lucar connector (W), through the coil and back to the blade (V), through the points and to earth, thus energising the coil and attracting the armature (A1). The armature, together with the diaphragm assembly, then retracts, thereby sucking petrol through the inlet valve into the pumping chamber (N). When the armature has nearly travelled to the end of its stroke, the throw-over mechanism operates and the outer rocker moves rapidly backwards, thus separating the points and breaking the circuit.

The spring (S1) then re-asserts itself, forcing the armature and diaphragm away from the coil housing. This action forces petrol through the delivery valve at a rate determined by the requirements of the engine.

As the armature nears the end of its stroke the throw-over mechanism again operates, the tungsten points remake contact and the cycle of operations is repeated. The spring blade (V) rests against the small projection moulding (T) and it should be so set that when the points are in contact, it is deflected away from the moulding. The gap at the points should be approximately 0.030in. (0.75mm) when the rocker (U) is manually deflected until it contacts the end face of the coil housing.

REMOVAL

The two petrol pumps are located in the spare wheel well beneath the luggage compartment floor panel.

Remove the floor panel and spare wheel.

Withdraw the securing screws and detach the petrol pump cover to gain access to the pumps.

Drain the petrol tank connected to the faulty pump.

Disconnect the battery. Detach the feed and earth cables from the pump to be removed.

Remove two setscrews and locking washers securing the pump clamp to the floor panel.

Remove the pump and disconnect the inlet and outlet pipes by withdrawing the banjo bolts and washers.

Examine the rubber insulated mounting studs for deterioration and replace if necessary, otherwise excessive petrol pump noise may result.

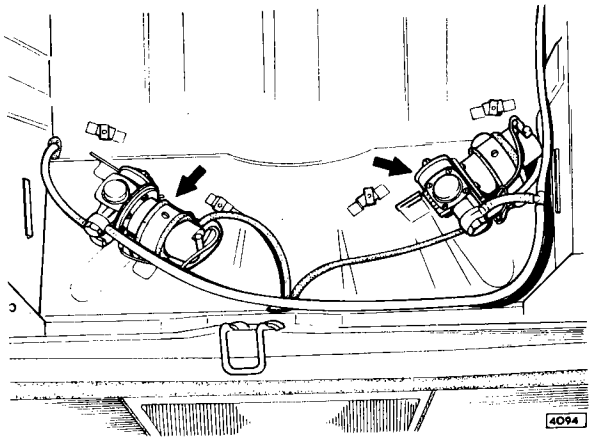


Fig. 14 *Location of petrol pumps*

REFITTING

Refitting is the reverse of the removal procedure.

FUEL PUMP – Overhaul

Dismantling

1. Remove insulating tape and seal.
2. Remove sleeve, nut, connector and washer, lift off end cap.
3. Suitably mark relative positions of body and housing.
4. Remove coil housing securing screws, lift off housing.
5. Unscrew diaphragm and spindle.
6. Remove contact blade securing screw.
7. Remove pedestal securing screws, lift off condenser.
8. Remove washer, terminal nut, contact and lead washer.
9. Lift off pedestal complete with rocker assembly.
10. Remove pin, detach rocker assembly.
11. Remove two Phillips head screws, lift off clamp plate, valve caps, valves, sealing washers and filter.
12. Remove screws securing flow smoothing device cover.
13. Lift off cover followed by 'O' ring, diaphragm and diaphragm support ring.
14. Remove inlet air bottle cover and gasket.

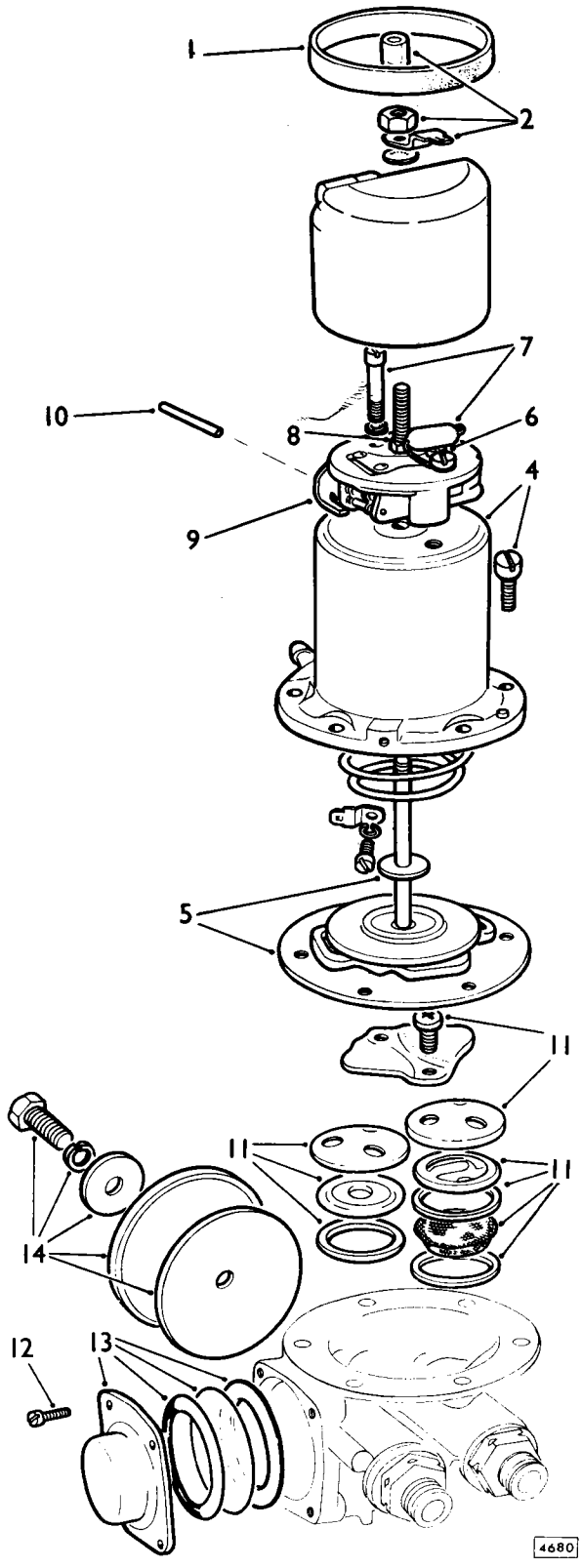


Fig. 15 *Fuel pump dismantling*

FUEL PUMP – Continued

Reassembling

15. Fit rocker assembly to pedestal.
16. Fit terminal stud followed by spring washer, terminal, lead washer, nut and seal.
17. Fit pedestal and condenser.
18. Fit impact washer and spring to diaphragm spindle.
19. Fit diaphragm and screw spindle into trunnion until rocker will not throw over.
20. Fit plastic armature guide, flat face towards diaphragm.
21. Unscrew diaphragm spindle until rocker just throws over, then unscrew it to the nearest hole and then a further two thirds of a turn; diaphragm is now correctly adjusted.
22. Refit valves in body.
23. Fit clamp plate, do not overtighten screws.
24. Fit flow smoothing diaphragm, 'O' ring and cover.
25. Fit air bottle cover and gasket, do not overtighten centre screw.
26. Fit coil housing to body, tighten screws by diagonal selection.
27. Fit contact blade.

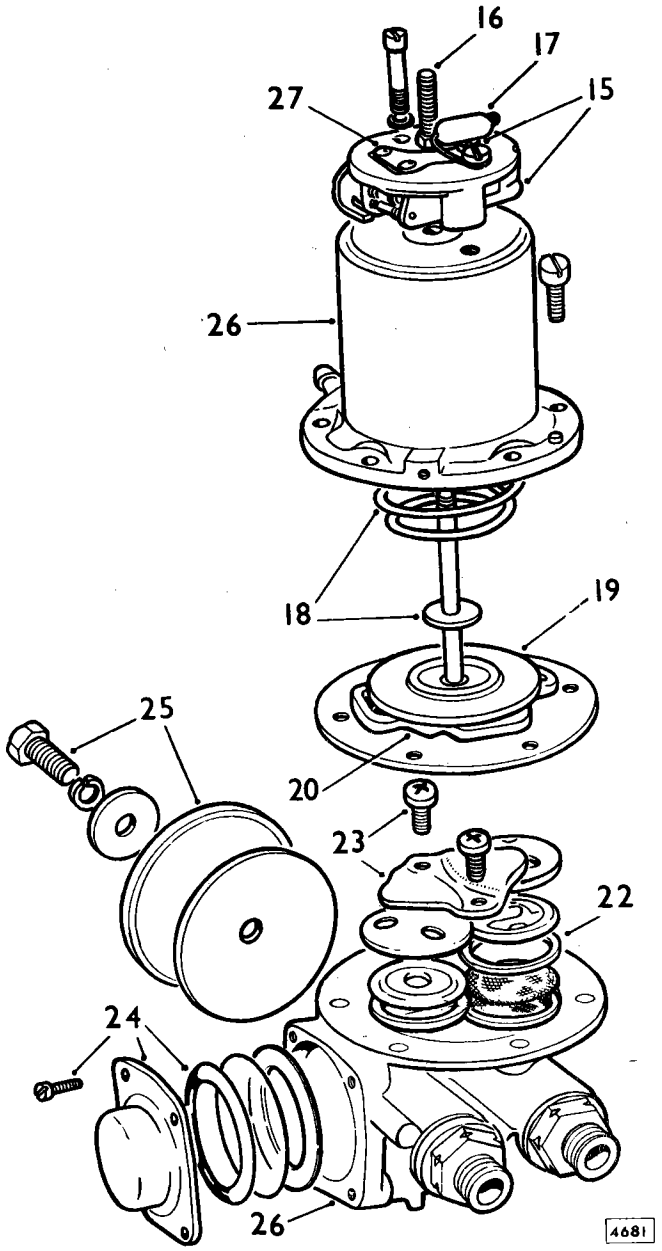


Fig. 16 *Fuel pump reassembly*

28. Using a feeler gauge, check that gap 'A' is 0.9 mm ± .13 mm (.035 in. ± .005 in.) and that gap 'B' is 1.8 mm ± .13 mm (.070 in. ± .005 in.). If necessary, stop finger may be bent slightly to obtain correct dimension.

29. Fit end cap, seal and cover joint with new insulating tape.

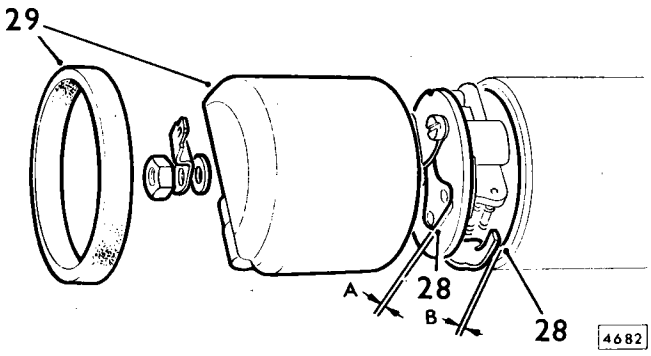


Fig. 17 *Checking contact breaker gap*

SUPPLEMENTARY INFORMATION

Filter Element Renewal – 1973 Cars

WARNING: A CERTAIN AMOUNT OF FUEL SPILLAGE IS UNAVOIDABLE DURING THIS OPERATION. IT IS THEREFORE IMPERATIVE THAT ALL DUE PRECAUTIONS ARE TAKEN AGAINST FIRE AND EXPLOSION.

1. Disconnect the battery.
2. Remove spare wheel.
3. Fit clamp on fuel inlet pipe.
4. Place shallow tray, lined with rag, beneath filter bowl.
5. Remove centre bolt securing filter bowl.
6. Ensure filter bowl is thoroughly clean; fit new element and seals.
7. Tighten centre bolt to secure filter bowl; **DO NOT OVERTIGHTEN.**
8. Remove pipe clamp and tray.
9. Reconnect battery.
10. Run engine and check for leaks.
11. Replace spare wheel.

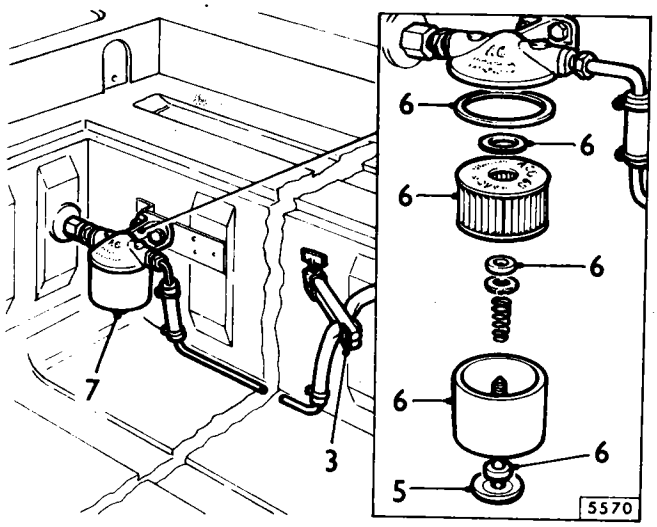


Fig. 17a *Fuel feed line filter*

CARBURETTERS
2.8/4.2 Litre Power Units fitted with SU.HS.8 Carburetters and Automatic Enrichment Device (A.E.D.)

Commencing engine numbers
7G.16693
7L.26480

The automatic enrichment device is a fully automatic auxiliary carburetter having its own float chamber.
Air, passing over the rear exhaust manifold, is ducted to the automatic enrichment device, where it is mixed with fuel, the air/fuel ratio being determined by the temperature of the engine exhaust manifold i.e. the colder the exhaust manifold the higher the ratio of fuel to air. The air/fuel mixture is passed in equal amounts to each carburetter where it is further mixed with the air and fuel supplied by the carburetter before passing into the induction manifold.

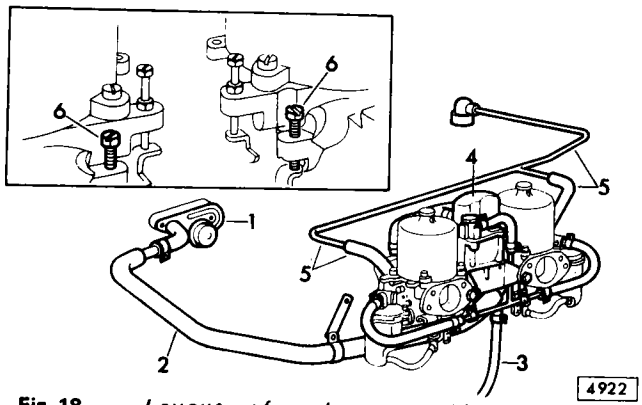


Fig. 18 *Layout of carburetters with automatic enrichment device*

1. Air pick up and sensor unit.
2. Air delivery pipe.
3. Fuel delivery pipe.
4. Automatic enrichment device.
5. Crankcase breather pipe.
6. Throttle adjusting screws.

DESCRIPTION

The Automatic Enrichment Device is a fully automatic auxiliary carburetter for providing an internal combusion petrol engine with the necessary fuel/air mixture in excess of that supplied by the standard carburetters whilst the engine is below its normal working temperatures.
In consists of a small carburetter complete with float-chamber and a throttle in the form of a valve opened or closed by the deflection of a temperature sensitive bi-metallic strip

Referring to the diagram the main valve (10) and its seating (13) from the orifice controlling the volume of fuel/air mixture admitted to the engine.
The main valve is connected to the main bi-metal (22) by spindle (6) which slides freely in the low friction carbon bush (8). By this means the valve orifice is determined by the temperature of the main bi-metal (22), the lower the temperature the larger the orifice.

The outlet pipe (32) is connected to the inlet manifold and the inlet pipe (28) is connected to a hot air pick-up on the exhaust manifold so that filtered air drawn through the device via the carburetter elbow is heated as the engine warms up.
The main bi-metal (22) is attached to the heat shroud (20) which serves as a heat storage and also as an adjustable member for the main valve, being loaded down by spring (21) into grooves (23) formed in the valve body (11) and abutting against the adjusting screw (1).
The main valve (10) is prevented from being drawn down by manifold depression on to its seating by the diaphragm (25) which is subjected to the depression in the balance chamber (24). This depression is provided by the matching of the two orifices (33) in the main valve and the orifice (9) in the valve body.
The fuel orifice (18) is situated at the lower end of the jet tube (14) surrounding which is the fuel well (16). This is filled with fuel whilst the device is out of action via the fuel orifice (18) and the well orifice (17) in the side of the jet tube, and is discharged via the well orifice immediately after the engine is started from cold.
The needle diaphragm (30) in conjunction with the diaphragm spring (31) raises or lowers the tapered fuel needle (15) in response to changes in manifold depression, the lower position of the needle, or normal idling position being established when the circlip (4) rests on the upper face of the adjusting nut (5) under the influence of spring (7) and the upper position of the needle is determined by the needle coming to rest against the secondary bi-metal (3) so that at low temperatures the needle is withdrawn further out of the fuel orifice.
Fuel enters the float-chamber (34) via fuel pipe (35) and the fine mesh nylon filter (36) to the viton-tipped and spring-loaded float needle (37) which in conjunction with the float (38) controls the level of fuel in the float chamber.
A drilled passage (39) feeds fuel to the fuel orifice.

OPERATION

Assuming a cold engine, the main valve (10) will be open to a degree determined by the temperature of the main bi-metal (22), the fuel needle (15) will be raised by the diaphragm spring (31) until it is restrained by the second bi-metal (3) and the fuel well (16) will be filled to the level of the fuel in the float-chamber.
On cranking the engine air is drawn past the lightly spring-loaded air valve (26) through the main valve seating (13) and into the inlet manifold. Fuel is drawn into the engine through the fuel orifice (18) temporarily enlarged by the lifted needle (15) also through the well orifice (17) and up the jet tube (14) to the main valve (10) producing a very rich mixture to wet the inlet manifold rapidly and so shorten the cranking time. When the engine runs, manifold depression acting via passage (29) draws down the needle diaphragm (30) and allows the spring (7) to lower the fuel needle to its normal idling position. The increased manifold depression also draws the main valve (10) slightly towards its seating due to small out-of-balance forces acting on the valve and its diaphragm. The engine will then run at the required speed as set by the adjusting screw (1) the mixture strength being temporarily increased by the discharge from the fuel well (16). When the well is emptied, the well orifice (17) acts as an air bleed to the jet tube, air being drawn into the fuel well via passage (12) from the bi-metal chamber (19).
As the engine temperature rises heated air is drawn through the device, a proportion of this passes through the bi-metal chamber via passage (27) and orifices (9) and (33) raising the bi-metal temperature and progresively closing the valve until the full working temperature is reached. At this point the valve will be fully closed but subsequent running will induce sufficient heated air to be drawn through the bi-metal chamber to maintain the bi-metal temperature and keep the main valve closed.

Before full running temperature is reached extra enrichment is needed for acceleration. This is provided in response to falling manifold depression, small carburetter throttle openings result in the main valve (10) opening slightly due to a reduction of the pneumatic load which was tending to close it, whilst further opening of the carburetter throttles reduces the depression sufficiently to allow the needle diaphragm spring (31) to push the needle (15) upward thus opening the fuel orifice (18) and increasing the fuel supply until such a time as either the increase in the engine speed raises the manifold depression or the throttle is closed.

On stopping the engine the heat stored in the heavy section heat shroud (20) and the thermal insulating properties of the moulded valve body (11) and the bi-metal cover (2) ensure that the cooling rate of the bi-metal matches that of the engine so that the device will only come into operation at the required temperature.

DATA

Ignition timing
2.8 litre engines 10° B.T.D.C. with retard pipe connected.
4.2 litre engines 8° B.T.D.C. with advance pipe connected.

Carburetter jet needle
2.8 litre engines B A U.
4.2 litre engines B A W.

THE AUTOMATIC ENRICHMENT DEVICE

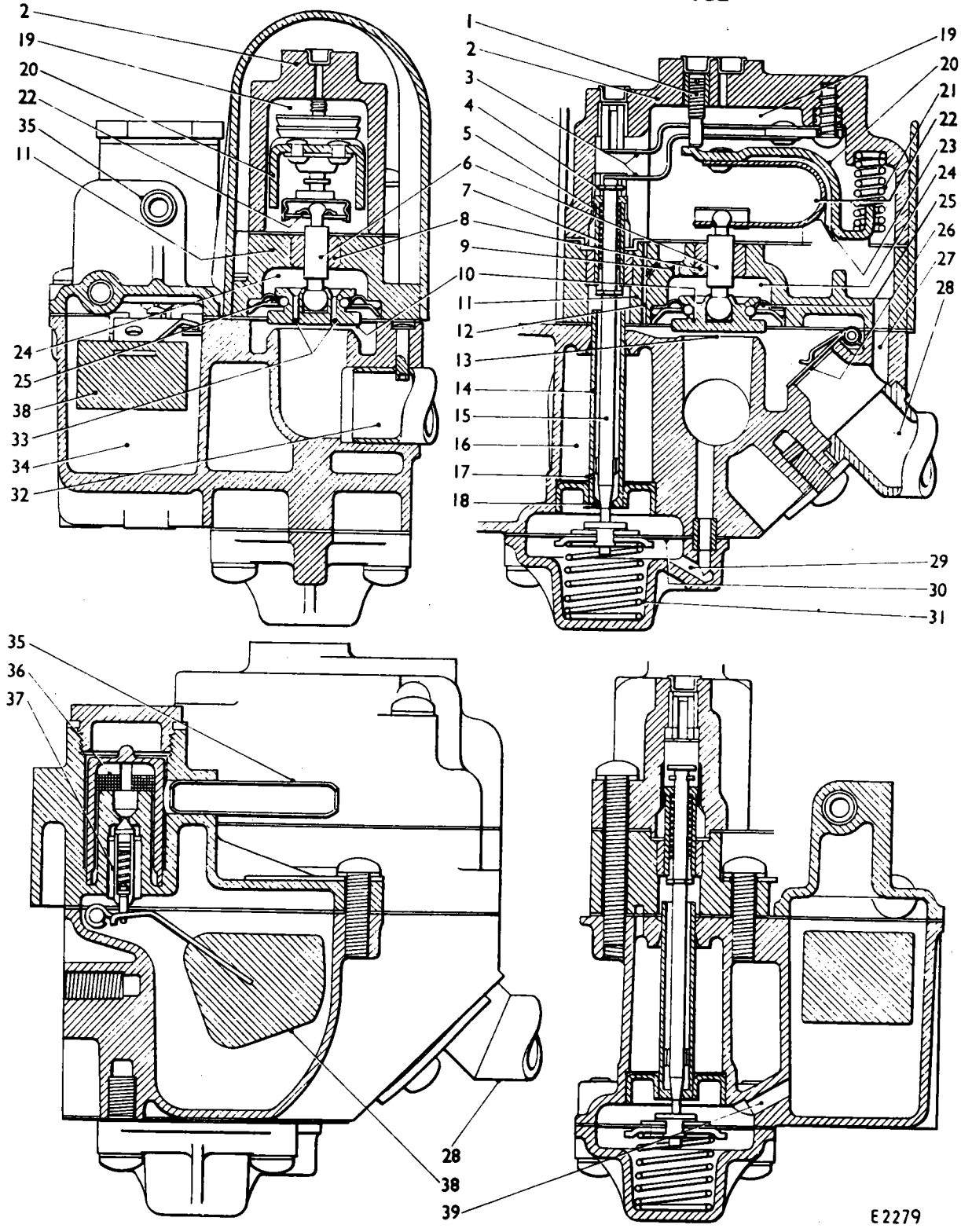
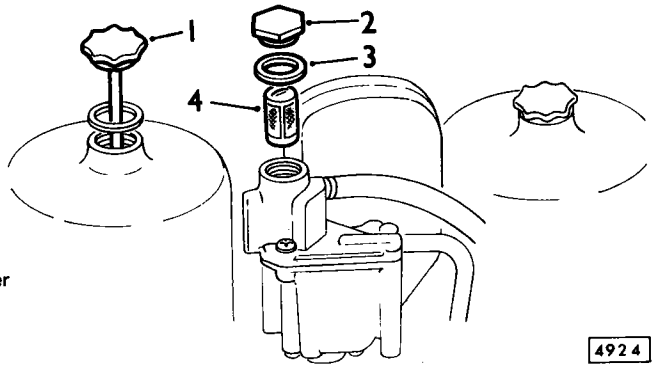


Fig. 19 *Components of the Automatic Enrichment Device*

CARBURETTERS AND FUEL SYSTEM

Servicing – Every 3,000 miles (5,000 km.)

Top up hydraulic piston dampers (1) with recommended grade of engine oil. Remove plug (2) and aluminium washer (3) from float chamber of automatic enrichment device, withdraw filter element (4). Wash element in petrol and dry with compressed air. Refit element and plug, use new sealing washer; do not overtighten plug.



1. Hydraulic damper
2. Plug
3. Sealing washer
4. Filter element

Fig. 20 *Carburetter piston dampers and Automatic Enrichment Device Filter*

CARBURETTERS

Removing and refitting

Removing

1. Remove A.E.D. Unit see page BS.13.
2. Disconnect crankcase breather pipe from carburetters.
3. Disconnect fuel inlet and overflow pipes from float chambers.
4. Disconnect mixture delivery pipes.
5. Disconnect vacuum pipe from rear carburetter.
6. Slacken off slow running adjustment screws until they no longer contact throttle levers.
7. Mark relative position of throttle rod to clamping bracket.
8. Slacken off clamping bolt and slide clamping bracket along throttle rod until it is disengaged from carburetter linkage.
9. Withdraw throttle rod from hollow nut by gently pushing rod in direction of bulkhead.
10. Remove nuts and spring washers securing carburetters to inlet manifold; lift off carburetters together with throttle lever return springs and brackets.
11. Remove carburetter flange gaskets and discard.
12. Slacken off clamping bolt and withdraw front carburetter from throttle linking rod.

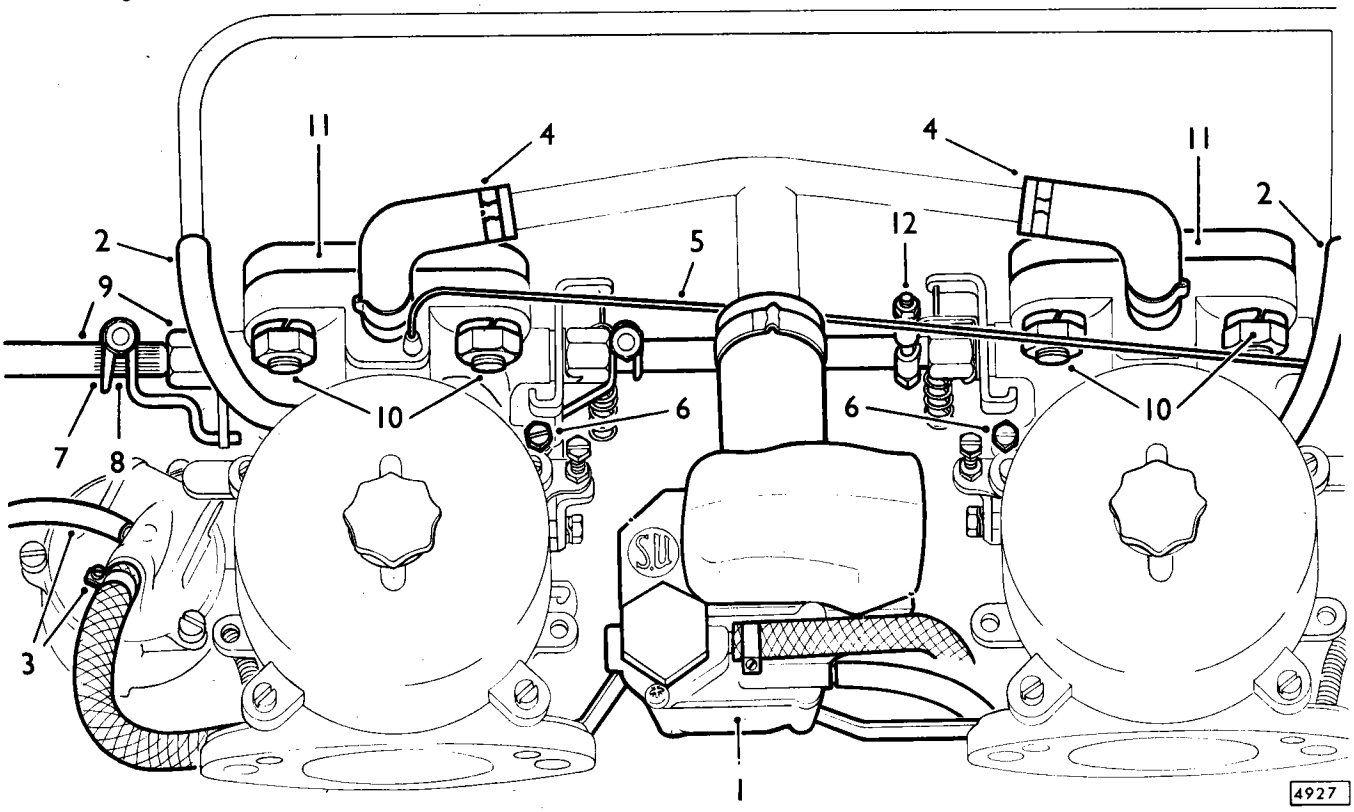


Fig. 21 *Carburetter removal*

Refitting

13. Insert throttle linking rod into hollow nut on front carburetter throttle spindle **DO NOT** tighten clamping bolt at this stage.
14. Position new carburetter flange gaskets on mounting studs.
15. Fit carburetters together with throttle lever return springs and brackets; tighten retaining nuts by diagonal selection.
16. Ensure that both throttle butterflies are in closed position and tighten clamping bolt.
17. Position throttle rod in hollow nut and engage clamping bracket with carburetter linkage.
18. By means of a spanner on hollow nut, hold throttle butterflies closed; rotate throttle rod until reference marks on rod and clamping bracket are in alignment; tighten clamping bolt.
19. Reverse operations 1 to 5.
20. Adjust carburetter slow running see page BS.12.

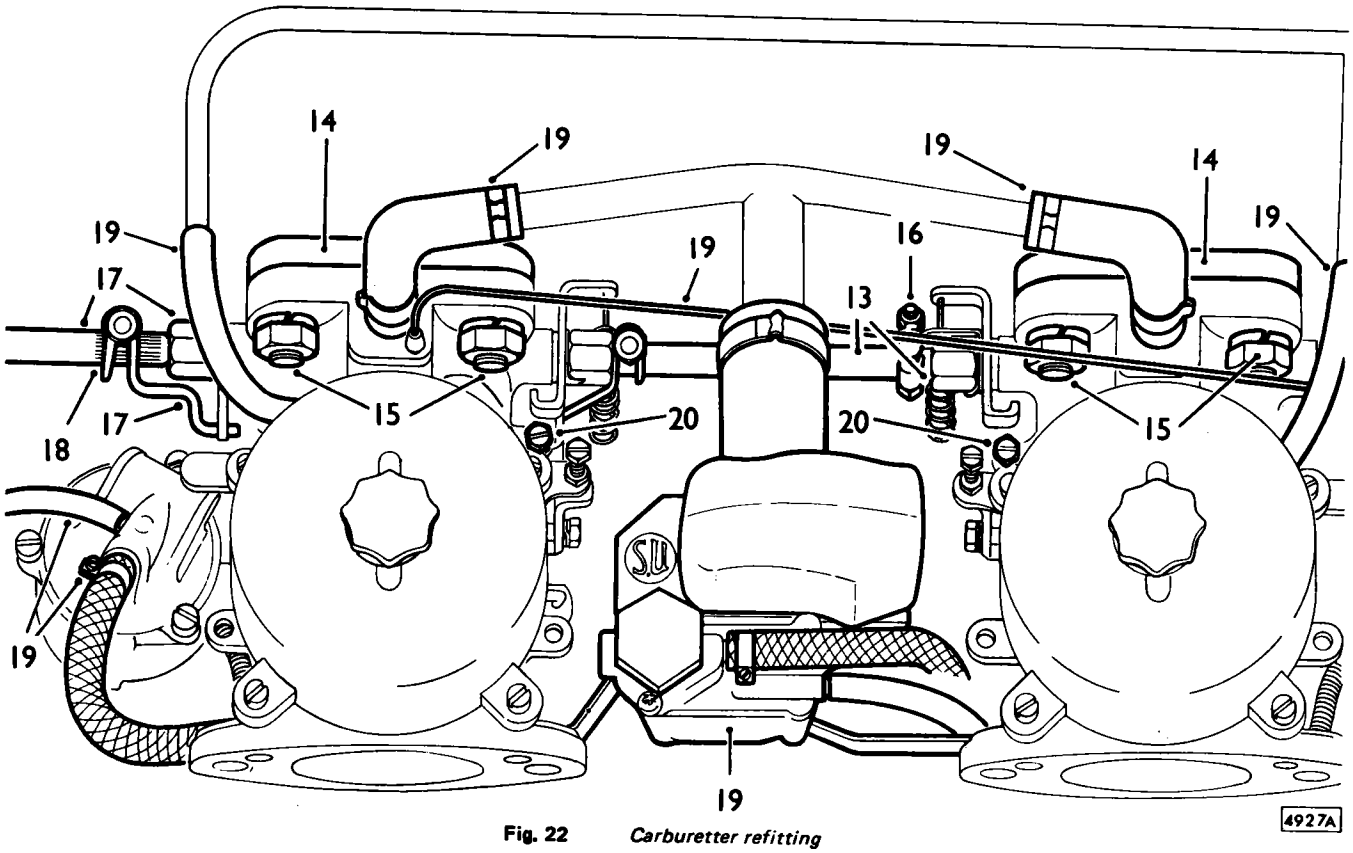


Fig. 22 *Carburetter refitting*

AIR CLEANER

Removing and refitting

Removing

1. Release clips securing air cleaner cover to backplate.
2. Lift off cover.
3. Remove element.
4. Remove outer pair of nuts and bolts securing backplate to carburetter flanges.
5. Support A.E.D. unit and remove inner pair of nuts and bolts; lift off backplate.
6. Remove carburetter flange gaskets and discard.

Refitting

7. Reverse operations 1 to 6; use new carburetter flange gaskets.

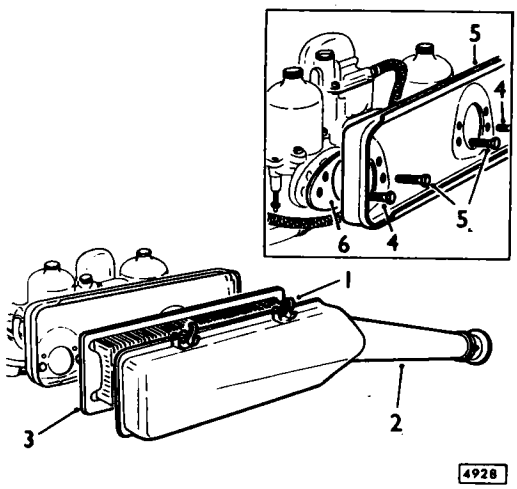


Fig. 23 *Air cleaner removal*

CARBURETTER

Overhaul

Dismantling

1. Remove carburetters see page BS.6.
2. Thoroughly clean outside of carburetter.
3. Remove damper and washer.
4. Mark relative positions of suction chamber and carburetter body.
5. Remove suction chamber securing screws, lift off chamber.
6. Lift off piston spring.
7. Carefully withdraw piston and needle assembly.
8. Remove needle locking screw.
9. Withdraw needle from piston together with bias sleeve and spring.
10. Remove split pins retaining jet spring anchor pin and jet fork pivot pin; withdraw pins and spring.
11. Withdraw jet fork from bracket.
12. Remove bolt, washer and bush securing link arm to carburetter body.
13. Unscrew nut securing flexi-pipe to float chamber, withdraw pipe followed by washer and gland.
14. Withdraw jet assembly together with bi-metal sensor washer and spacer.
15. Remove bolts, washers and spacers securing fork bracket to carburetter body.
16. Withdraw jet bearing together with spacer and concave washers.
17. Bend back tabs and unscrew throttle lever securing nut, withdraw lever followed by plain washer.
18. Remove and discard screws securing throttle butterfly to spindle; withdraw butterfly.
19. Push spindle out of carburetter body.
20. Mark relative positions of float chamber lid and float chamber.
21. Remove float chamber lid retaining screws; lift off lid together with gasket.
22. Withdraw float needle from lid.
23. Unscrew needle seating.
24. Withdraw float hinge pin, lift out float.
25. Remove bolt securing float chamber to carburetter body; detach float chamber together with rubber distance piece and steel backing washer.

Inspection

CAUTION: Any component showing signs of unserviceability or wear **MUST** be renewed.

26. Check float for damage.
27. Check float needle and seating for wear.
28. Check that there is not excessive clearance between butterfly spindle and carburetter body.
29. Check that jet assembly is free to move in jet bearing.
30. Check flexi-pipe for cracks or obstructions.

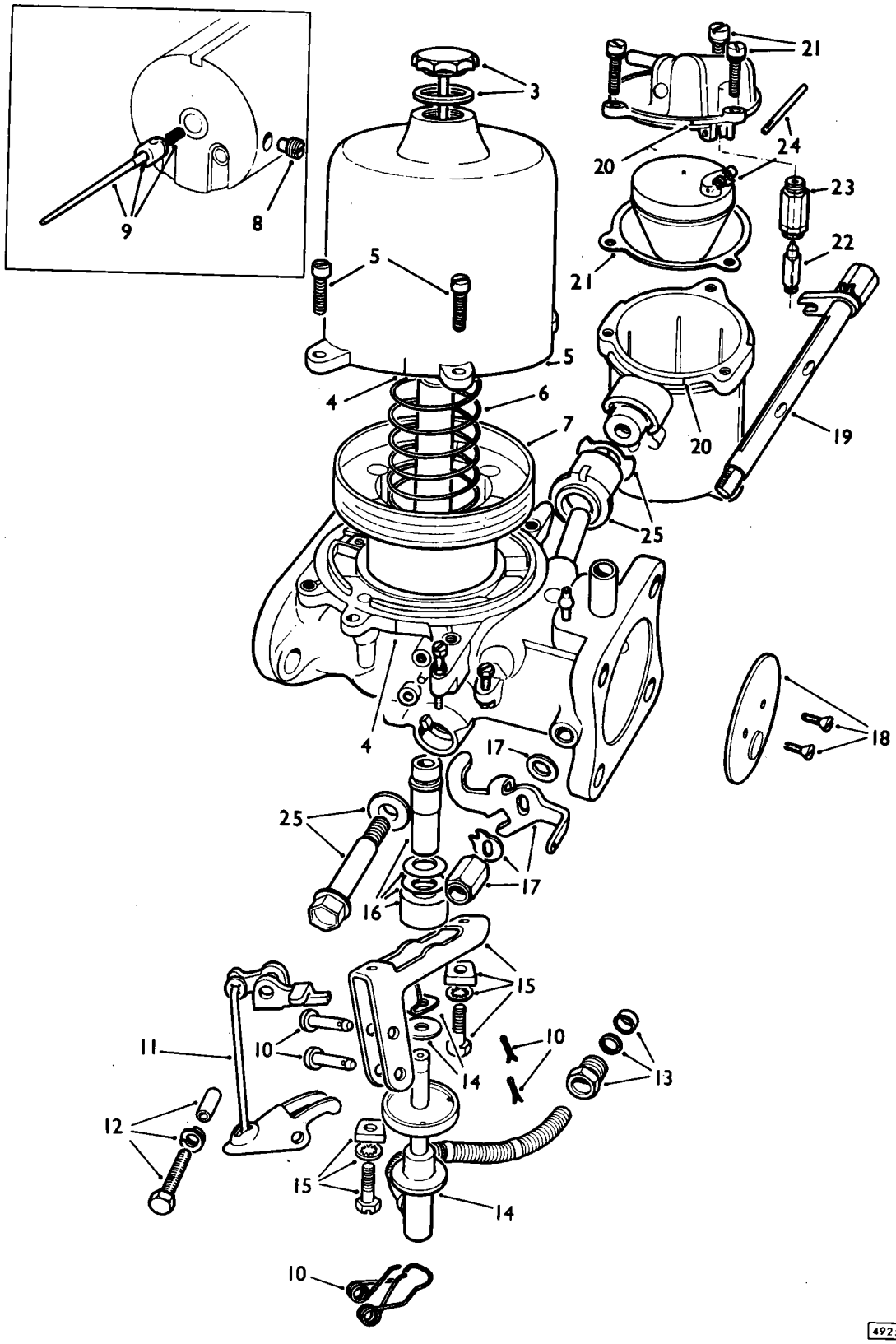


Fig. 24 *Carburetter overhaul – Dismantling*

Carburetter Overhaul (continued)

Reassembling

31. Insert throttle spindle into carburetter body.
32. Insert butterfly into slot in spindle, fit two new securing screws but do not tighten at this stage.
33. Adjust position of butterfly until it closes fully; tighten and spread split end of screws to prevent turning.
34. Screw needle seating into float chamber lid; do not overtighten.
35. Refit needle, coned end first.
36. Hold needle in closed position, apply **LOW** pressure air to fuel inlet and check that no leakage occurs past needle. If leakage is evident, needle and/or seating must be replaced.
37. Refit float followed by hinge pin.
38. Insert float chamber lid assembly and allow float to rest on needle. Check that gap 'A' is 3.2 mm to 4.7 mm (1/8 in. to 3/16 in.). If this dimension is not obtained, a new float and/or needle must be fitted.
39. Fit a new gasket to lid.
40. Fit float chamber lid and gasket to float chamber in the position marked during dismantling. Tighten securing screws diagonally to prevent distorting lid.
41. Insert float chamber bolt into carburetter body; refit rubber distance piece, steel washer and float chamber.
42. Fit bias sleeve and spring to needle in position shown.
43. Fit needle securing screw and tighten; check that needle is free to move.
44. Check that piston key is securely fitted.
45. Lightly oil periphery of piston and fit piston in carburetter body.
46. Fit piston spring.
47. Fit suction chamber to carburetter body in position marked during dismantling; tighten screws by diagonal selection.
48. Fit jet bearing together with concave washers and spacer.
49. Fit fork bracket, spacers and bolts.
50. Position jet fork in bracket, insert pivot pin and secure with new split pin.
51. Position bush in link arm, secure with bolt and double spring washer.
52. Position bi-metal sensor, copper washer and spacer on jet assembly and slide assembly into jet bearing.
53. Position spacer as shown.
54. Fit jet spring insert anchor pin and secure with new split pin.
55. Slide nut on to flexi-pipe followed by steel washer and new gland.
56. Position flexi-tube in bottom of float chamber, fit nut; **DO NOT** overtighten.
57. Fit plain washer, throttle lever, new tab washer and nut to butterfly spindle, hold butterfly closed whilst tightening nut; bend over tabs to secure nut.
58. Refit carburetters to car.
59. Top up piston damper with S.A.E.20 engine oil.
60. Fit damper and washer.
61. Tune carburetters — see page BS.12.

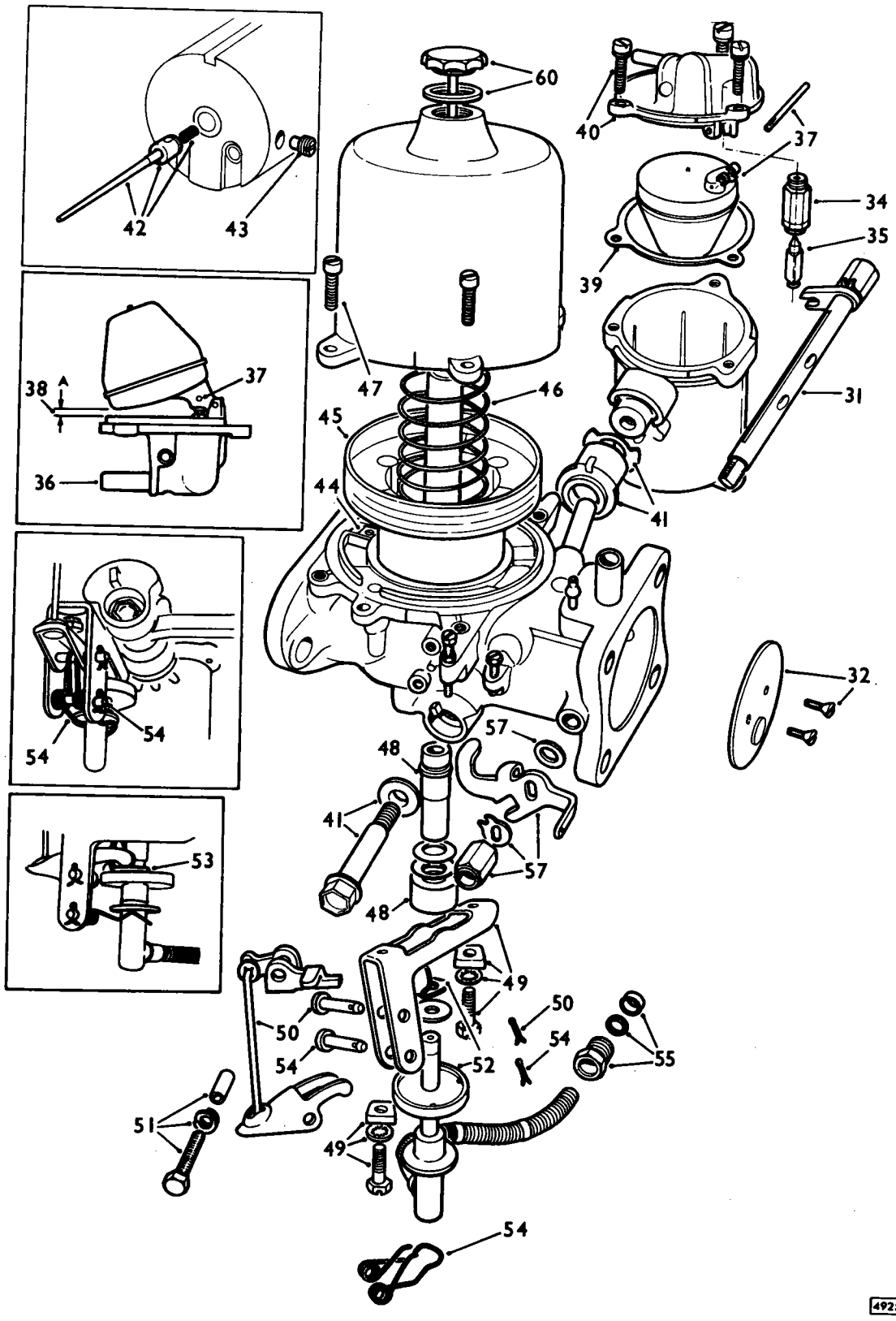


Fig. 26 *Carburetter overhaul – Reassembling*

CARBURETTER SLOW RUNNING

Adjust

NOTE: Before tuning the carburetters, check sparking plug gaps, contact breaker gaps, distributor centrifugal advance mechanism and ignition timing. Adjust as necessary. The mixture adjusting screws are pre-set during manufacture and **SHOULD ON NO ACCOUNT BE DISTURBED.**

1. Run engine until it attains normal operating temperature.
2. Check that mixture delivery pipe is warm.
3. Screw back throttle adjusting screws until they no longer contact throttle levers.
4. Ensure that the butterfly valve in each carburetter is fully closed.
5. Screw throttle adjusting screws until they just contact throttle levers, then screw in a further 1½ turns.
6. Remove air cleaner cover and element.
7. Compare intensity to intake "hiss" on both carburetters and alter throttle adjusting screws until "hiss" is the same on both carburetters.

NOTE: correct idling speed is:-
Cars fitted with manual transmission – 650 r.p.m.
Cars fitted with automatic transmission – 750 r.p.m.

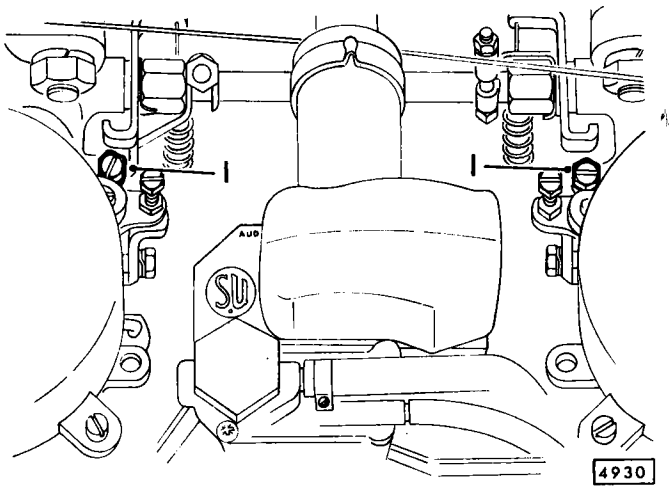


Fig. 27 *Carburetter slow running adjustment screws*

THROTTLE KICKDOWN SWITCH – AUTOMATIC TRANSMISSION CARS ONLY

Adjust

1. Slacken securing screws.
2. Adjust position of switch by moving towards cable.
3. Holding switch in new position, tighten screws.
4. Check operation of switch by following items 1 to 4 in test procedure.

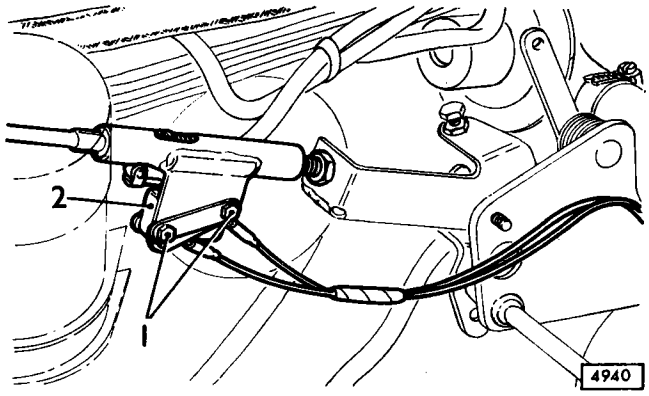


Fig. 28 *Kickdown switch adjustment*

THROTTLE KICKDOWN SWITCH – AUTOMATIC TRANSMISSION CARS ONLY

Test

1. Remove output (black/red) lead from switch.
2. Connect test lamp to output terminal and earthing point.
3. Switch on ignition.
4. Operate accelerator pedal to kick-down position when lamp should illuminate.
5. If lamp fails to illuminate, check efficiency of switch by **gently** raising spring steel lever on switch until a "click" is heard. Lamp should now illuminate. If lamp still fails, remove switch and replace with new unit.
6. If lamp illuminates when switch lever is raised, reset switch position as outlined above.

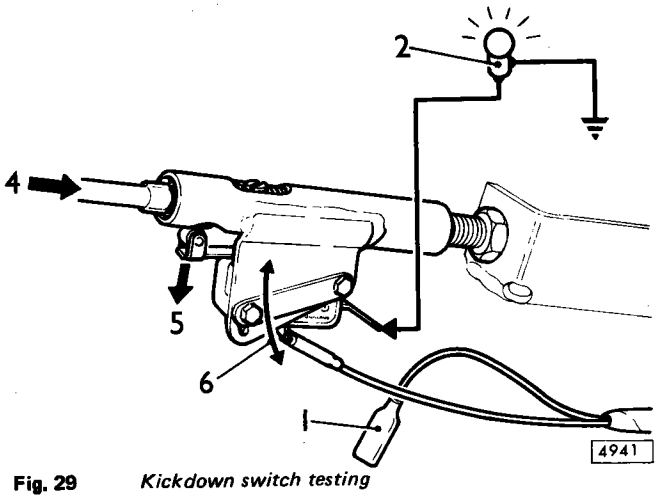


Fig. 29 *Kickdown switch testing*

AIR DELIVERY PIPE

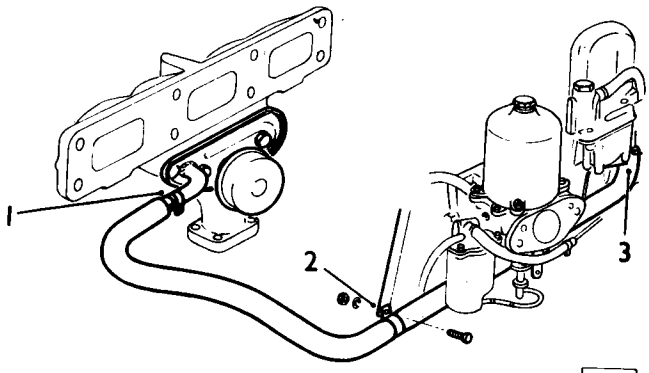
Removing and refitting

Removing

1. Slacken clamping bolt and withdraw air delivery pipe from outlet tube.
2. Remove nut and bolt securing pipe clip to support bracket.
3. Disconnect delivery pipe from A.E.D. unit.

Refitting

4. Reverse operations 1 to 3; use new clip to secure delivery pipe to A.E.D. unit.



4932

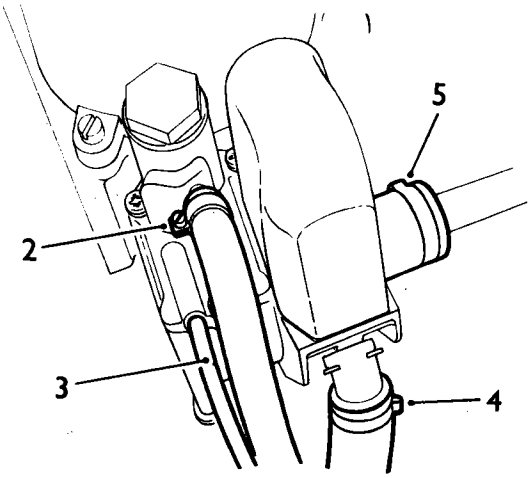
Fig. 30 *Air delivery pipe removal*

AUTOMATIC ENRICHMENT DEVICE (A.E.D.)

Removing and refitting

Removing

1. Disconnect battery.
2. Disconnect fuel inlet pipe.
3. Disconnect fuel overflow pipe.



4931

Fig. 31 *Automatic enrichment device removal*

4. Disconnect air delivery pipe.
5. Disconnect mixture delivery pipe.
6. Remove bolts and spring washers securing A.E.D. unit to mounting bracket; left off A.E.D. unit.

Refitting

7. Reverse operations 1 to 6; use new clips on hot air inlet and mixture delivery pipes.

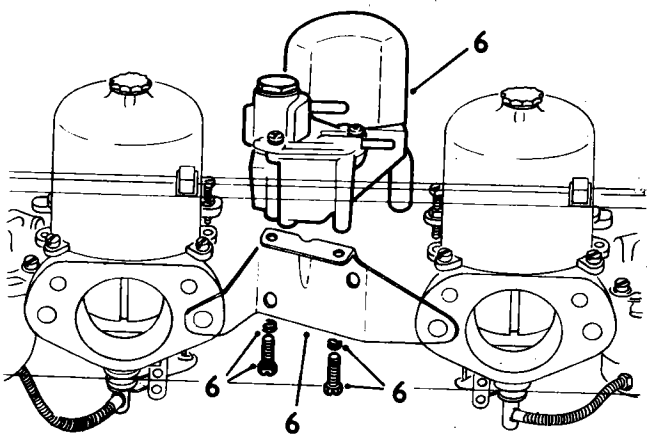


Fig. 32 *Automatic enrichment device removal* 4929

HOT AIR PICK-UP UNIT

Removing and refitting

Removing

1. Slacken clamping bolt and withdraw air delivery pipe from outlet tube.
2. Remove bolts securing pick-up unit to exhaust manifold, withdraw pick-up unit together with air filter.

Refitting

3. Reverse operations 1 and 2.

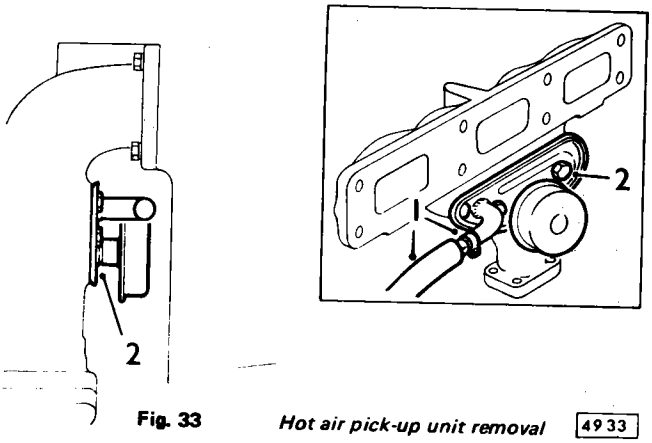


Fig. 33 *Hot air pick-up unit removal* 4933

HOT AIR PICK-UP UNIT FILTER

Removing, cleaning and refitting

Removing and cleaning

1. Slacken off clamping bolt.
2. Move filter towards cylinder block and withdraw.
3. Wash filter in petrol and dry with compressed air.
4. Lightly oil filter gauze with engine oil.

Refitting

5. Reverse operations 1 and 2.

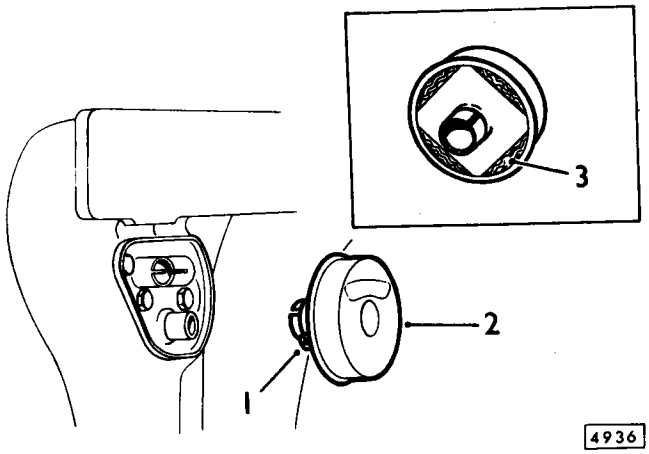


Fig. 34 *Hot air pick-up unit filter removal*

FAULT DIAGNOSIS

NOTE: The automatic enrichment device is a sealed unit no adjustment or overhaul is permissible and in the event of any malfunction the unit **MUST** be returned to Jaguar Cars Limited and a replacement fitted.

SYMPTOM	POSSIBLE CAUSE	REMEDY
A–**ENGINE COLD** Engine fails to fire.	1. Inadequate or no fuel supply to the A.E.D.	1. Slacken filter plug on the A.E.D. Crank engine; fuel should leak from plug. If no fuel, check system leading to the A.E.D. If fuel is present, tighten plug; then carry out check 2 under symptom A.
	2. Inadequate or no fuel supply from the A.E.D. to inlet manifold.	2. Crank engine for several seconds. Disconnect mixture delivery pipe from A.E.D. If fuel is present, it indicates that the A.E.D. is satisfactory and cause for failure to start must be traced to some other source. If no fuel is present this indicates a faulty A.E.D. – renew unit.
B–**ENGINE COLD** Engine fires but fails to keep running	1. Sticking or faulty needle valve or float.	1. Check following: a. Remove overflow pipe from float chamber and check that fuel is not discharged when cranking engine. b. If fuel is discharged, faulty needle valve is indicated – renew unit. c. Check that overflow pipe is not restricted.

FAULT DIAGNOSIS (continued)

SYMPTOM	POSSIBLE CAUSE	REMEDY
B—**ENGINE COLD (Contd.)** Engine fires but fails to keep running	2. Faulty air flap valve.	2. Remove air inlet elbow on the A.E.D. and check that flap valve is free to move and return under spring load. If jammed, replace unit.
	3. Inadequate fuel supply.	3. Check for lack of fuel as detailed under 'A'
C—**ENGINE PART WARM OR HOT** Engine fails to start or fires and fails to keep running.	1. Incorrect starting procedure.	1. Crank engine and open throttle slightly. If the A.E.D. is badly over-choked, open throttle fully **DO NOT** over-rev. If engine starts but fails to keep running, carry out check '4'.
	2. Leaks from pipe layout.	2. Ensure that all pipes are correctly fitted, particularly the air delivery pipe. Rectify as necessary, ensuring airtight joints. Check no air gap exists at hot air pick-up. **NOTE:** Air leaks at hot air pick-up will result in excessive fuel consumption and the possibility of stalling at certain engine temperatures.
	3. Before carrying out further checks ensure that the A.E.D. is not cause of failure to start.	3. Disconnect mixture delivery pipe from A.E.D., blank off holes in carburetters. If engine starts, this indicates that the A.E.D. is at fault; renew unit. However, if engine is flooded, it may be necessary to crank for several seconds with a slightly open throttle before engine will fire.
	4. Sticking or faulty needle valve or float.	4. Check following: a. Remove overflow pipe from float-chamber and check that fuel is not discharged when cranking engine. b. If fuel is discharged, faulty needle valve or float is indicated – renew unit. c. Check that filter in A.E.D. is clear, see A.E.D. filter remove and refit.
		5. If above checks prove negative, an internal fault in A.E.D. unit is indicated; renew unit.

HEAT EXCHANGER

Later XJ6 cars with air conditioning installed are fitted with a heat exchanger in the petrol feed line to the carburetters.
The heat exchanger is mounted upon a heatshield above the induction side of the engine.
Petrol is passed through a jacket around the air conditioning system suction pipe, and gives up heat to the relatively cool refrigerant vapour. This cooling action assists in preventing fuel vapour lock under hot soak conditions.

WARNING: THE REFRIGERANT PIPES MUST NOT BE DISCONNECTED FROM THE HEAT EXCHANGER UNLESS THE AIR CONDITIONING SYSTEM SECTION HAS BEEN CONSULTED, AND ALL SPECIFIED PROCEDURES CARRIED OUT.

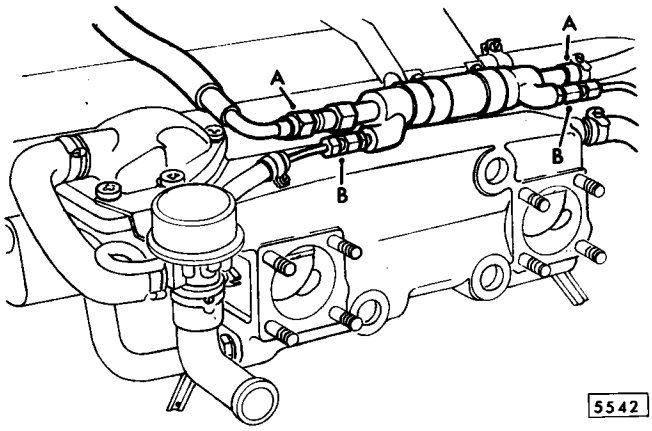


Fig. 35 *Showing location of heat exchanger*
A – Refrigerant pipes
B – Fuel Pipes