FUEL SYSTEM

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THE FUEL SYSTEM.

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THE FUEL SUPPLY SYSTEM AND REAR STRAINER.

THE FUEL SUPPLY SYSTEM.

From the 18 gallon tank at the rear of the chassis, the fuel passes through a strainer which is attached to the cross member in front of the tank and then to the S.U. electric fuel pump which is mounted on the inside of the right hand side chassis frame member below the driver's seat.

From the pump the supply is carried by a pipe attached to the side frame member, a length of flexible pipe connects this pipe with the pipe attached to the engine and which leads to the carburetter. This provides for the movement of the flexibly mounted engine.

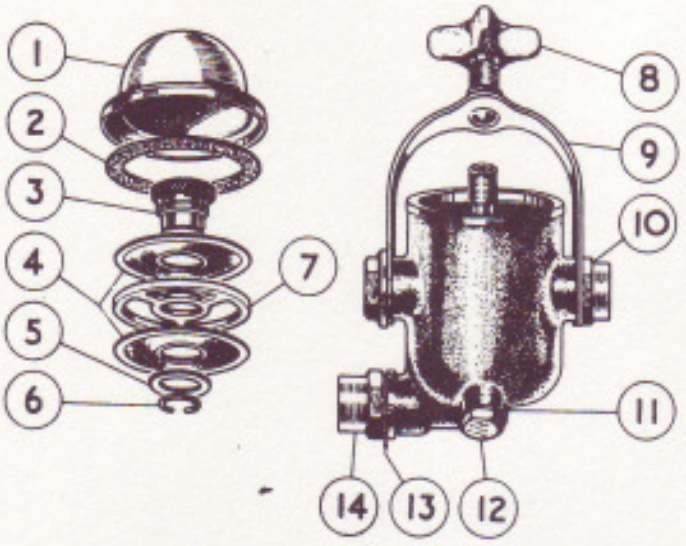
REAR FUEL STRAINER.

The fuel strainer (petrol filter), mounted on the frame cross member immediately in front of the petrol tank, is provided with two cricular gauzes located above a settling sump (see Fig.1). Fuel passes upwards through the gauzes and dirt settles on their lower faces and in the sump.

SERVICE OPERATIONS.

The strainer should be cleaned every 10,000 miles.

To do this, the wing nut (8) must be released, the stirrup (9) swung forwards and the cover (1) removed. The knurled nut (3) should then be unscrewed and removed, carrying with it two gauzes (4). These are held apart by a distance piece (7) and are retained on the nut by a spring clip (6) and washer (5). The spring ring should be removed and the gauzes taken off and cleaned in petrol. Before replacing them, the strainer sump should be drained by removing the drain plug (12) and wiped out with a clean damp wash leather.



1. Cover.
2. Cork Washer.
3. Knurled Nut.
4. Gauzes.
5. Washer.
6. Spring Clip.
7. Distance Piece.
8. Wing Nut.
9. Stirrup.
10. Inlet Union.
11 Aluminium Washer.
12. Drain Plug.
13. Aluminium Washer.
14. Outlet Union.

FIG. 1. FUEL STRAINER.

When refitting the cover, care must be taken that the cork washer (2) is sound and properly in position, and the wing nut (8) tightly screwed up. Any leaks on this (the suction) side of the pump, although they may not be apparent by leakage of fuel, will impair the proper functioning of the pumpby admitting air to the latter.

It is not necessary to remove the strainer for cleaning purposes, but should it be necessary to do so for any other reason proceed as follows:-

(1) Disconnect the inlet and outlet pipes at the unions on the strainer body.

(2) Remove the two nuts and spring washers securing the strainer to its mounting bracket and remove the strainer.

To replace the strainer, reverse the above operations.

THE S.U. TWIN ELECTRIC FUEL PUMP.

CONSTRUCTION OF THE PUMP.

The pump consists of five main assemblies, the body (20 Fig.2), two magnet assemblies (17) and two contact breaker assemblies mounted upon bakelite pedestals (3). The body is composed of a hollow aluminium alloy casting, into the bottom of which two filters (23) and filter plugs (24) are inserted. The inlet and outlet unions (19 and 18) are screwed into the body on one side. Fuel is supplied through the inlet union (19) to a common chamber in which the two filters are housed. The fuel then passes through each filter and along separate passages to each pumping unit. On the top of the pump are two bosses, in each of which is housed an inlet and a delivery valve (16 and 14) together with their cages (15).

Each of the two valve assemblies comprise an inlet valve disc (16), retained upon its seating in the pump body by the delivery valve cage (15). The delivery valve cage houses the delivery valve (14) which is identical with the inlet valve and is retained within its cage by means of a spring retainer clip (13). The cage is retained by means of the retaining ring (12) provided with a hexagon on its upper face. The retaining ring has a central hole through which fuel is delivered to one common passage leading to the outlet union (18). The plugs (10) and washers (11) close the bores in which the two valve assemblies are housed.

The spaces between the valves of each valve assembly are separate, and each is connected by a passage to one of the pumping chambers, which are shallow depressions in the main faces of the body. The spaces within these depressions are each closed by one of the diaphragm assemblies (30 Fig.3) which is clamped between the magnet housing (17) and the body, and in the centre between the brass plate (29) and the steel armature (33). A bronze rod (31) is screwed to the centre of these and passes through the magnet core to the contact breaker which is located at the far end. The magnet consists of a cast-iron pot having an iron core (28), on which is wound a copper wire coil which energises the magnet. Between the magnet housing and the armature are eleven spherical-edged brass rollers (35). These locate the armature centrally within the magnet at all times and allow freedom of movement in a longitudinal direction.

A spring (32) is interposed between the armature and the end plate of the coil, and it is the strength of this spring which determines the fuel pressure.

The contact breaker consists of a bakelite pedestal (3) carrying two rockers (4 and 26), which are both hinged to the moulding and are connected together at their top ends by a small toggle spring arranged to give a "throw over" action. A trunnion (27) is fitted into the centre of the inner rocker and the bronze rod (connected to the armature) is screwed into it. The outer rocker (4) is fitted with two tungsten points which make contact with the tungsten points on the spring blade (2). This spring blade is connected to one end of the coil, the other end of the coil being connected to the terminal (9). A bakelite end cover cap (1) encloses the contact breaker mechanism and is secured to the terminal by means of a small nut (7).

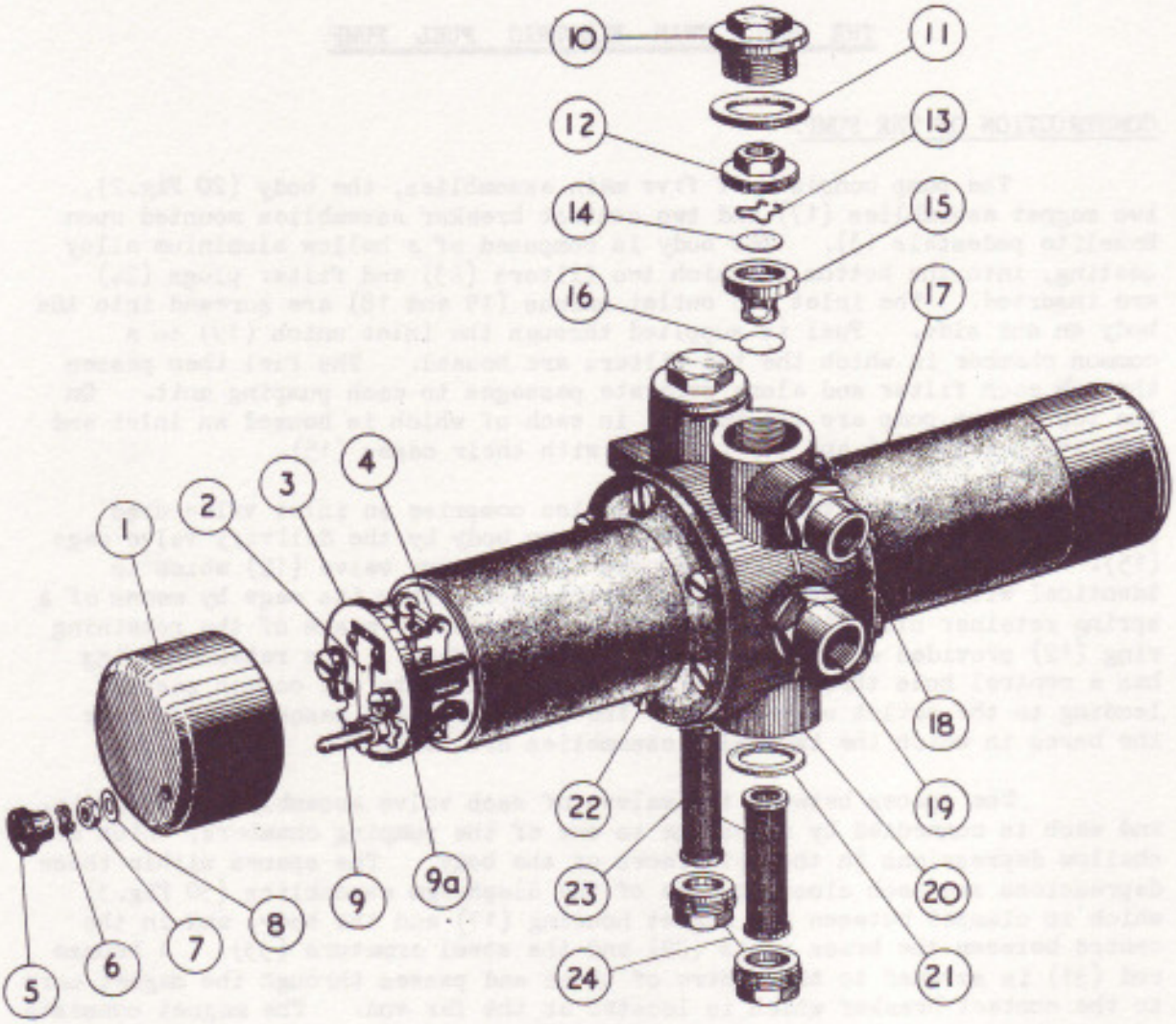


FIG. 2. S.U. ELECTRIC FUEL PUMP WITH ONE END COVER REMOVED. (WATERPROOF GAITERS NOT SHOWN).

1. End Cover Cap.
2. Spring Blade (with tungsten points).
3. Bakelite Pedestal.
4. Outer Rocker (with tungsten points).
5. Terminal Nut.
6. Thackeray Washer.
7. Nut.
8. Plain Washer.
9. Terminal Screw.
9A. Fixing Screw - End Plate.
10. Nut.
11. C & A Washer.
12. Retaining Ring.
13. Spring Retainer Clip - Valve Disc.
14. Delivery Valve Disc.
15. Delivery Valve Cage.
16. Inlet Valve Disc.
17. Magnet Housing.
18. Outlet Union (Pressure Side).
19. Inlet Union (Suction Side).
20. Body.
21. Fibre Washer.
22. Fixing Screw - Magnet Housing.
23. Filter Assembly.
24. Filter Plug.

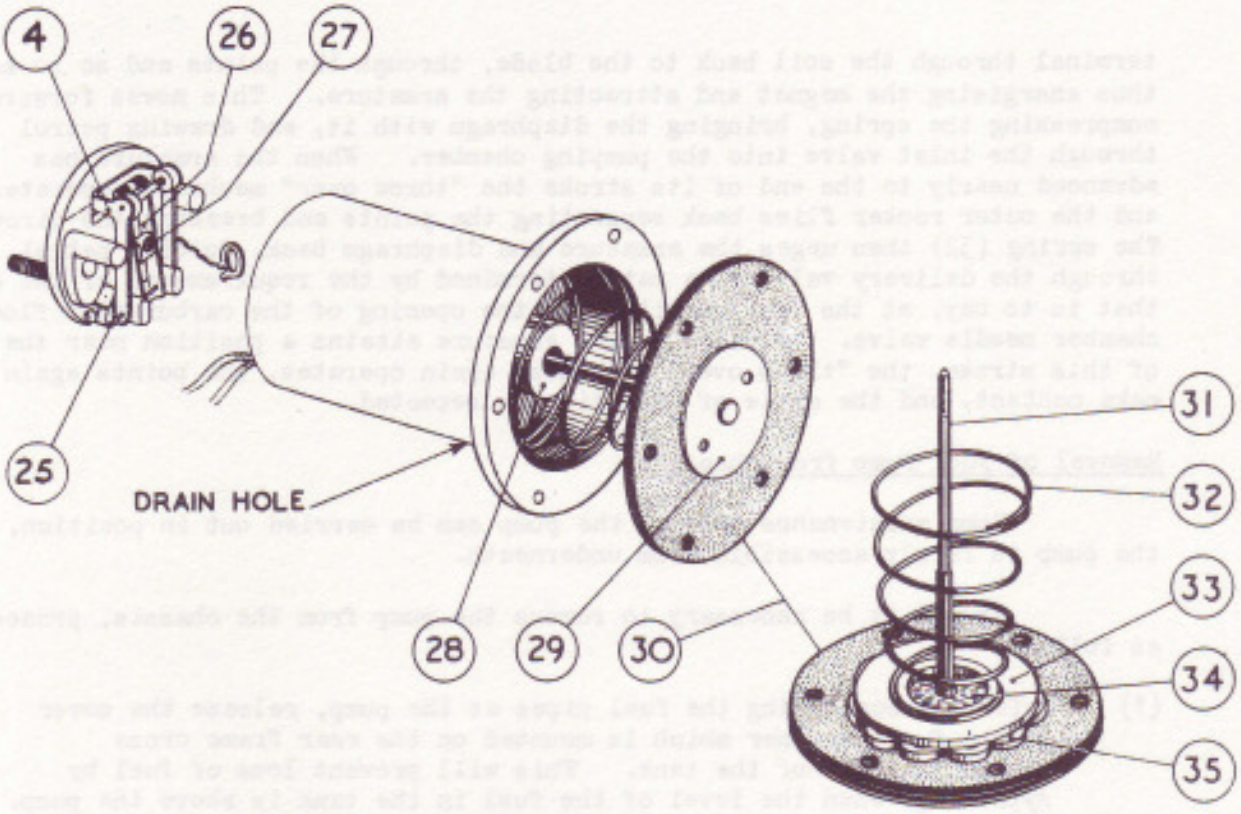


FIG. 3. SHOWING CONTACT MECHANISM AND DIAPHRAGM ASSEMBLY.

4. Outer Rocker (with tungsten points).
25. Hinge Pin.
26. Inner Rocker.
27. Trunnion.
28. Magnet Core.
29. Brass Plate.
30. Diaphragm Assembly.
31. Bronze Rod - Armature.
32. Armature Spring.
33. Steel Armature.
34. Impact Washer.
35. Brass Rollers - Armature Locating.

A short length of flexible wire connects the outer rocker to one of the screws which hold the bakelite pedestal on to the magnet housing in order to complete the circuit to earth.

Fibre bushes are fitted to the spindle of the outer rocker which carries the toggle spring, in order to silence the operation of the pump, and for the same reason an impact washer (34) is fitted to the armature (33).

ACTION OF THE PUMP.

The action of the pump is as follows:- Each half of the pump works independently of the other. Considering one pumping element only, when the pump is at rest the outer rocker lies in the outer position remote from the main body, and the tungsten points are in contact. Current passes from the

terminal through the coil back to the blade, through the points and so to earth, thus energising the magnet and attracting the armature. This moves forward, compressing the spring, bringing the diaphragm with it, and drawing petrol through the inlet valve into the pumping chamber. When the armature has advanced nearly to the end of its stroke the "throw over" mechanism operates, and the outer rocker flies back separating the points and breaking the circuit. The spring (32) then urges the armature and diaphragm back, forcing petrol through the delivery valve at a rate determined by the requirements of the engine, that is to say, at the rate permitted by the opening of the carburetter float chamber needle valve. As soon as the armature attains a position near the end of this stroke, the "throw over" mechanism again operates, the points again make contact, and the cycle of operation is repeated.

Removal of Fuel Pump from chassis.

Some maintenance work on the pump can be carried out in position, as the pump is fairly accessible from underneath.

Should it be necessary to remove the pump from the chassis, proceed as follows:-

(1) Before disconnecting the fuel pipes at the pump, release the cover of the fuel strainer which is mounted on the rear frame cross member in front of the tank. This will prevent loss of fuel by syphoning, when the level of the fuel in the tank is above the pump.

(2) Disconnect from the terminal on the front pump cover, the feed wire, the radio interference suppressor wire and the connecting wire to the rear pump. From the rear pump terminal remove the suppressor wire.

(3) Disconnect the suction and delivery pipes at their unions on the pump body (19 and 18).

(4) Remove the four nuts and spring washers retaining the mounting bracket to the chassis side frame member and remove the pump complete with the mounting bracket and the two radio interference suppressors.

To replace the fuel pump, reverse the above operations.

SERVICE OPERATIONS.

NOTE: Keep the spring blade out of contact and press firmly and steadily on the diaphragm assembly while setting it.

Stretch the diaphragm to the end of its stroke while tightening the six screws.

Do not attempt to move the core of the magnet under any conditions.

Do not attempt to stretch the armature spring.

Restriction in the system on the delivery side of the Pump.

If the pump functions, the fault may be a blockage in the pipe to the carburetters or the carburetter float chamber needles may be stuck to their seatings, but this is unlikely unless the car has been laid-up for some time.

Restriction in the system on the suction side of the Pump.

Disconnect the suction pipe from the inlet union (19) and reconnect the delivery pipe to the outlet union (this must be done or the pump would not be earthed) then switch on again. If the pump now functions, a blockage between the tank and the pump is indicated. This is probably due to the fuel strainer mounted on the frame cross member (in front of the tank) requiring cleaning.

When carrying out this check it is advisable to inspect the filters (23) which are housed in the pump body, by removing the filter plugs (24), and also to ascertain that there is not an accumulation of sediment in the fuel tank by removing the drain plug in the bottom. This will drain out any foreign matter present.

A restriction on the suction side will cause the pump to become very hot.

Failure of Electric Supply to Pump.

If the pump still does not function, check that current is reaching the pump, by connecting a 12 volt bulb between the pump supply lead and the pump body and switching on.

If no current is available at the pump, check that the fuse, which will be the sixth one looking at the fuse box from left to right, or the third one looking from right to left is intact. (This fuse is also used for the ignition circuit etc). Also check that the pump is efficiently earthed through the suction and delivery pipes.

Pump Valves stuck to their seating.

If the pump still does not function, it is possible that the disc valves (14 and 16) have stuck to their seating, but this is unlikely unless the car has been out of use for some time.

To rectify this trouble, remove both plugs (10) and both sets of valves. Unstick them from their seatings. Clean and replace with the smooth side downwards.

Faulty Pumping Unit or Units.

Disconnect the leads from the terminals (9), remove both water-proof gaiters from the pumps and then remove both bakelite end cover caps (1) by unscrewing the nuts (7).

Taking each pumping unit in turn, examine the points to see if they are in contact. If they are, try to strike a spark from the terminal screw (9) by touching it with the feed wire with the ignition switched on.

If there is no indication of a current flow, it is probable that the points are dirty or that one of the flexible wire connections to the coil or rocker arm are broken.

The points may be cleaned by placing a piece of card between them, pressing them together and drawing the card backwards and forwards.

Diaphragm swollen or stiffened up or Armature jammed with foreign matter.

If the points are apart and will not make contact or the pump attempts to do a suction stroke but fails to make the points separate, it is probable that the diaphragm has stiffened up or swollen or that the armature has become jammed with some foreign matter. The diaphragm assembly should then be removed for inspection, and at the same time the white fibre bushes which are fitted to the ends of the outer rocker (4) should be tested for freedom on their mounting pin. Failure of the outer rockers to "throw over" has been traced, on a few occasions, to swelling of these fibre bushes which have caused the toggle to jam.

(a) To remove the diaphragm assembly, take out the six screws (22) and remove the magnet housing (17) complete with the diaphragm assembly. Unstick the diaphragm from the flange of the magnet housing and then unscrew it in an anti-clockwise direction, taking care not to lose the eleven brass rollers (35) which can be removed at this stage. After cleaning all parts, inspect the brass rollers to see if they have flats worn on the spherical edges, if so, replace with new rollers.

(b) To re-assemble and adjust the diaphragm.

Slacken off the retaining screw of the spring blade (2) so that it cannot exert any pressure on the tungsten points attached to the outer rocker. (If this is not done the diaphragm cannot be correctly set).

Place the large end of the spring (32) in the magnet housing. After making sure that the impact washer (34) is in position in the recess in the armature, slide the bronze rod (31) through the hole in the magnet core (28) and screw the threaded end into the trunnion (27) which is attached to the inner rocker (26). Screw right up, holding the magnet housing in the left hand, flange uppermost, then replace the eleven brass rollers by lifting the edge of the diaphragm to allow the rollers to be inserted into the annular recess in the armature. Now, holding the magnet housing as shown in Fig.4, unscrew the armature one sixth of a turn (one flange hole) at a time and simultaneously press it in and out, firmly but slowly, until a point is reached at which the outer rocker will 'toggle over' (when the diaphragm is pressed in), then unscrew it a further two-thirds of a turn (4 holes). The setting is now correct. Re-tighten the spring blade screw.

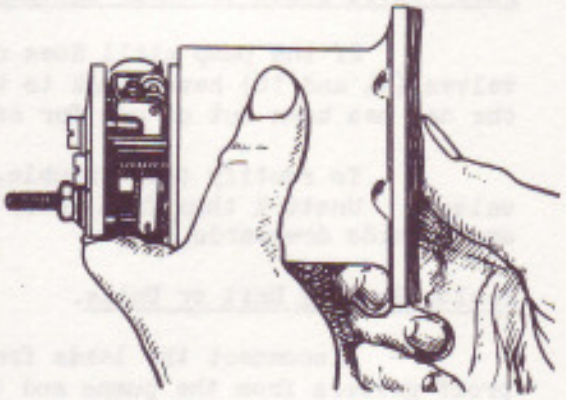


FIG.4. SHOWING METHOD OF HOLDING THE MAGNET HOUSING WHILE ADJUSTING THE DIAPHRAGM.

When a new diaphragm is fitted, it is possible that considerable pressure will be required to push it right home. If there is any doubt about the point at which the contact breaker throws over, come back one-sixth of a turn.

Replace the magnet housing with the drain hole at the bottom, taking care not to trap any of the rollers, loosely screw the six screws (22) into place, but before tightening these down, stretch the diaphragm by removing the hinge pin (25) on which both rockers pivot, this allows the armature spring (32) to push the armature and diaphragm assembly further back. The screws may now be tightened and the hinge pin replaced. Alternatively, if considered more convenient, the diaphragm may be stretched, prior to tightening up the six screws, by inserting a match stick between one of the white fibre rollers on the outer rocker and the magnet housing, and then passing a current through the pump in the normal way. This will cause the armature to be drawn forward. The six screws should then be tightened as before.

If the pump now functions satisfactorily, replace the bakelite end cover caps and the plain washers (8) and nuts (7) and then the waterproof gaiters with the drain holes at the bottom.

To cure a noisy Pump.

If the pump becomes noisy (i.e., ticks excessively) inspection should be made for an air leak on the suction side. In order to do this, it should be ascertained that the fuel strainer cover and the unions are not leaking and also that there is sufficient petrol in the tank. If these precautions do not effect a cure, it is probable that there is an air leak somewhere in the pipe line, and the simplest way to test for this is to replace the suction pipe from the pump with a short length of piping and let the pump draw petrol directly from a separate receptacle. If the pump functions satisfactorily under these conditions, the fault is then in the pipe line itself. If the pump continues to tick without delivering petrol, it is probable that foreign matter has become lodged under one of the valves. This may be removed by unscrewing the plug (10), the retaining ring (12) and taking out the valve and valve cage assembly, which may then be cleaned.

To change Points.

Should it be necessary to change a set of points proceed as follows:-

First remove the magnet housing from the body, by taking out the six screws, then unscrew and remove the diaphragm and armature assembly.

Two fixing screws (9A) hold the pedestal (3) to the magnet housing. Disconnect the earth wire to the outer rocker from one of these and replace the screw on the last thread or two. Slacken the other screw to nearly the last thread. Pull out the hinge pin, lift the bakelite pedestal and remove both sets of rockers. Remove screw holding spring blade and remove spring blade.

In re-assembling the rockers to the pedestal, see that they are a free fit, but without side play. Excessive side play on the outer rocker permits the points to get out of line, while tightness makes the contact breaker sluggish. It may be necessary to "square-up" the outer rocker after assembly, with a pair of thin nosed pliers.

Make sure that the inner rocker is below the centre spring coil (when the magnet housing is standing on its flange).

Pieces of wire should not be used for a hinge pin; the standard hinge pin is case hardened.

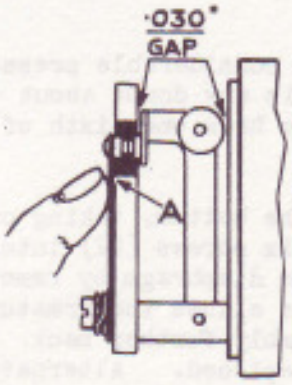


FIG. 5. SHOWING THE SPRING BLADE (2) BEING PRESSED IN AGAINST THE LEDGE AT "A" SO THAT THE OUTER ROCKER CLEARANCE CAN BE MEASURED.

The spring blade should be fitted next to the bakelite pedestal, followed by the tag, then the spring washer and finally the screw. Make sure that the tag is turned the right way round or it may "short" to the terminal screw (9). The spring blade should rest against the ledge (A Fig.5) on the pedestal when the points are apart and it must not be stiff enough to prevent the outer rocker from coming right forward when the points are in contact. The points should just make contact when the outer rocker is in its mid-way position. The simplest way to check this is to hold the blade in contact with the ledge on the pedestal (as shown in Fig.5), being careful not to press on the overhanging portion, and then ascertain that a thirty thousandths of an inch (.030") feeler can just be passed between the white rollers and the cast iron body of the pump. If necessary the tip of the blade should be "set" in order to correct the gap.

The spring washer on the 2BA screw to which the earthing connection is taken should be fitted below the tag, that is next to the pedestal. The reason for this is that the spring washer cannot be relied on as a conductor, and therefore the brass tag should be next to the head of the screw.

All four connections, that is the two ends of the earthing tag and the two ends of the coil, are soldered. The coil end going to the terminal is soldered to its tag and not to the nut.

The remainder of the assembly and the adjustment of the diaphragm should be carried out as described previously.

Replacement of cracked or broken bakelite pedestal.

Should the bakelite pedestal (3) get broken, it should be replaced. This will entail removal of the magnet housing from the pump body and the removal of the diaphragm assembly as described in a previous paragraph.

In fitting the new bakelite pedestal the main point to note is the order in which the various items are fitted to the terminal (9) See Fig.6.

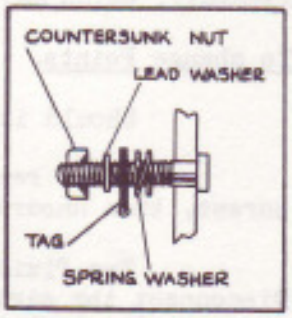


FIG. 6. CORRECT ORDER OF ASSEMBLY OF ITEMS ON THE TERMINAL SCREW (9).

The correct order for the assembly on the terminal is, spring washer next to the bakelite, then the tag, the lead washer and the countersunk nut. A lead washer has been found necessary at this point as a few cases of bad connections have been found. Under no conditions should this assembly be shortened by leaving out the spring washer or in any other way, as this will probably result in breakage of the pedestal when the nut holding the cover in position is tightened.

Re-assemble the rockers and springs blade to the pedestal, and then screw in and adjust the diaphragm assembly and refit the magnet housing to the pump body as previously described.

THE CARBURETTERS.

OPERATION.

Two carburetters of the S.U. controllable jet type are fitted, one of which is shown "exploded" in Fig.7 and in section in Fig.8.

This type of carburetter automatically adjusts both its choke area and jet area to suit the engine demands. This is effected by using the manifold depression to operate a piston or air valve (3), which carries a tapered needle (5) to regulate the fuel passage. The upper side (A) of the piston is connected by the passage way (C) to the base of the piston facing the throttle valve, and is subject to the depressions in the throttle body. The lower side (B) of the piston is vented to atmosphere.

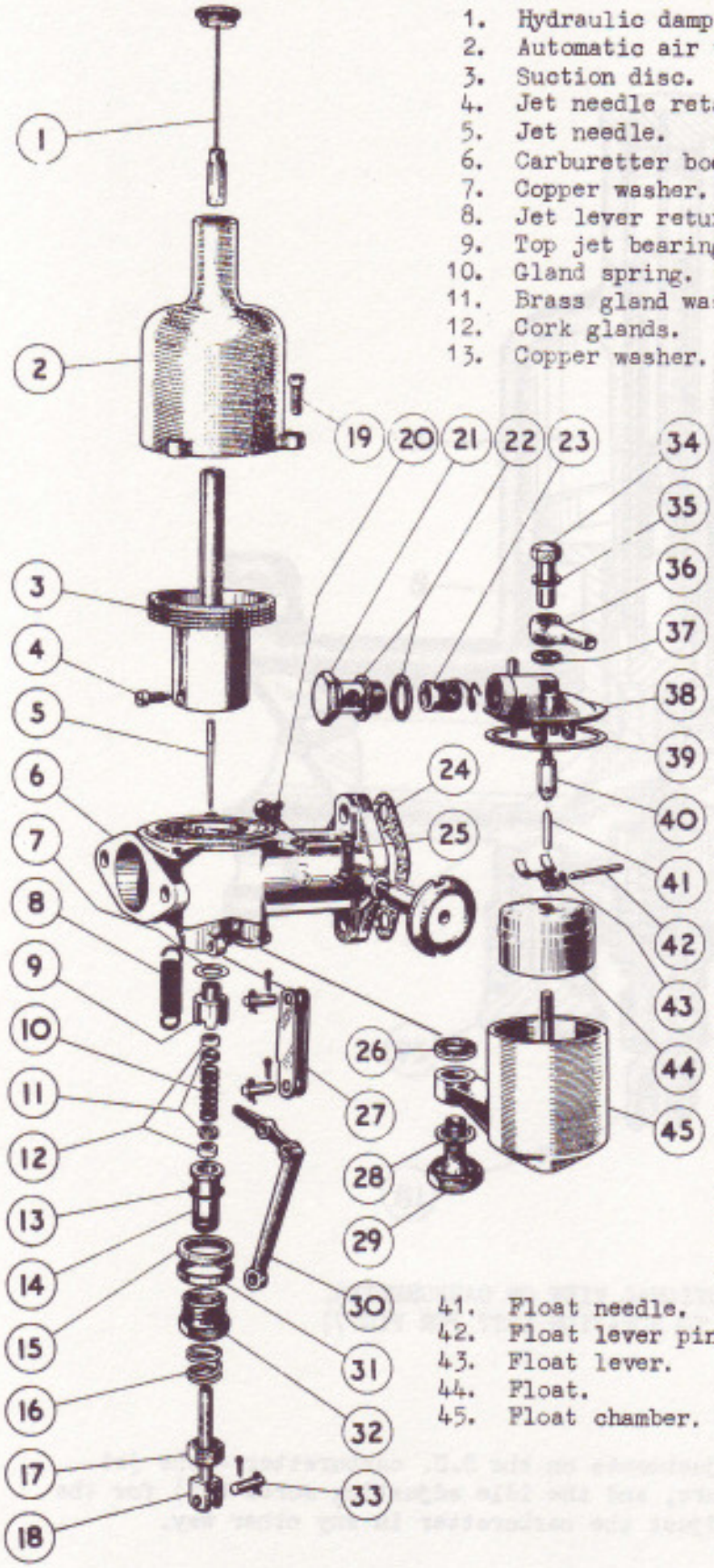
As the air flow through the carburetter increases, so the depression between the piston and the throttle valve increases, thereby causing the piston to rise and admit more air and the needle to be withdrawn from the jet, thus allowing more fuel to flow. Similarly, as the air flow falls, due to reduced engine requirements, so the piston falls. In this way, a state of balance is maintained whereby the piston keeps at a certain height, dependent on the engine speed and the throttle opening. Thus the carburetter automatically adjusts itself to the varying requirements of the engine.

A hydraulic damper (1) is fitted to prevent the piston rising too quickly when the throttle is suddenly opened, thus a slightly richer mixture is provided momentarily during the delayed rising of the piston, which results in cleaner and more rapid pick-up.

The damper consists of a small cylindrical brass plunger attached by a thin steel rod to the oil cap nut. Inside the plunger is a one-way ball valve which seats in an upward direction. The plunger is a free fit in the hollow guide rod of the automatic air valve piston, the chamber being filled with a thin oil. The action of the device being as follows:-

When the automatic air valve piston rises in accordance with the demands of the engine, the movement is retarded due to the displacement of oil through the clearance existing between the damper plunger and the guide rod. The fall of the automatic air valve is unimpeded due to the ball valve being opened, which allows the unrestricted passage of the displaced oil. No attention should be necessary other than the replenishment of the oil in the reservoir.

Every month, the oil reservoir cap nut should be unscrewed and the plunger withdrawn, great care being taken to avoid damage to the plunger rod by bending; the oil should be topped up, if required, with a recommended oil (See Sub-Section BD.1) so as to maintain the level of the oil to the top of the guide rod. The plunger should then be replaced, taking care that no dirt or grit is present. A light steady pressure may be required to displace the oil sufficiently to allow the engagement of the thread of the cap.



1. Hydraulic damper plunger, rod and cap.
2. Automatic air valve cylinder.
3. Suction disc.
4. Jet needle retaining screw.
5. Jet needle.
6. Carburetter body.
7. Copper washer.
8. Jet lever return spring.
9. Top jet bearing.
10. Gland spring.
11. Brass gland washers.
12. Cork glands.
13. Copper washer.
14. Bottom jet bearing.
15. Cork sealing washer.
16. Adjusting nut spring.
17. Jet adjusting nut.
18. Jet head.
19. Air valve cylinder retaining screws.
20. Throttle return spring hook.
21. Petrol inlet banjo bolt.
22. C and A washers.
23. Petrol strainer.
24. Joint washer.
25. Throttle stop adjusting screw and spring
26. C and A washer - float chamber to body.
27. Link - jet lever.
28. Cork washer - float chamber retaining bolt.
29. Float chamber retaining bolt.
30. Jet lever.
31. Brass sealing washer.
32. Jet holding screw.
33. Pin - jet lever to jet head.
34. Nut - float chamber cover.
35. Alum washer.
36. Banjo connection for overflow pipe.
37. Fibre washer.
38. Float chamber cover.
39. Joint - float chamber cover.
40. Needle seat and guide.
41. Float needle.
42. Float lever pin.
43. Float lever.
44. Float.
45. Float chamber.

FIG. 7. EXPLODED VIEW OF CARBURETTER.

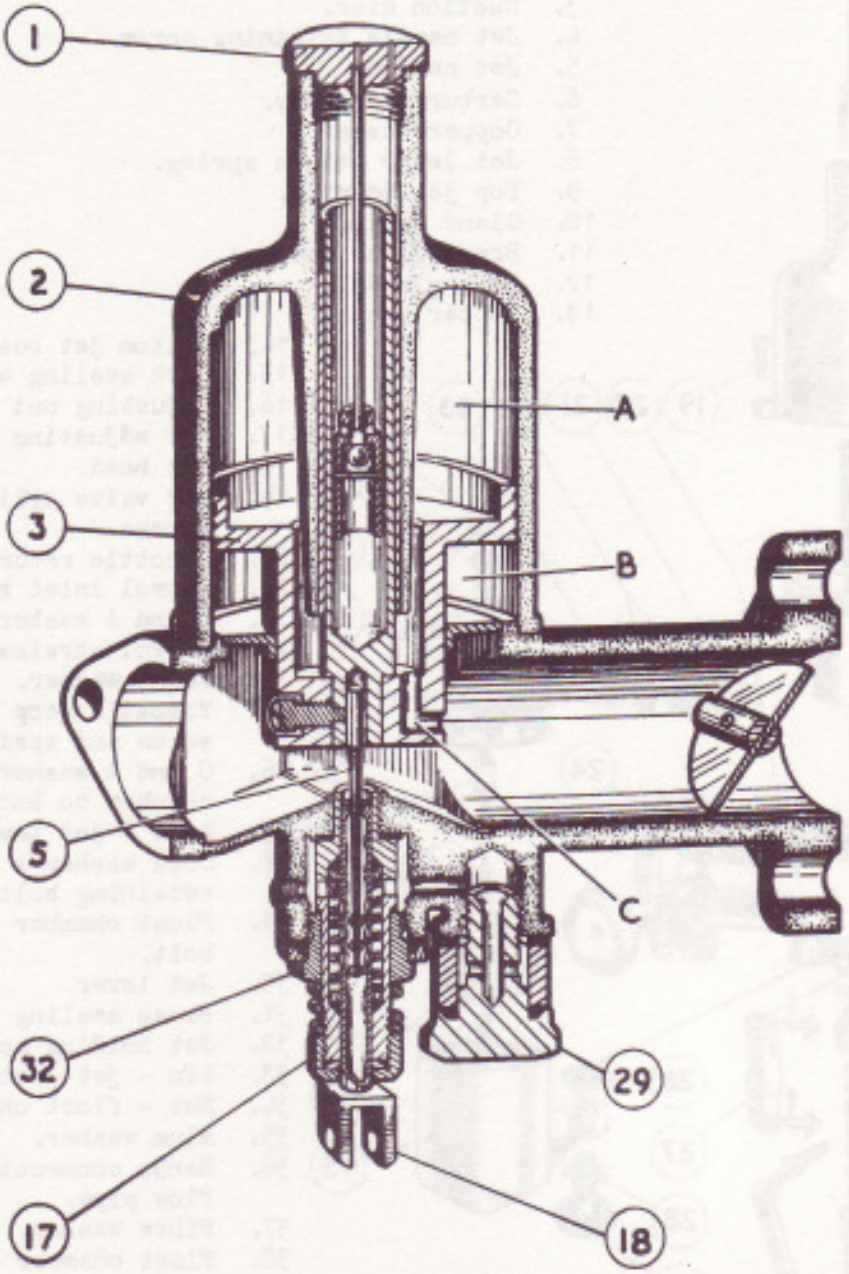


FIG. 8. SECTIONAL VIEW OF CARBURETTER.
(REFER TO NOTATION LIST FOR FIG. 7)

ADJUSTMENTS.

There are only two adjustments on the S.U. carburetter - the jet adjusting nut (17) for the mixture, and the idle adjusting screw (25) for the idling speed. Do not try to adjust the carburetter in any other way.

MIXTURE.

The jet adjusting nut (17) is a "stop" against which the jet head should bear, except when the jet is lowered for cold starting. The adjustment consists of varying the position of this stop and therefore varying the amount by which the jet is pushed up for normal running. This adjustment should be carried out with the engine idling and at its normal running temperature. The shape or contour of the needle is so proportioned that when the mixture is set correct for idling, it will be correct throughout the range.

If the mixture is too rich, the exhaust note will have a constant rhythmical uneven beat, known as "hunting". If the mixture is weak the exhaust note will be irregular and splashy.

To adjust the mixture, proceed as follows:-

Run the engine until it attains its normal running temperature. With the engine idling, adjust the jet to such a position that the engine idles on the correct mixture. An easy way to do this is to adjust the jet up to a weaker position, then unscrew the jet down to the position when the engine idles with an even exhaust.

A simple way to test for a rich mixture is to lift one of the pistons up very slightly, say 1/32" with a small screwdriver, if the engine runs faster, the mixture is too strong.

It is an advantage, if these adjustments are carried out in reasonably quiet surroundings as the exhaust note can then be heard more easily. The movement of the engine on its flexible mountings and the speed of the fan also give a useful indication of the evenness of firing.

THROTTLE.

The correct idling speed can be obtained by adjusting the throttle stop screw (25a) which is fitted only to the front carburetter. This adjustment should be carried out with the engine warmed up, the mixture correctly adjusted and the hand throttle lever on the steering column closed.

The throttles of the two carburetters are synchronised by Bentley Motors Ltd., and no further attention should normally be required to the inter-throttle connecting shaft. However, the following paragraphs give complete information on synchronising in case this should be necessary.

Synchronising of the throttles - explanation.

The synchronising of the throttles is largely a matter of trial and error, and is not so straight-forward an operation as it might at first appear. This is due to the twisting of the inter-throttle connecting shaft (48, Fig.9) under the influence of the throttle return spring.

If both carburetters were fitted with a throttle stop screw, then in the idle position the inter-throttle connecting shaft would be relieved of the throttle return spring torgue and would therefore not be twisted. However, on opening the throttle the connecting shaft would be subject to the return spring torque which would cause it to twist very slightly and thus cause the front

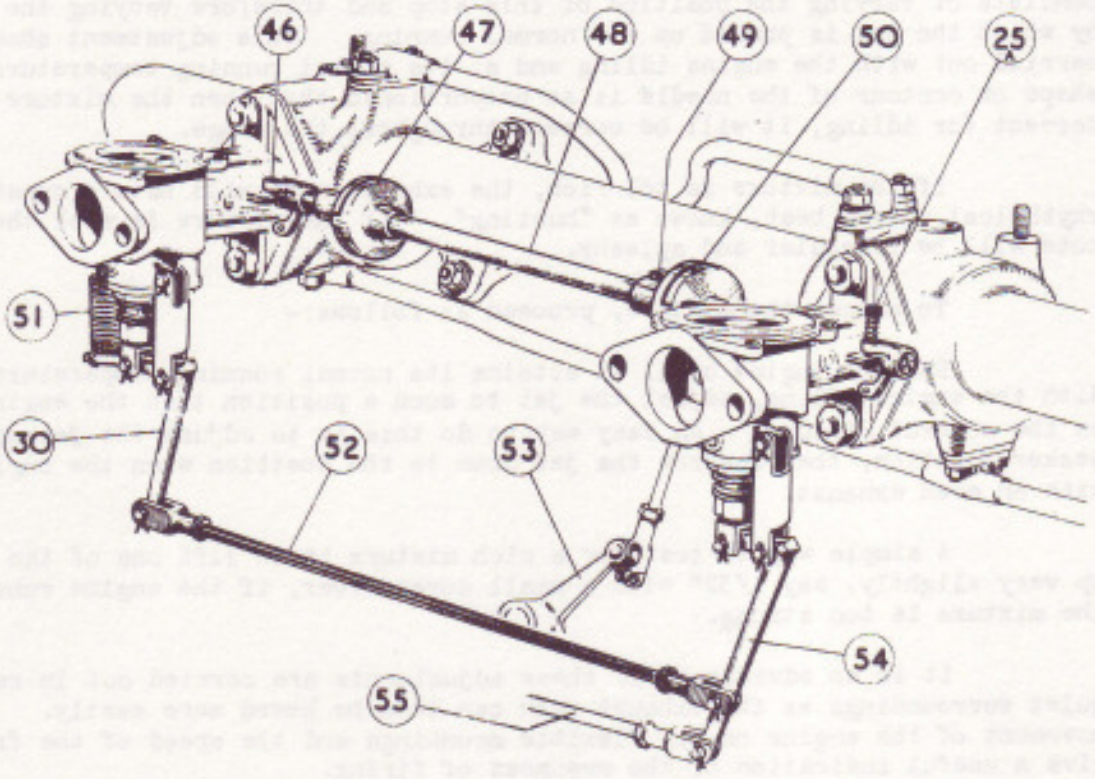


FIG. 9. VIEW OF CARBURETTER CONTROLS. (CARBURETTERS PARTLY DISMANTLED FOR CLARITY).

25a. Throttle stop adjusting screw.
30. Jet lever - rear carburetter.
46. Lever to which throttle stop screw is temporarily fitted for synchronising purposes.
47. Coupling - rear.
48. Throttle connecting shaft.
49. Pinch bolt.
50. Coupling - front.
51. Jet lever return spring.
52. Jet lever connecting rod.
53. Throttle control lever.
54. Jet lever - front carburetter.
55. Mixture control rod.

carburetter throttle to open slightly in advance of the rear carburetter The difference would be slight and not enough to have any effect at appreciable throttle openings but it would nevertheless be sufficient to upset the running at very small throttle openings.

It is for this reason that only the front carburetter is fitted with a throttle stop screw, this ensures that the connecting shaft is subject to the return spring torque even in the idling position.

Checking Synchronism.

(i) As the checking of the synchronism is partly an aural check, it will be necessary to disconnect the air intake casting from the carburetters to enable the sound of the air as it passes through the carburetters to be heard.

Remove the nuts which retain the air intake to the carburetters and also disconnect air intake from the air silencer. As the throttle return spring is anchored to the air intake casting, some temporary anchorage for the return spring must be arranged, or, alternatively, the air intake casting can be wedged in a suitable position. It is important, however, whichever method is used, that the anchorage is in approximately the correct position, as it would be a waste of time to synchronise the throttles with an incorrect return spring tension.

(ii) Unscrew the oiler caps and remove the hydraulic dampers (1) from both carburetters.

(iii) With the engine warmed up and running at a fast tick over speed, (approx. 500 - 600 r.p.m.) sufficient to lift the suction pistons slightly, note the sound emitted by the front carburetter. Now with the aid of a pencil or other suitable article, depress the piston of this carburetter by pressing down on the piston guide rod through the top of the suction chamber and note the change in air noise or hiss, and the amount by which the piston can be depressed; i.e., note the travel of the piston before it contacts the bridge piece. Now repeat this on the rear carburetter and again listen to the change in hiss and note the amount by which it can be depressed.

The "depression" and the change in note should be the same for both carburetters. If this is so the carburetters are correctly synchronised. If not, they should be synchronised as follows:-

Synchronising.

(i) The rear carburetter is not normally fitted with a throttle stop screw for reasons already described, but for synchronising purposes it will be necessary to fit one together with its spring.

(ii) With the engine warmed up and running (i.e. mixture satisfactory), set the hand throttle control lever on the steering column to the fully closed position and then slacken off the pinch bolt (49) of the inter-throttle connecting shaft. Make sure that the throttles can now be moved independently.

(iii) Adjust each carburetter to the same throttle opening by means of the two throttle stop screws, adjust "aurally" and for "equal depression" of the pistons.

(iv) It will now be necessary to advance the opening of the rear carburetter very slightly, to compensate for the twisting of the connecting shaft which will occur when the rear throttle stop screw

is removed. Advance the opening of the rear carburetter by screwing in the stop screw, say an $\frac{1}{8}$th of a turn. Now nip up the pinch bolt of the connecting shaft - see paragraph on "End Float". Remove the rear carburetter throttle stop screw and carry out the "aural" and "equal depression" test. If this indicates satisfactory synchronisation then replace the air intake casting etc.

(v) If not satisfactory, note whether the rear carburetter throttle is open more than or less than the front. Repeat the above instructions (i) to (iv) inclusive, but advance the rear throttle opening slightly more or slightly less than the previous $\frac{1}{8}$th of a turn as the case may be.

(vi) Any adjustment to the tick-over speed can now be made by screwing in or out, as required, the throttle stop screw of the front carburetter, the rear one having been removed.

"End Float" - Throttle Connecting Shaft.

The shaft should have an end float between the couplings of .010 ins. min. with the throttle closed and the engine cold.

SERVICE FAULTS.

Owing to the simplicity of the S.U. carburetter, there are very few faults which can develop in service.

For instance, a blocked jet is most unlikely as there is only one in each carburetter and this is of a large size and has a constantly moving needle passing through it.

In the unlikely event of foreign matter entering the carburetter, it will probably settle in the bottom of the float chamber or round the base of the float chamber retaining bolt (29). To clean, remove the bolt (29) and the float chamber.

To clean the jet, remove the pin (33, Fig.7) and then withdraw the jet after marking it so that it can be re-assembled the same way round, i.e. with the same "flat" of the jet head facing the engine. With the jet removed, it can be cleaned and replaced.

Two other possible faults are a sluggish or sticking air valve piston, or a sticking float needle.

Sluggish or Sticking Air Valve.

The air valve comprises the piston, forming the choke, the needle and suction disc; into this is inserted the hardened and ground piston guide rod which works in the bearing of the air valve cylinder. The piston rod running in the bearing is the only part which is in actual contact with any other part - the suction piston and needle are a clearance fit in the cylinder and jet respectively and consequently should not cause sticking. However, if this does occur, the most likely cause is a small piece of grit or dirt which may have lodged between the piston and the cylinder, in which case the whole piston and cylinder assembly should be carefully cleaned by wiping with a

clean cloth dipped in petrol, and the piston guide rod ONLY should be lubricated with a spot of thin oil. On no account should any polishing compound be used to clean the piston or cylinder. A sticking piston can be ascertained by inserting a finger in the air intake and lifting the piston, which should come up quite freely and fall right on to its seat when released.

A locating groove down the side of the piston ensures that it can only be replaced in its correct angular position.

IMPORTANT NOTE: The pistons and air valve cylinders are carefully matched by the manufacturers and should not be interchanged. Therefore, it is advisable to remove only one cylinder at a time.

Float Needle Sticking.

This can be caused by foreign matter preventing the needle from seating, or by a gummy deposit sticking the needle to its seating.

The latter is most unlikely to occur unless the car has been laid-up for a long period or an inferior grade of fuel has been in use, while the former is effectively guarded against by the fuel strainers (one near the tank, two in the base of the electric fuel pumps and one in each float chamber cap).

The symptoms and remedy for either of the above are as follows:-

A needle not seating, will be indicated by the continued "ticking" of the electric petrol pump when the ignition is switched on and the engine not running, also petrol will be seen escaping from the end of the float chamber over-flow pipe. If this trouble occurred "on the road" an indication would be an excessively rich mixture.

In an isolated case of trouble of this nature it would probably be sufficient, merely to depress the carburetter tickler pin with the ignition switched on, this would wash away the dirt. In a persistent case it would be advisable to clean the fuel strainer, drain and flush out the fuel tank and allow the pump to flush out the fuel line by operating it for a short period with the carburetters disconnected. A needle stuck to its seating would be suspected by fuel starvation and confirmed by depressing each carburetter "tickler" pin in turn when the offending carburetter would not flood or cause the pump to "tick".

In an isolated case, the cure is to clean the needle and its seating, and in a persistent case, to thoroughly clean out the whole fuel system.

To Replace Gland Washers of Jet Assembly.

Leakage of petrol from the bottom of the jet assembly, is a trouble that very rarely occurs even after a considerable mileage has been covered. However, if it does occur, it can be cured by renewing the two cork gland washers and the cork sealing washer of the jet assembly.

To Remove Jet Assembly.

(i) Disconnect the mixture control lever (30) from the jet head (18).

(ii) Remove the hydraulic damper from the top of the air valve cylinder. Remove the three screws (19) and the cylinder and then carefully lift out the piston, taking care not to bend the needle.

(iii) Unscrew the large hexagonal jet screw (32) and remove the jet assembly complete.

(iv) Dismantle and thoroughly clean all parts.

To Rebuild the Jet Assembly.

First assemble the jet bearing lower half (14, Fig.7 and 8), the copper washer (13), the jet screw (32), the spring (16) and the jet adjusting nut (17). Screw the jet adjusting nut up about five turns and then insert the jet. Next, fit the sealing ring (31) over the jet screw with the chamfer uppermost, followed by a new cork washer (15). Now fit a new lower jet gland cork washer (12) and the jet gland (11) with the chamfer downwards, both of these should be slid over the jet and pushed to the bottom of the jet bearing by the spring (10) which is left in position. The upper jet gland (11) should now be placed over the jet and against the spring (chamfer uppermost) followed by a new jet gland cork washer (12), the jet bearing upper half (9) and finally the copper washer (7). The jet assembly is now complete and ready for fitting to the carburetter body. This should be done, to begin with, only finger tight, to allow for the centring of the jet which is the next operation.

CENTRING THE JET IN RELATION TO THE NEEDLE.

If the piston is lifted by hand, it should fall freely and hit the jet bridge with a slight click.

The centralising of the jet is an operation which should not be carried out unnecessarily. It consists of moving the jet assembly until its centre line coincides with that of the needle, so that no contact between the jet and the needle takes place. There is an annular space or clearance around the jet assembly to enable it to be moved for this purpose.

Having ascertained that the jet is out of centre, proceed to re-centralise as follows:-

(i) Disconnect the jet lever from the jet head.

(ii) Screw the jet adjusting nut (17) up to its top position.

(iii) Slacken off the large hex. jet screw (32) about a third to half a turn.

(iv) Push the jet up to its top position and then tap the jet head in an upwards direction very lightly several times, using a small fibre hammer or wooden handle of a screwdriver.

(v) Re-tighten the large hex. jet screw and then check the piston to see that it falls freely with a click. If not, repeat the above process until it does.

(vi) Return jet adjusting nut to its previous position or re-adjust as described under "Mixture Adjustment".

To check for worn jet:- Remove the jet from the carburetter simply by pulling it out from the bottom after disconnecting the jet lever, but mark the jet head to enable the jet to be replaced in the same angular position (i.e. the jet lever can be assembled to the jet head in either of two positions but should be replaced in the same position unless re-centring of the jet is going to be carried out). Use a new or an unworn needle of the correct type as a gauge, entering it into the jet, and by careful inspection ascertain if any wear of the jet has taken place.

The bore of the jet should be the same size as the diameter of the top of the needle just below the shoulder (i.e. .100" dia.). If the jet is worn it should be replaced.

To check for a bent needle:- Unscrew the oiler cap and remove the hydraulic damper. Remove the three screws securing the suction chamber and remove the suction chamber. Carefully remove the piston by lifting vertically, taking care not to bend the needle.

Hold the suction chamber horizontally against a bench, enter the piston into the suction chamber and spin the piston. If the needle is in any way bent it will be apparent by the needle not spinning perfectly true. A needle which is only slightly out of true may be corrected by bending slightly with the fingers, (never grip a needle with a pair of pliers), and re-checking. Very great care is required as the needle must be perfectly straight and concentric. A needle which is worn, bruised, appreciably bent or damaged in any other way should be replaced by a new one of the correct type.

PETROL LEVEL.

The petrol level in the float chamber can be varied by bending the forked lever (43). The forked lever should be set so that when it is holding the needle against its seating a 7/16" diameter bar can just be passed between the lever and the float chamber cover as shown in Fig.10.

An incorrect petrol level can also be caused by a punctured float. This can easily be determined by shaking the float. A punctured float should be replaced by a new one.

Do not dismantle a carburetter unnecessarily and in any case do not remove the piston plate as this is machined in position by the makers. (The piston plate can be seen secured to the carburetter body by two counter-sunk screws, after removal of the suction chamber and piston).

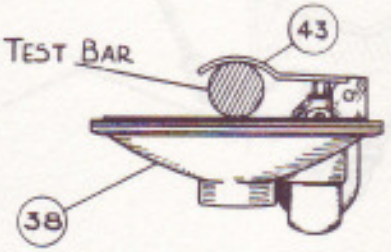


FIG.10. TEST BAR IN POSITION.

38 - Float chamber cover.
43.- Float lever.

CARBURETTER CONTROLS.

The following is a description of setting the carburetter controls. It should not normally be necessary to adjust all the points described, but complete information is given, should this be required.

(i) No attempt should be made to set the controls, unless it is known that the slow running is correctly adjusted and that the carburetter throttles are correctly synchronised. These two operations are fully described in Sub-Section EM.3.

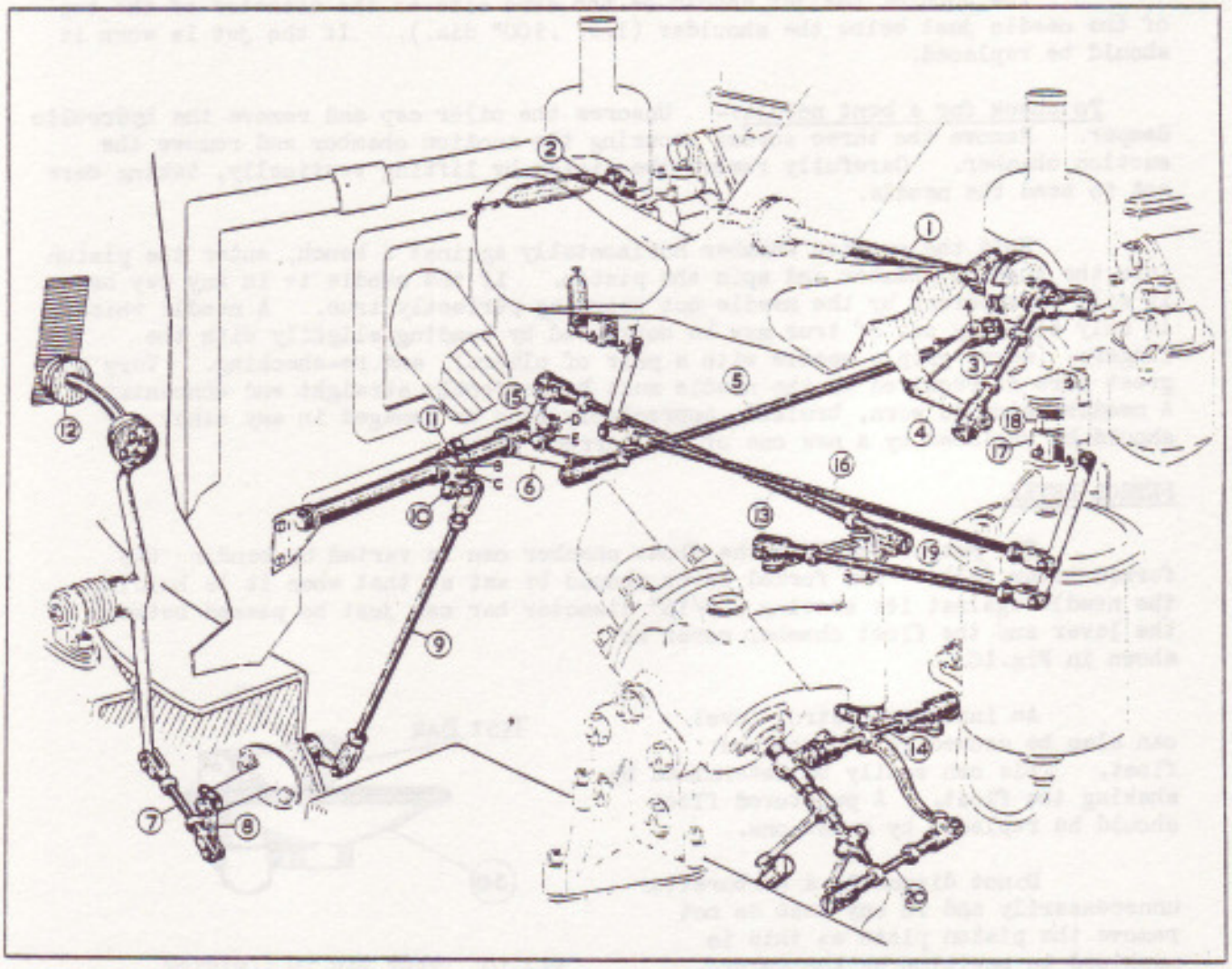


FIG.11. CARBURETTER CONTROLS.

(ii) With the throttle connecting shaft (1, Fig.11) held in the fully closed position by the throttle return spring (2) and with the hand throttle lever on the quadrant of the steering column also in the fully closed position, adjust the length of the rod (3),

so that a clearance of approximately $\frac{1}{2}$" (12.5 m/m) is obtained between point 'A' (centre of ball pin) of the bellcrank lever (4) and the side of the rod (3) nearest to the ball-pin.

(iii) Adjust the length of the rod (5), so that the lever (6) on the countershaft fitted to the dashboard is in the position as shown on Fig.12.

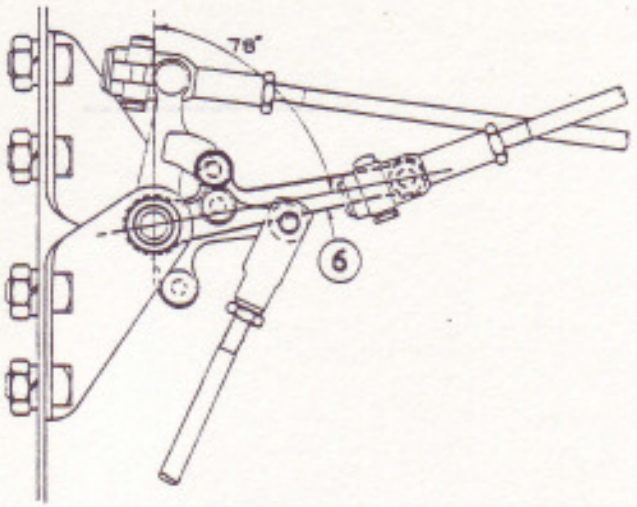


FIG.12. CORRECT ANGULAR POSITION OF LEVER '6'.

(iv) Adjust the length of the accelerator pedal rod (7) so that the lever (8) hangs vertically when the accelerator pedal is in the up (closed) position.

(v) Adjust the length of the rod (9) so that the clearance between the upper peg 'B' on the lever (10) and the pad 'C' on the lever (11) is sufficient to allow approximately $\frac{1}{8}$" (3.2 m/m) free movement of the accelerator pedal. Check for tightness, the nut of the pinch-bolt securing the lever (11) to the countershaft.

(vi) If necessary, fit rubber stops (12) under the accelerator pedal plate so that the pedal is stopped on the pedal gap plate when the throttles are in the fully open position.

(vii) Adjust the length of the rods (13 and 14) so that the clearance between the pad 'D' on the lever (15) and the peg 'E' on the lever (6) is sufficient to allow from 7 to 9 notches free travel of the hand throttle lever on the quadrant of the steering column before the throttles commence to open.

(viii) Adjust the length of the rod (16) so that the jet heads (17) of both carburetters are on their normal running stops, i.e. against the jet adjusting nuts (18).

(ix) Adjust the length of the rods (19 and 20), so that when the jet heads of the carburetters are on their normal running stops (18),

the hand controlled mixture lever on the quadrant of the steering column is two notches up from the normal running position.

(x) Finally check that all the locknuts have been tightened, that no split pins have been omitted, and also, that all the locking screws of the ball joints have been tightened up.
