SECTION D
FUEL SYSTEM
SERIES BN4

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Section D.1

THE FUEL TANK

(1) Remove the drain plug from the tank and drain the petrol into a suitable receptacle.
(2) Within the luggage compartment release and remove the spare wheel by disconnecting its securing strap.
(3) Remove the carpet which covers the floor of the luggage compartment.
(4) Remove the petrol tank feed pipe cover, situated in the top right-hand corner of the boot, by unscrewing the six securing Phillip screws. Disconnect the feed pipe from the tank.

(5) Disconnect the petrol tank filler pipe at its union with the tank. The union is made by a rubber joint hose and two securing clips.
(6) Detach the insulated lead from the petrol gauge unit terminal.
(7) Release the tank securing straps by unscrewing the nut and locknut of each tank strap stud. These nuts are visible on the under side of the luggage compartment floor just in front of the rear body panel. Pull the straps through the compartment floor and hinge them back on their clevis pin anchorages.
(8) Lift out the tank.

1. Outlet union.
2. Fibre washer (thick, orange).
3. Spring clip.
4. Delivery valve disc.
5. Valve cage.
6. Fibre washer.
7. Suction valve disc.
8. Pump body.
10. Armature guide rollers.
11. Retaining plate.
12. Filter.
13. Fibre washer (thick, orange).
14. Filter plug.
15. Steel armature.
16. Path rod.
17. Magnet iron core.
18. Magnet collar.
19. Rocker hinge pin.
20. Terminal screw.
22. Cover and terminal nuts.
23. Earth terminal screw.
25. Inner rocker.
27. Magnet housing.
28. Valve spring.
29. Inlet union.
30. Condenser.
31. Suction valve spring.

Fig. D.1. Lift pump—components.
Section D.2  FUEL PUMP

Description
The fuel pump is an S.U. type H.P., 12-volt electric pump. (See Fig. D.1).

The pump consists of three main assemblies, the body, the magnet assembly and the contact breaker.

The body is composed of a hollow alloy die-casting (8) in two parts, into the bottom of which the filter (12) is screwed. The pump inlet union (29) is screwed in at an angle on one side. The outlet union (1) is screwed into the top and tightens down on the delivery valve cage (5) which is clamped between the two fibre washers (2) and (6). In the top of the delivery cage is the delivery valve, a thin brass disc (4) held in position by a spring clip (3). Inserted in the bottom of the cage is the suction valve (7), being a similar disc to (4) and held lightly on a seating machined in the body by a spring.

Holes connect the space between the valves and the pumping chamber, a shallow depression on the forward face of the body. This space is closed by a diaphragm assembly (9) clamped at its outside edge between the magnet housing (27) and body (8) and at its centre between the retaining plate and the steel armature (15).

A bronze rod to which the diaphragm is attached (16) is screwed through the centre of the armature, passes through the magnet core to the contact breaker, located at the other end. A volute spring (28) is interposed between the armature and the end plate of the coil to return the armature and diaphragm.

The magnet housing consists of a cast-iron pot containing an iron core (17), wound with a coil of copper wire to energise the magnet. Between the magnet housing and the armature are fitted eleven spherical-edged brass rollers (10). These locate the armature centrally within the magnet at all times, and allow absolute freedom of movement in a longitudinal direction. The contact breaker consists of a small bakelite moulding carrying two rockers (25) and (26), which are both hinged to the moulding at one end and are connected together at the top end by two small springs, arranged to give a “throw over” action. A trunion is fitted into the centre of the inner rocker, and the bronze push-rod (16) is connected to the armature is screwed into this. The outer rocker (26) is fitted with a tungsten point, which makes contact with a further tungsten point on a spring blade (24). This spring blade is connected to one end of the coil, and the other end of the coil is connected to the terminal (20).

A short length of flexible wire is connected to the outer rocker and to the other terminal (23) which also serves to hold the bakelite moulding on the magnet housing.

The rocker mechanism is insulated by fibre bushes. Two fibre bushes are fitted to one of the spindles of the “throw over” mechanism in order to silence the operation of the contact breaker.

Action of the Fuel Pump
When the pump is at rest, the outer rocker lies in the outer position and the tungsten points are in contact. The current passes from the terminal through the coil back to the blade, through the points and to the earth return, thus energising the magnet and attracting the armature. This comes forward, bringing the diaphragm with it and sucking petrol (gasoline) through the suction 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 (28) then pushes the armature and diaphragm back, forcing petrol (gasoline) through the delivery valve at a rate determined by the requirements of the engine. As soon as the armature gets near the end of this stroke the “throw over” mechanism again operates, the points again make contact, and the cycle of operations is repeated.

Section D.3  SERVICING THE PUMP

When a pump comes in for reconditioning, the first thing to do is to determine, by the sense of smell, whether the parts in contact with the fuel have become coated with gum. The gum is a substance similar to varnish and can cause the eventual destruction of the diaphragm. Its presence can be detected by smelling the outlet union: if an unpleasant stale smell is noticed, gum is present. The ordinary smell of petrol (gasoline) denotes that no gum has been formed.

![Fig. D.2. The correct armature setting.](image_url)
Fuel System

To Dismantle the Pump

1. Unscrew the filter plug and remove the plug, washer and filter. The latter may be found clogged with gum.
2. Remove the inlet union and washer.
3. Remove the outlet union and its washer.
4. Extract the valve cage, valve cage washer, suction valve and spring. Remove the circlip retaining the delivery valve and withdraw the valve disc.
5. Unscrew the six screws holding the two main components of the pump together. If the presence of gum has been detected, all parts (NOT ALUMINIUM) must be boiled in 20 per cent. caustic soda solution, dipped in nitric acid and then washed in boiling water. Aluminium parts must be cleaned by thoroughly soaking in methylated spirits.
6. If no evidence of gum formation has been found, separate the two parts of the pump and check the action of the valves. It should be possible to blow freely but not to suck air back through the inlet union, and to suck, but not blow, air through the delivery valve. If valve action is satisfactory there is no need to disturb their assembly.
7. Clean the filter with a brush and swill out the body of the pump.
8. Unscrew the diaphragm assembly from its union in the contact breaker by rotating the whole assembly in an anti-clockwise direction. Take care not to lose the rollers fitted behind the diaphragm.
9. Remove the contact breaker cover and the nut on the terminal acting as a seating for the cover. Cut away the lead washer squeezed on the terminal threads below the nut, and push the terminal down a short way so that the tag on the coil end is free on the terminal.
10. Unscrew the contact blade retaining screw and the two long pedestal screws; remove the blade and the pedestal. Do not damage the coil end in disengaging the tag from the terminal.
11. Push out the rocker hinge pin. Do not disturb the core of the magnet; special press tools are required for its correct location.

To Reassemble the Pump

1. Make sure that all parts are clean.
2. Fit each valve with its smooth side downwards and ensure the correct location of the circlip in its groove.
3. Fit the red fibre washers as follows: the thin one below the valve cage, the next thickest above the cage, and the thickest on the inlet union. The washer on the filter plug is also a thick red fibre one.

4. Assemble the contact breaker on its pedestal so that the rockers are free in their mountings without appreciable sideplay. Any excessive sideplay on the outer rocker allows the points to be out of line, while excessive tightness interferes with the action of the pump through sluggish contact breaker operation.
5. In cases of tightness it may be necessary to square up the outer rocker with a pair of thin-nosed pliers.
6. The hinge pin is case hardened and ordinary wire must never be used as a replacement.
7. If the contact blade has been removed, replace it underneath the tag, bearing directly against the pedestal. When the points are separated, the blade should rest against the ledge of the pedestal and must not be so stiff as to prevent the outer rocker from coming right forward when the points are in contact. The points must make contact when the rocker is in the midway position. To check, hold the blade in contact with the pedestal without pressing on the overhanging portion, and test the gap between the white rollers and the body of the pump with a 0.030 in. (76 mm). If necessary, set the tip of the blade to give the correct clearance.

Note.—Fit the spring washer on the earth connection screw between the tag and the pedestal as the spring washer is not a reliable conductor and the tag must bear directly against the head of the screw. Solder the coil ends to their tags and the two terminals to the earthing wire.

The assembly of components on the terminal screw holding the cover in position is as follows: spring washer, wiring tag, lead washer and recessed nut. In no circumstances omit the spring washer or shorten the assembly in any way or the pedestal may be broken when the cover retaining nut is tightened.

Fit the armature return spring with its larger diameter towards the coil and the smaller to the armature. Do not stretch the spring.
Section D.4

FUEL PUMP ADJUSTMENT

If the armature has been removed, reassemble and adjust as follows:—

1. Swing the contact blade on the pedestal to one side.
2. Fit the impact washer to the armature recess.
3. Screw the armature into position.
4. Place the eleven guide rollers in position around the armature. Use no jointing compound on the diaphragm.
5. Hold the magnet assembly in an approximately horizontal position and push in the armature firmly and steadily. If the contact breaker throws over, screw the armature farther in until it ceases to do so; unscrew the armature one-sixth of a turn at a time until a position is found where the rocker just throws over. It is important to press steadily and not to jerk the armature. When the correct position is found unscrew the armature a further two-thirds of a turn; this is important.

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

6. Place the magnet housing in position on the main body with the drain hole at the bottom; make sure that the rollers are still in their correct positions. If a roller drops it may get trapped between the two ports and cut a hole in the diaphragm.

Insert the coupling screws and the earth terminal screw. Do not screw up tightly before stretching the diaphragm to its outermost position. This is best accomplished by the use of a wedge as shown in Fig. D.4. Insert the wedge between the white rollers of the outer rocker and pressed under the tips of the inner rocker until it lifts the trunnion in the centre of the inner rocker as far as it will go.

If no wedge is available, insert a matchstick under one of the white rollers and pass a current through the pump. This will excite the magnet, actuate the armature and stretch the diaphragm; the screws may then be tightened down fully while the diaphragm is held in this position. The spring blade rests against a small projection on the bakelite moulding, and it must be set so that when the points are in contact it is deflected back from the moulding. The width of the gap at the points is approximately 0.030 in. (0.76 mm.).

7. Now place the pump on test, using a cut-away cover to allow observation of the contact breaker and prevent the hinge pin from falling out.

A test rig of the type illustrated in Fig. D.5 is advised and either petrol (gasoline) or paraffin (kerosene) may be used for testing.

When the pump is switched on it should prime itself promptly and if there is any air leak in the pump or in its connections, bubbles will be seen coming out of the pipe projecting into the flow-meter. Bubbles normally appear when the pump is first started up but should cease to appear when the pump has been running for a minute or two.

Turn off the tap fully; the pump should stand without repeating its action for at least 15 seconds, if not, the suction valve is not seating correctly.

Next, turn the tap off slowly and note whether the pump idles satisfactorily, and that the outer rocker comes fully forward and contacts the pedestal. While in this position, press the tip of the blade inwards to reduce the stroke of the pump gradually. However much the stroke is reduced the pump should continue to pump normally until it fails, when there is no gap left. If it buzzes instead of pumping, the cause is usually excessive flexibility in the diaphragm, and is unlikely to occur on a new one.
Finally test the pump on 9 volts, when it should work satisfactorily though probably with a somewhat reduced output.

Note.—Three important points, which will seriously affect the working of the pump if overlooked, are the following:

1. Keep the contact breaker blade out of contact while setting the diaphragm.
2. Press firmly without jerking on the diaphragm.
3. Stretch the diaphragm to its limit while tightening up the body screws.

Section D.5
TRACING PUMP TROUBLES
Should the pump cease to function, first disconnect the fuel delivery pipe from the pump. If the pump then works the most likely cause of the trouble is sticking needles in the float-chambers of the carburetters. Should the pump not work, disconnect the lead from the terminal and strike it against the body of the pump after switching on the ignition. If a spark occurs it indicates that the necessary current is available at the terminals, and that the trouble arises with the pump mechanism. If no spark can be detected, then it is an indication that the current supply has failed and that attention should be given to the wiring and battery. If current is present further investigation should be carried out by removing the bakelite cover which is retained by the terminal nut. Touch the terminal with the lead. If the pump does not operate and the contact points are in contact yet no spark can be struck off the terminal, it is very probable that the contact points are dirty and require cleaning. These may be cleaned by inserting a piece of card between them, pinching them together and sliding the card backwards and forwards.

If, when the wire is connected to the terminal and the tickler of the carburettor is depressed, the points fail to break, it is possible that there is either an obstruction in the suction pipe, which should be cleared by blowing it through with air, or some irregularity in the pump itself is preventing the correct movement. This may be due either to the diaphragm having stiffened, or to foreign matter in the roller assembly which supports the diaphragm, in which case the diaphragm should be removed and the whole assembly cleaned and reassembled in accordance with the instructions on page D.3.

On the other hand, if the points are not making contact, see that the tips of the inner rocker (25) (Fig. B.1) are in contact with the magnet housing. If they are not, it is an indication that the armature has failed to return to the end of its normal travel.

To cure this, loosen the six screws which attach the magnet housing to the pump body, and make sure that the diaphragm is not sticking to the face of the magnet housing by carefully passing a penknife between the two. The hinge pin (19) should then be removed and the six retaining screws tightened up again. The tips of the inner rockers will probably now be found to be making contact with the face of the magnet housing, but if they are not, it will be necessary to remove and dismantle the whole magnet assembly in order to ascertain if an accumulation of foreign matter has caused a jam. Remember that whenever the magnet housing is removed, care should be taken to see that the guide rollers (10) do not drop out.

Pump Noisy
If the pump becomes noisy and works rapidly, it is usually an indication that there is an air leak on the suction side of the pump. Check the level of the fuel in the tank and see that it is not too low.

The simplest way to test for air leakage is to disconnect the fuel pipe from the carburettor and place its end in a glass jar (approximately 1 pint or half a litre) and allow the pump to deliver fuel into it. If air bubbles appear when the end of the pipe has become submerged in the fuel, it is a clear indication of an air leak on the suction side of the pump in the fuel feed pipe between the tank and the pump, which should be found and
cured. Check all the unions and joints, making sure that the filter union and inlet unions are all quite airtight.

**Failure to Deliver Fuel**

Should the pump continue beating without delivering fuel, it is probable that some dirt has become lodged under one of the valves, in which case they should be dismantled by unscrewing the top or delivery union and lifting out the valve cage, when they can be cleaned and reassembled. When replacing it, see that the thin hard red fibre washer is below the valve cage and the thick orange one above.

If the pump struggles to pump and becomes very hot, it is probable that the filter has become clogged or there is an obstruction on the suction side. The filter is readily removed for cleaning by unscrewing its retaining plug at the bottom of the pump.

**Section D.6**

**FUEL PUMP MAINTENANCE**

Apart from keeping the contacts clean there is no maintenance required on the fuel pump.

The filter can be removed for cleaning by unscrewing the hexagon plug at the bottom of the pump. Clean the filter in fuel with a stiff brush; do not use rag.

Many of the troubles encountered with the pump are a result of the terminals not being tight, resulting in poor connections. Make sure that the earth wire terminal, in particular, is quite tight.

**Section D.7**

**THE CARBURETTERS**

The two S.U. carburetters are of the variable jet type, fitted with air cleaners.

A damper is provided in each carburetter, consisting of a plunger and non-return valve attached to the oil cap nut, and operates in the hollow piston rod. Top up to within \( \frac{1}{4} \) in. (13 mm.) from the top of the hollow piston rod with oil. Its function is to give a slightly enriched mixture on acceleration by controlling the rise of the piston and to prevent piston flutter.

**Section D.8**

**CARBURETTER ADJUSTMENT**

It is first essential to run the engine until it has attained its normal running temperature before commencing any mixture or slow-running adjustments.

The slow-running is governed by the setting of the jet adjusting screws and the throttle stop screws, all of which must be correctly set and synchronised if satisfactory results are to be obtained.

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Fig. D.6. Throttle linkage oiling points. With an oil can lubricate the points indicated.

The two carburettor throttles are interconnected by a coupling shaft and spring coupling clips which enable them to be correctly synchronised when adjustments take place.

Before blaming the carburettor settings for bad slow-running, make quite sure that it is not due to badly set contact points, faulty plugs, bad valve clearance setting or faulty valves and valve springs.

Good slow-running cannot be obtained if the setting for the jets is incorrect. It is therefore advisable to commence any adjustments at this point.

In order to adjust the carburetters successfully it is necessary to remove the air cleaners and intake pipe assembly from the carburetters and engine valve cover and make sure the pistons work freely and the jets are properly centred (see below).

**Adjusting the Jets**

1. Slacken off the pinch-bolt of one of the spring coupling clips locating the carburettor interconnecting shaft to the carburettor throttle spindles and also release the two screws securing the choke spring to the jet levers, so that each carburettor can be operated independently.

2. Release the throttle lever adjusting screws until both throttles are completely closed.

3. Turn the throttle lever adjusting screw for the rear carburettor clockwise until it is just touching the web on the carburettor body and then give it one full turn. This will set the rear carburettor for fast idling and leave the front one out of action. This can be ensured further by lifting the front carburettor piston a matter of \( \frac{1}{4} \) in. (13 mm.).
(4) With the engine running, set the jet adjusting screw for the rear carburettor so that a mixture strength is obtained which will give the best running speed for this throttle opening, taking care to see that the jet head is kept in firm contact with the adjusting nut the whole time.

(5) The correctness or otherwise of this setting can be checked by raising the suction piston with a small screwdriver, or similar instrument, to the extent of ½ in. (1 mm.). This should cause a very slight momentary increase in the engine speed without impairing the evenness of the running in any way.

If this operation has the effect of stopping the engine it is an indication that the mixture setting is too weak.

If an appreciable speed increase occurs and continues to occur when the piston is raised as much as ½ in. (6 mm.) it is an indication that the mixture is too rich.

(6) When the rear carburettor mixture setting has been carried out correctly release its throttle adjusting screw so that it is clear of the stop and the throttle completely closed, and lift the piston ½ in. (13 mm.) to render it inoperative. Then repeat the jet-adjusting operations on the front carburettor.

(7) When both carburettors are correctly adjusted individually for mixture strength the throttles of each should be set so as to give the required slow-running and synchronisation.

Slow-running and Synchronisation
Screw each throttle lever adjusting screw so that its end is only just making contact with the web on the carburettor body, then give each screw one full turn exactly.

Start the engine, which will now idle on the fast side.

Unscrew each throttle lever adjusting screw an equal amount, a fraction of a turn at a time, until the desired slow-running speed is achieved.

Correct synchronisation can be checked by listening at each carburettor air intake in turn through a length of rubber tube and noticing if the noise produced by the incoming air is the same at both. Any variation in the intensity of the sound indicates that one throttle is set more widely open than the other—the louder sound indicating the throttle with the greater opening.

When the same intensity of sound is given by both carburettors the intercoupling shaft clip should be tightened up firmly to ensure that the throttles work in unison.

Since the delivery characteristics, when both carburettors are operating together, vary somewhat from those existing when each is working separately, it will be found necessary to check them again for correctness of mixture strength by lifting the pistons in turn as described in "Adjusting the Jets," making such adjustments of the jet adjusting screws as are required to balance the mixture strength and to ensure that it is not too rich.

Fitting New Needles
If the road performance is not satisfactory after the above adjustments have been made, larger or smaller needles may be necessary.

To change the needles, remove the screws and lift off the suction chambers, having marked them to ensure

Fig. D.9. The shoulder of the needle should be flush with the under face of the piston. Two types of shoulder are in use and the correct datum point for each is shown.
their refitting to their respective carburetters. Remove the pistons and return springs.

Unscrew the screw at the side of each piston tube and withdraw the needles.

Fig. D.9. The jet assembly.

Fit the new needles: a needle should be fitted with its shoulder flush with the face of the piston as shown in Fig. D.9.

The Float-chamber

The position of the forked lever in the float-chamber must be such that the level of the float (and therefore the height of the fuel at the jet) is correct.

This is checked by inserting a \( \frac{1}{4} \) in. (11 mm.) round bar between the forked lever and the machined lip of the float-chamber lid. The prongs of the lever should just rest on the bar (see Fig. D.8) when the needle is on its seating. If this is not so, the lever should be reset at the point where the prongs meet the shank. Care must be taken not to bend the shank, which must be perfectly flat and at right angles to the needle when it is on its seating.

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Centring a Jet

First remove the clevis pin at the base of the jet which attaches the jet head to the jet operating lever; withdraw the jet completely, and remove the adjusting nut and the adjusting nut spring. Replace the adjusting nut without its spring and screw it up to the highest position. Slide the jet into position until the jet head is against the base of the adjusting nut. When this has been done, feel if the piston is perfectly free by lifting it up with the finger with the dashpot piston removed. If it is not, slacken the jet holding screw and manipulate the lower part of the assembly, including the projecting part of the bottom half jet bearing, adjusting nut and jet head. Make sure that this assembly is now slightly loose. The piston should then rise and fall quite freely as the needle is now able to move the jet into the required central position. The jet holding screw should now be tightened and a check made to determine that the piston is still quite free. If it is not found to be so, the jet holding screw should be slackened again and the operation repeated. When complete freedom of the
piston is achieved the jet adjusting nut should be removed, together with the jet, and the spring replaced. The adjusting nut should now be screwed back to its original position.

Experience shows that a large percentage of carburetters returned for correction have had jets removed and incorrectly centred on replacement.

Section D.9
SOURCES OF CARBURETTER TROUBLE

Piston Sticking

The piston assembly comprises the suction disc and the piston forming the choke, into which is inserted the hardened and ground piston rod which engages in a bearing in the centre of the suction chamber and in which is, in turn, inserted the jet needle. The piston rod running in the bearing is the only part which is in actual contact with any other part, the suction disc, piston, and needle all having suitable clearances to prevent sticking. If sticking does occur the whole assembly should be cleaned carefully and the piston rod lubricated with a spot of thin oil. No oil must be applied to any other part except the piston rod. A sticking piston can be ascertained by removing the dashpot piston damper, inserting a finger in the air intake and lifting the piston, which should come up quite freely and fall back smartly onto its seating when released.

Water or dirt in the Carburettet

When this is suspected, lift the piston: the jet can then be seen. Flood the carburettet and watch the jet; if the fuel does not flow through freely there is a blockage. To remedy this, start the engine, open the throttle, and block up the air inlet momentarily without shutting the throttle, keeping the throttle open until the engine starts to race. This trouble seldom arises with the S.U. carburettet owing to the size of the jet and fuel ways. When it does happen the above method will nearly always clear it. Should it not do so, the only alternative is to remove the jet.

Float-chamber Flooding

This can be seen by the fuel flowing over the float-chamber and dripping from the air inlet, and is generally caused by grit between the float-chamber needle and its guide. This can usually be cured by depressing the float depressing plunger to allow the incoming flow of fuel to wash the grit through the guide and into the float chamber.

Float Needle Sticking

If the engine stops, apparently through lack of fuel, when there is plenty in the tank and the pump is working properly, the probably cause is a sticking float needle. An easy test for this is to disconnect the pipe from the electric pump to the carburettet, switch on the ignition to check if fuel is delivered; if it is, starvation has almost certainly been caused by the float needle sticking to its seating, and the float-chamber lid should therefore be removed, the needle and seating cleaned, and refitted. At the same time it will be advisable to clean out the entire fuel feed system, as this trouble is caused by foreign matter in the fuel, and unless this is removed it is likely to recur. It is of no use whatever renewing any of the component parts of the carburettet, and the only cure is to make sure that the fuel tank and pipe lines are entirely free from any kind of foreign matter or sticky substance capable of causing this trouble.

Section D.10
THE AIR CLEANERS

Remove the units and wash the gauze in fuel at the recommended mileage.

When the gauze is clean and dry, re-oil it with engine oil and allow it to drain before refitting to the engine.

Section D.11
CARBURETTETS (Type H.D.)

General Description

S.U. H.D. carburettets are fitted to 6 port cylinder head engines. A damper is provided in each carburettet, consisting of a plunger and non-return valve attached to the oil cap nut, and operates in the hollow piston rod which is partly filled with oil. Its function is to give a slightly enriched mixture on acceleration by controlling the rise of the piston, and to prevent piston flutter.

Remove the suction chamber cap and damper assembly and replenish the oil reservoir as necessary at the recommended mileage.

The carburettet differs from the more familiar S.U. type in so far that the jet glands are replaced by a flexible diagram, and the idling mixture is conducted along a passage-way, in which is located a metering screw, instead of being controlled by the throttle disc; the throttle and jet interconnection mechanism is also re-designed.
The constructional details are as follows (fig.
D.12):—

The jet (1) which is fed through its lower end is
attached to a synthetic rubber diaphragm (5) by means
of the jet cup (4) and jet return spring cup (7), the centre
of the diaphragm being compressed between these two
parts; at its outer edge it is held between the diaphragm
casing (9) and the float-chamber arm. The jet (1) is
controlled by the jet return spring (8) and the jet actuati-
ing lever (10), the latter having an adjusting screw (18)
which limits the upward travel of the jet (1) and thus
constitutes the idler adjustment; screwing it in (clock-
wise) enriches the mixture, and unscrewing it weakens
the mixture.

Throttle and Jet Interconnection

The throttle and jet interconnection mechanism is
operated by a cam (21) mounted on the throttle spindle
(19), the whole being housed in the diaphragm casing (9).
The cam (21), in being rotated by means of the jet handle
control lever (22) actuates the cam shoe (20), thereby
caus~ing vertical movement of the push-rod (17). To the
top of this push-rod is attached the top plate (16),
which is fitted with an adjusting screw which makes
contact with the throttle stop lever (15).

It will be seen that angular movement of the jet
handle control lever (22) will turn the jet lever spindle (19)
and, therefore, the jet actuating lever (10) controls the
jet cup (4) and the jet (1). The cam controls the cam
shoe (20), push-rod (17), top plate (16) and the throttle.
Suitable setting of the two adjustment screws (14) and
(18) will give any desired combination of mixture
enrichment and throttle opening.

Vacuum Controlled Ignition and Economiser Ports

The connection to the vacuum ignition control is
made at the top of the carburettor instead of under-
neath or at the side, as with the older type.

Throttle Spindle Glands

Provision is made for the use of throttle spindle
glands consisting of the cork gland itself (23), a dished
retaining washer (24), a spring (26) and a shroud (25).
This assembly should not require servicing and can only
be removed by dismantling the throttle spindle and disc.

Idling

The H.D. carburettor idles on the main jet, the
mixture, passing under the throttle disc, is conducted
along the passage-way (11) connecting the choke space
to the other side of the throttle disc.

The quantity of mixture passing through the
passage-way (11) and, therefore, the idling speed of the
engine, is controlled by the "slow-run" valve (12),
quality, or relative richness of the mixture, being deter-
mined by the jet adjusting screw (18). It follows that
when idling, once the engine has reached its running
temperature, the throttle remains completely closed
against the bore of the carburettor; for fast idle, when
the engine is cold, it continues to be partially open, the
mixture passing under the throttle disc as well as along
the passage-way (11).

Centring the Jet

This is carried out in much the same way as on
the standard type carburettor, except that the float-
chamber must be removed and the jet held in the upper-
most position by hand, the jet adjusting screw (18) having
first been undone sufficiently to allow the jet cup (4)
to make contact with the jet bearing (2), with a distinct
clearance between the jet adjusting screw (18) and its
abutment. It is important to keep the diaphragm and
therefore the jet in the same radial position, in relation
to the carburettor body and jet casing throughout this
operation, as the jet orifice is not necessarily concentric
with its outside diameter, and turning might cause
decentralisation. The simplest way to do this is to mark
one of the diaphragm and corresponding jet screw casing
holes with a soft pencil.
Fig. D.14. Carburetter exploded.

1. Suction chamber.
2. Piston spring.
3. Hydraulic damper.
4. Suction chamber screw.
5. Piston.
7. Throttle stop lever adjusting screw.
8. Throttle spindle.
11. Carburetter body.
13. Float chamber securing screw.
14. Float chamber.
15. Jet hand control lever.
17. Diaphragm casing.
19. Float.
20. Cover joint washer.
22. Float chamber cover.
23. Filter spring.
24. Filter.
25. Inlet union.
26. Float chamber cover screw.
27. Float washer.

In this installation item 15 is at the rear of the carburetter.
**Fuel System**

Fig. D.13 Carburettor linkage.

1. Petrol overflow pipe union.
2. Jet adjusting screw stop.
4. Throttle stop screw.
5. Jet adjusting screw.
8. Throttle shaft interconnection clip.

**Adjustment**

The adjustment of the H.D. carburettor is extremely simple. Whereas with the older type the jet was controlled by a nut, it is now set by a screw (18), and whereas the engine speed was determined by adjustment of the throttle, it is now controlled by the “slow-run” valve (12). To enrich the mixture the screw (18) should be screwed in, and to increase the idling speed the “slow-run” valve (12) should be unscrewed.

The adjustment procedure is as follows:

1. Run the engine until its normal operating temperature is reached.
2. Disconnect the interconnecting rod between the jet actuating levers.
3. The throttle stop screws on each carburettor must be undone so that they are clear of the stops. This ensures that the throttles are fully closed.

4. Screw the slow running valve screw right down on each instrument and then unscrew them 2½ turns.
5. If the engine runs too fast when this has been done, screw in both slow running screws a little at a time until even idling is achieved.
6. Set the mixture strength by means of the jet lever adjusting screws.
7. The correctness or otherwise of this setting can be checked by raising the suction piston with a small screwdriver, or the piston lifting pin, to the extent of \( \frac{1}{3} \) inch (1 mm.). This should cause a very slight momentary increase in the engine speed without impairing the evenness of the running in any way. If this operation has the effect of stopping the engine it is an indication that the mixture setting is too weak.

If an appreciable speed increase occurs and con-
FUEL SYSTEM

(8) The interconnecting rod should now be refitted taking care not to alter the positions of the jet actuating levers. It may be necessary to adjust its length.

(9) With the foregoing adjustments complete, it is only necessary to reset the amount of automatic throttle opening which should occur when the choke is operated. Do this by screwing down the throttle stop screw on each carburettor an equal amount until a fast idle is obtained with approximately half choke. This will give the necessary cold start throttle opening. After this is done, ensure that when the choke is fully released the throttles are closed.

Defects in Operation

Since the jet of the H.D. carburettor is fed through its centre and has no glands, leakage can only be caused by an insecure fit of the jet cup, an imperfect seal of the diaphragm, either at its outer edge, where it is compressed between the float-chamber and the diaphragm casing, or at its inner edge, where it is fitted to the jet, or by fracture of the diaphragm. Leakage at the outer edge may be cured by tightening the float-chamber securing screws (3) but fracture, or leaking at the inner edge will probably call for a new jet assembly.

The jet may also stick, either up or down, due to dirt between it and its bearing (2), or due to corrosion. The cure is to remove the parts by undoing the jet screw (3) clean and refit.

Section D.12

CARBURETTER REMOVAL

To remove the carburetters from the inlet manifold proceed as follows:

(1) Turn the battery master switch to the off position.
(2) Disconnect the petrol feed pipe from the union on the forward carburettor.
(3) Remove the air cleaners from the carburettor flanges.
(4) The float chamber overflow pipes must be removed.
(5) Release the choke wire from the jet hand control lever on the rear carburettor, and from the clamping bracket.
(6) Disconnect the throttle valve rod from the lever on the carburettor throttle shaft.
(7) Disconnect the accelerator link rod from the carburettor throttle shaft.
(8) Release the vacuum advance pipe from its union on the rear carburettor.
(9) Remove the four nuts from each carburettor flange and pull the units off the studs together, after taking the bracket, which locates the rear extension of the throttle shaft, off the car bulkhead.

If only one carburettor is to be removed the interconnecting petrol feed pipe must be released. In this case it is also necessary to split the throttle shaft at the centre connecting clip. The connecting rod for the jet hand control levers must also be released by taking out the clevis pins from the levers.

Section D.13

FUEL PUMP (Type LCS)

The type LCS fuel pump is fitted to later Series BN.4 cars consists of three main assemblies, body, magnet assembly (coll housing assembly), and the contact breaker. This pump is consistent in description with the type HP pump given in Section D.2, with the exception of the body which is an aluminium die-casting with two identical cover plates each secured by 6, 2 BA screws. Removal of the lower cover plate gives access to the fuel filter and the top cover plate access to the valve cage and with this exception the servicing, tracing pump troubles and maintenance are the same as those given for the HP pump in Sections D.3, 4, 5 and 6.
FUEL SYSTEM

Fig. D.15.
The type LCS fuel pump with the inlet and outlet connections shown 90° out of position for clarity.

1. Outlet union.
2. Rubber ring.
3. Inlet valve.
4. Outlet valve.
5. Outlet valve cage.
6. Top cover plate.
7. Spherical rollers.
8. Magnetic coil.
10. Bronze rod.
11. Outer rocker.
12. Inner rocker.
13. Tungsten points.
15. Inlet union.
16. Rubber ring.
17. Body.
18. Lower cover plate.
19. Filter.
20. Diaphragm.
22. Armature spring.
23. Magnet core.
24. Tension.
25. Bakelite moulding.
SECTION DD

FUEL SYSTEM

NOTE
The fuel system of the BN6 is the same as that of later BN4 cars. All BN6 cars are fitted with H.D. type carburetters and LCS type fuel pumps. Reference should, therefore, be made to Section D and particular attention given to Sections D.12, D.13 and D.14.
SECTION DDD
FUEL SYSTEM

Mk. I and II (SERIES BN7 and BT7)
AND Mk. II and Mk. III (SERIES BJ7 and BJS)

NOTE

Use the information given in this section in conjunction with
Section D.

Sections DDD.1 to DDD.5 should be used for carburetters
fitted with the auxiliary thermo carburettor. This informa-
tion supersedes that given in Sections D.12 and D.13.
Full information is given in Sections DDD.6 to DDD.9 and
DDD.11 for the carburetters fitted to the Austin-Healey
3000, Mk.II.

Section No. DDD.1 Carburetters (with thermo-carburettor)
Section No. DDD.2 Carburettor removal
Section No. DDD.3 Modified starting jet needle spring
Section No. DDD.4 Reversion to hand choke control
Section No. DDD.5 Location of fuel pump
Section No. DDD.6 Carburetters (Healey 3000, Mk. II)
Section No. DDD.7 Carburettor removal (Mk. II)
Section No. DDD.8 Float chamber overflow pipes
Section No. DDD.9 Carburetters with nylon floats
Section No. DDD.10 Revised location of fuel pump
Section No. DDD.11 Carburetters (Convertible Model Mk. II)
Section No. DDD.12 Carburetters (Convertible Model Mk. III)
Section No. DDD.13 Fuel pump AUF 301 (Later Convertible Model Mk. III)
Section DDD.1

CARBURETTERS

(Type H.D. with Thermo-Carburettor fitted from Engine No. 29D/U/H2864)

General Description

The two S.U. H.D. carburetters are fitted with pancake type air cleaners.

A damper is provided in each carburettor, consisting of a plunger and non-return valve attached to the oil cap nut, and operates in the hollow piston rod which is partly filled with oil. Its function is to give a slightly enriched mixture on acceleration by controlling the rise of the piston, and to prevent piston flutter.

Remove the suction chamber cap and damper assembly and replenish the oil reservoir as necessary at the recommended mileage.

The carburettor differs from the more familiar S.U. type in so far that the jet glands are replaced by a flexible diaphragm, and the idling mixture is conducted along a passage-way, in which is located a metering screw, instead of being controlled by the throttle disc.

An auxiliary carburettor controlled by a thermostatic switch, provides the enriched mixture required when starting from cold. The fuel for this carburettor is drawn from the rear main carburettor supply but its operation is completely independent.

Constructional Details of the H.D. Carburettor

The jet (1), Fig. DDD.2, which is fed through its lower end, is attached to a synthetic rubber diaphragm (5) by means of the jet cup (4) and jet return spring cup (7), the centre of the diaphragm being compressed between these two parts; at its outer edge it is held between the diaphragm casing (9) and the float-chamber arm. The jet (1) is controlled by the jet return spring (8) and the jet actuating lever (10), the latter having an adjusting screw (15) which limits the upward travel of the jet (1) and thus constitutes the idling adjustment; screwing it in (clockwise) enriches the mixture, and unscrewing it weakens the mixture.

Throttle Spindle Glands

Provision is made for the use of throttle spindle glands consisting of the cork gland itself (17), a dished retaining washer (18), a spring (20) and a shroud (19). This assembly should not require servicing and can only be removed by dismantling the throttle spindle and disc.

Vacuum-controlled Ignition and Economizer Ports

The connection (13) to the vacuum ignition control is made at the top of the carburettor instead of underneath or at the side, as with the older type.

Idling

The H.D. carburettor still idles on the main jet, but the mixture, instead of passing under the throttle disc, is conducted along the passage-way (11) connecting the air intake passage to the manifold side of the throttle disc.

The quantity of mixture passing through the passage-way (11) and, therefore, the idling speed, of the engine, are controlled by the "slow-run" valve (12) the quality or relative richness of the mixture being determined by the jet adjusting screw (15).

It follows that when idling, once the engine has reached its running temperature, the throttle remains completely closed against the bore of the carburettor.

Constructional Details of the Auxiliary Enrichment Carburettor

The enrichment apparatus to assist cold starting is, in effect, an auxiliary carburettor and is shown in Fig. DDD.3. The main body casting (30) containing a solenoid operated valve and fuel metering system is attached by means of a dented mounting arm to the base of the main carburettor fuel inlet.

The auxiliary carburettor forms, therefore, a separate unit additional to the normal float-chamber, but drawing its fuel supply directly from it. Fuel is supplied to the base of the jet (29) which is obstructed to a greater or lesser degree by the tapered slidable needle (25).

When the device is in action air is drawn from the atmosphere through the air intake (26) and thence through the passage (28), being carburetted with fuel as it passes the jet (29). The mixture is thence carried upwards past the shank of the needle (25) through the passage (37) and so past the aperture provided between the valve (33) and its seating (35). From here it passes directly to the induction manifold through the external feed pipe shown.

The device is brought into action by energizing the winding of the solenoid (31) from the terminal screws (30). The centrally located iron core (32) is thus raised magnetically, carrying with it the ball-jointed disc valve (33) against the load of the small conical spring (34) and thus uncovering the aperture provided by the seating (35).
Choosing the function of the slideable needle (23), it will be seen that this is loaded upwards in its open position by means of the slight compression spring (24) which abuts against a disc (23), attached to the shank of the needle. The needle continues upwards through the vertically adjustable stop (22) in which it is slide mounted and it finally terminates in an enlarged head.

Depression within the space surrounding the spring (24) is directly derived from that prevailing in the induction tract, and this exerts a downward force upon the disc (23), which is provided with an adequate clearance with its surrounding bore. This tends to overdrive the load of the spring (24) and to move the needle downwards, thus increasing the obstruction afforded by the tapered section which enters the jet (29).

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 (23) to be drawn downwards, drawing the tapered needle into the jet (29), while 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 only adjustment provided is the needle stop screw (22) which limits the degree of movement provided for the needle assembly. The size and degree of taper of the lower end of the needle (25), the diameter of the disc (23), and the load provided by the spring (24) are not adjustable.

The solenoid (31) is energized by means of a thermostatically operated switch housed within the cylinder head water jacket. This is arranged to bring the apparatus into action at temperatures below 30-35°C (86-95°F).

Centring the Jet

This is carried out in much the same way as on the standard H-type carburettor, except that the float chamber and jet casing must be removed and the jet held in the uppermost position by hand. It is important to keep the diaphragm and, therefore, the jet in the same radial position in relation to the carburettor body and jet casing throughout this operation, as the jet orifice is not necessarily concentric with its outside diameter, and turning might cause decentralisation. The simplest way to do this is to mark one of the diaphragm and corresponding jet casing screw holes with a soft pencil.

Adjustment

The adjustment of the H.D. carburettor is extremely simple. Whereas with the older type the jet was controlled by a nut, it is now set by a screw (15), and whereas the engine speed was determined by adjustment of the throttle, it is now controlled by the "slow-run" valve (12). To enrich the mixture the screw (15) should be screwed in, and to increase the idling speed the "slow-run" valve (12) should be screwed out.

The adjustment procedure is as follows:

1. Run the engine until its normal operating temperature is reached.
2. Disconnect the interconnecting rod between the jet actuating levers. This ensures that the throttles are fully closed.
3. Screw the slow running valve screw right down on each instrument and then unscrew them 2½ turns.
4. If the engine runs too fast when this has been done, screw in both slow running screws a little at a time until even idling is achieved. It is essential to remember that the adjustments made to each carburettor must be identical.
5. Set the mixture strength by means of the jet lever adjusting screws.
6. The correctness or otherwise of this setting can be checked by raising the suction piston with a small screwdriver, or the piston lifting pin, to the extent of ¼-inch (1 mm.). This should cause a very slight momentary increase in the engine speed without impinging the evenness of the running in any way. If this operation has the effect of stopping the engine it is an indication that the mixture setting is too weak. If an appreciable speed increase occurs and continues to occur when the piston is raised as much as ¼-inch (6 mm.), it is an indication that the mixture is too rich.

Fig. D.D.D.1. The needle stop screw indicated by the arrow adjusts the mixture strength of the thermo-carburettor.

Austin-Henley 100-6/3000. Issue 5. (76031)
Fig. D.D.D.3  A section view of a carburetor

1. Jet.
2. Jet bearing.
5. Diaphragm.
6. Float chamber securing screw.
7. Jet return spring cup.
13. Vacuum advance union.
14. Throttle stop lever.
18. Dishhead washer.
20. Spring.
Fig. DDD.3. The auxiliary enrichment carburettor

21. Float chamber
22. Stop screw
23. Disc
24. Spring
25. Needle
26. Air intake
27. Carburettor body
28. Air passage
29. Jet
30. Terminal
31. Solenoid
32. Core
33. Valve
34. Conical spring
35. Valve seating
36. Body casting
37. Passage

Austin-Healey 100-6/3000. Issue 2. (27023)
(7) Secure the throttle interconnecting rod and make final adjustments to the “slow running” if necessary.

(8) Adjustment of the auxiliary carburettor is confined to the stop screw which limits the downwards movement of the needle. Anti-clockwise rotation of the stop screw will raise the needle and increase the mixture strength, while rotation in the opposite direction will have the opposite effect.

(9) An approximate guide to its correct adjustment is provided by energizing the solenoid when the engine has already attained its normal running temperature. The stop screw should then be 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.

(10) In order to energize 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 or, by means of a separate wire, earth the solenoid terminal which is connected to the switch (Blue—White Wire).

NOTE.—Should difficulty be experienced when starting from cold on the next occasion, unscrew the stop screw (22) one or two flats only.

Defects in Operation

Since the jet of the H.D. carburettor is fed through its centre and has no glands, leakage can only be caused by an insecure fit of the jet cup, an imperfect seal of the diaphragm, either at its outer edge, where it is compressed between the float-chamber and the diaphragm casing, or at its inner edge, where it is fitted to the jet, or by fracture of the diaphragm. Leakage at the outer edge may be cured by tightening the float-chamber securing screws (6) but fracture or leaking at the inner edge will probably call for a new jet assembly.

The jet may also stick, either up or down, due to dirt between it and its bearing (2), or due to corrosion. The cure is to remove the parts by undoing the jet screw (3), clean, and refit.

Section DDD.2

CARBURETTOR REMOVAL

To remove the carburettors from the inlet manifold proceed as follows:—

Section DDD.3

MODIFIED STARTING JET NEEDLE SPRING

To improve starting characteristics, the green spring (24) Fig. DDD.3, fitted to the starting jet needle has been changed to a blue spring (Part No. AU/C1041) commencing at engine No. 3664. It is recommended that all engines between 2864 and 3664 be checked and that the blue spring be fitted if it is not already incorporated.

Section DDD.4

REVERSION TO HAND CHOKE CONTROL

Commencing at chassis Nos. BN5234 and BT5310, standard type H.D. carburettors and hand choke controls were fitted.

The fitting of the H.D. type carburettor with the cold start device has been discontinued.
Section DDD.5

LOCATION OF FUEL PUMP

The fuel pump on the BT.7 is situated under the left hand seat pan, and is accessible when the seat pan has been removed.

The BN.7 has the fuel pump fitted on the left hand side of the car and access to it is obtained through the hinged portion of the spare wheel floor, as for the batteries (See Section NN.1).

Section DDD.6

CARBURETTERS (Healey 3000 Mk.II)

The carburetters fitted to the Healey 3000 Mk. II are triple S.U. type H.S.4. Each carburettor is mounted on an individual manifold secured to the cylinder head by three studs and nuts, and interconnected by an external balance pipe running above the manifolds.

Description

The H.S.4 carburettor is of the automatically expanding choke type in which the size of the main air passage (or choke) over the jet, and the effective area of the jet, are variable according to the degree of throttle opening used on the engine against the prevailing road conditions (which may differ widely from light cruising to heavy pulling).

Therefore, to serve the complete throttle range a single jet only is used, being a simple metal tube sliding in a single bearing bush, fed by fuel along a small-diameter nylon tube leading direct from the base of the float-chamber. The jet is varied in effective area by a tapered fuel metering needle.

Adjustments

Slow-running is governed by the setting of the jet adjusting nuts and the throttle adjusting screws, all of which must be correctly set and synchronized if satisfactory results are to be obtained.

Before blaming the carburettor setting for incorrect slow-running make certain that the trouble is not caused by badly adjusted distributor contact points, faulty plugs, incorrect valve clearance, or faulty valves and springs.

Slow running adjustment and synchronization

After the first long run or so when the engine is fully run in, the slow running may require adjustment. This must only be carried out when the engine has reached its normal running temperature.

As the needle size is determined during engine development, tuning of the carburetters is confined to correct idling setting. Slacken the actuating arms on the throttle spindle inter-connection. Close all throttles fully by unscrewing the throttle adjusting screws, then open each throttle by screwing down the idling adjustment screws one turn.

Remove pistons and suction chambers, and disconnect the jet control cables. Screw the jet adjusting nuts until each jet is flush with the bridge of its carburettor, or as near to this as possible (all jets being in the same relative position to the bridge of their respective carburetters). Replace the pistons and suction chamber assemblies, and check that the pistons fall freely on to the bridge of the carburetters (by use of the piston lifting pins). Turn down the jet adjusting nut two complete turns (12 flats).

Re-start the engine, and adjust the throttle adjusting screws to give the desired idling speed, by moving each throttle adjusting screw an equal amount. By listening to the hiss in the intakes, adjust the throttle adjusting screws until the intensity of the hiss is similar on all intakes. This will synchronize the throttle setting.

When this is satisfactory, the mixture should be adjusted by screwing each jet adjusting nut up or down by the same amount, until the fastest idling speed is obtained consistent with even firing. During this adjusting, it is necessary that the jets are pressed upwards to ensure that they are in contact with the adjusting nuts.

As the mixture is adjusted the engine will probably run faster, and it may therefore be necessary to unscrew the throttle adjusting screws a little, each by the same amount, to reduce the speed.

Fig. DDD.4. The H.S.4 type carburettor

1. Jet adjusting nut
2. Throttle adjusting screw
3. Fast idle adjusting screw
4. Jet locking nut
5. Float chamber securing nut
6. Jet link
7. Jet head
8. Vacuum ignition take-off

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Now check the mixture strength by lifting the piston of the front carburettor by approximately \( \frac{3}{8} \) in. (75 mm.) when if:

(a) the engine speed increases, this indicates that the mixture strength of the front carburettor is too rich.
(b) the engine speed immediately decreases, this indicates that the mixture strength of the front carburettor is too weak.
(c) the engine speed momentarily increases very slightly, then the mixture strength of the front carburettor is correct.

Repeat the operation at the centre and rear carburettors, and after adjustment re-check the front carburettor, since all carburettors 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 misfire and colourless exhaust, the mixture is too weak. If there is a regular or rhythmic type of misfire in the exhaust heat, together with a blackish exhaust, then the mixture is too rich.

The carburettor throttle on each carburettor is operated by a lever and pin, with the pin working in a forked lever attached to the throttle spindle. A clearance exists between the pin and the fork, which must be maintained when the throttle is closed and the engine idling, to prevent any load from the accelerator linkage being transferred to the throttle butterfly and spindle.

To set this clearance: with the throttle shaft levers free on the throttle shaft, put a \( \frac{1}{8} \) in. (305 mm.) feeler between each throttle shaft stop at the top and the carburettor heat shield (see Fig. DDD.5). Move each throttle shaft lever downwards in turn until the lever pin rests lightly.

The method of checking the correct adjustment of the float level, on the lower arm of the fork in the carburettor throttle lever. Tighten the clamp bolt of the throttle shaft lever at this position. When all three carburettors have been dealt with, remove the feelers. The pins on the throttle shafts should then have clearance in the forks.

Re-connect the choke cables, ensuring that the jet heads return against the lower face of the jet adjusting nuts when the choke control is pushed fully in.

Pull out the mixture control knob on the dash panel until the linkage is about to move the carburettor jets (a minimum of \( \frac{1}{8} \) in. (6 mm.)) and adjust the fast-idle cam screws to give an engine speed of about 1,000 r.p.m. when hot.

The float-chamber

The position of the forked lever in the float-chamber must be such that the level of the float (and therefore the height of the fuel at the jet) is correct.

This is checked by inserting a \( \frac{3}{8} \) in. (7.94 mm.) round bar between the forked lever and the machined lip of the float-chamber lid. The prongs of the lever should rest on the bar (see Fig. DDD.6) when the needle is on its seating. If this is not so, the lever should be reset at the point where the prongs meet the shank. Care must be taken not to bend the shank, which must be perfectly flat and at right angles to the needle when it is on its seating.

Jet centring

To check the jet for concentricity with the jet needle, set the jet head and the jet adjusting nut in the uppermost position, lift the suction piston with the piston lifting pin and allow the piston to fall. It should fall freely and a definite soft metallic click will be heard as the base of the piston strikes the jet bridge.

If this does not happen with the jet raised, but does occur when the jet is lowered, the jet bearing and jet must be re-centred as follows:—
Tighten the jet locking nut, at the same time ensuring that the jet head is held firmly in its uppermost position and at its correct angular relation to the float chamber.

Repeat the check for concentricity both with the jet raised and lowered. If the result is not satisfactory the recentering operation must be repeated until the correct result is obtained.

When the operation is completed, replace the adjusting nut lock spring and the jet operating link.

This adjustment is best effected with the carburetters removed from the engine.

**Float needle sticking**

If the engine runs unevenly, apparently through lack of fuel, when there is plenty in the tank and the pump is working properly, the probable cause is a sticking float needle. An easy test for this is to disconnect the pipe from the electric pump to the carburettor and switch the ignition on and off quickly while the end of the pipe is directed onto a pad of cloth or into a container.

If fuel is delivered, starvation is almost certainly being caused by the float needle sticking to its seating, and the float chamber lid(s) should therefore be removed and the needle and seating cleaned and refitted.

At the same time it will be advisable to clean out the entire fuel feed system as this trouble is caused by foreign matter in the fuel, and unless this is removed it is likely to recur. It is of no use whatever renewing any of the component parts of the carburetters, and the only cure is to make sure that the fuel tank and pipe lines are entirely free from any kind of foreign matter or sticky substance capable of causing this trouble.

**Piston sticking**

The piston assembly comprises the suction disc and the piston forming the choke, into which is inserted the hardened and ground piston rod which engages in a bearing in the centre of the suction chamber and in which is, in turn, inserted the jet needle. The piston rod running in the bearing is the only part which is in actual contact with any other part, the suction disc, piston, and needle all having suitable clearances to prevent sticking. If sticking does occur the whole assembly should be cleaned carefully and the piston rod lubricated with a spot of thin oil. No oil must be applied to any other part except the piston rod. A sticking piston can be ascertained by removing the piston damper and lifting the piston by pressing the piston lifting pin; the piston should come up quite freely and fall back smartly onto its seating when released. On no account should the piston return spring be stretched or its tension altered in an attempt to improve its rate of return.
Water and dirt in the carburettor

Should this be suspected, lift the piston with a pencil; the jet can then be seen. Flood the carburettor and watch the jet; if fuel does not flow freely there is a blockage. To remedy this start the engine, open the throttle, and block up the air inlet momentarily, keeping the throttle open until the engine starts to race.

If the jet is completely blocked it must be removed and thoroughly cleaned.

Float-chamber flooding

This is indicated by fuel flowing from the drain hole in the top of the float chamber lid below the main fuel feed pipe, and is generally caused by grit between the float chamber needle and its guide. The float-chamber lid should be removed and the needle and its guide thoroughly cleaned.

Section DDD.7

CARBURETTOR REMOVAL

Turn the battery master switch to the 'off' position.

Disconnect the fuel feed pipe from the front carburettor, the two snap-lock ball joints from the accelerator relay shaft, and the three throttle return springs.

Release the three mixture control cables from the carburettor levers. Slacken the retaining clip and remove the engine breather hose from the rear air cleaner. Pull off the rubber connector for the vacuum ignition control pipe from the top of the rear carburettor body.

Remove the two nuts, spring washers and plain washers securing each carburettor flange and withdraw the three carburetters as one unit.

Detach the throttle interconnecting shafts, remove the fuel pipes and separate the carburetters.

Refitting is a reversal of the removal procedure.

The throttle linkage must be checked and re-adjusted if necessary after refitting.
Section DDD.8

FLOAT CHAMBER OVERFLOW PIPES

Flexible plastic overflow pipes were fitted to each carburettor float chamber from Power Unit No. 29E-H-1092. The float chamber lids were modified to incorporate short overflow nozzles on to which the flexible pipes are a push fit. The overflow pipes may be fitted with the modified lids to earlier 3000 Mk. II cars.

Section DDD.9

CARBURETTERS WITH NYLON FLOATS

Carburetters fitted to later 3000 Mk. II cars incorporated float chambers equipped with nylon floats in place of the metal floats used previously. The nylon floats are integral with the float levers which are attached to the float chamber lids. The nylon float and lever assembly may be interchanged with the earlier metal float and separate lever. Red aluminium tags were used for a time to identify carburetters modified in this way.

To check the float level, hold the float chamber lid and float assembly upside down and place a ¼ in. (3-18 mm.) diameter bar across the diameter of the machined lip of the float chamber lid, parallel with the float lever hinge pin, and under the float lever (see Fig. DDD.9). The face of the float lever should just rest on the bar when the needle valve is fully on its seating. If it does not do this, carefully reset the angle made between the straight portion of the float lever and its hinge until the correct position is obtained.

Section DDD.10

REVISED LOCATION OF FUEL PUMP

From Car No. 17547 (BN7) and 17352 (BT7) the fuel pump and fuel lines were transferred from the left-hand side to the right-hand side of the car. The repositioning of these components isolates them from the exhaust system and diminishes any possibility of fuel vaporization. This change involved the introduction of new fuel pipes between the tank and the pump, and between the pump and the flexible pipe leading to the carburetters, new petrol pipe fittings, and associated body modifications.

On the BT7, BJ7 and BJ8 the fuel pump is now accessible when the right-hand rear seat pan has been removed.

Access to the fuel pump on the BN7 is obtained in the same way as before (see Section DDD.5) although it is now located on the right-hand side.

Fig. DDD.9 Checking the nylon float level.

A. ¼ in. diameter bar.
B. Machined lip.
C. Float lever resetting point.
D. Needle valve assembly.
E. Hinge pin.

Section DDD.11

CARBURETTERS (CONVERTIBLE MODEL MR II)

The Austin-Healey 3000 Mk. II Sports Convertible (Series BJ7) is equipped with twin S.U. carburetters, type HS6. Each carburettor is attached by four studs and nuts to a detachable one-piece six port induction manifold (see Section A.36). The carburettor float chambers incorporate nylon floats (see Section DDD.9) and are fitted with flexible overflow pipes (see Section DDD.8).

The construction and servicing of the HS6 carburettor are basically similar to that of the HS4 type described in Section DDD.6. For the description and servicing procedure applicable to the carburetters fitted to Convertible models, refer to Section DDD.6, but note the following differences.

Fig. DDD.10

The HS6 carburettor linkage with a feeler below the throttle shaft stop, and the pin at the bottom of the clearance in the forked lever.

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Throttle linkage adjustment

The instructions given under ‘Slow running adjustment and synchronisation’ in Section DDD.6 for the slow running and mixture adjustment of the triple carburettet layout apply also to the twin HS6 carburetters. When setting the throttle linkage, however, use the method given below.

The throttle on each carburettet is operated by a lever and pin, with the pin working in a forked lever attached to the throttle spindle. A clearance exists between the pin and fork which must be maintained when the throttle is closed and the engine idling, to prevent any load from the accelerator linkage being transferred to the throttle butterfly and spindle.

To set this clearance, with the throttle shaft levers free on the throttle shaft, put a -012 in. (305 mm.) feeler between the throttle shaft stop and its abutment on the inlet manifold (see Fig. DDD.10). Move each throttle shaft lever downwards in turn until the lever pin rests lightly on the lower arm of the fork in the carburettet throttle lever. Tighten the clamp bolt of the throttle shaft lever at this position. When both carburetters have been dealt with, remove the feeler. The pins on the throttle shaft levers should then have clearance in the forks.

Re-connect the choke cables, ensuring that the jet heads return against the lower face of the jet adjusting nuts when the choke control is pushed right in.

Pull out the mixture control knob on the dash panel until the linkage is about to move the carburettet jets (a minimum of 1/4 in. (6 mm.) and adjust the fast-idle cam screws to give an engine speed of about 1,000 r.p.m. when hot.

Float chamber fuel level

Refer to Section DDD.9 for the method of checking and adjusting the level of the nylon floats.

Carburettet removal

Turn the battery master switch to the ‘off’ position.

Disconnect the fuel feed pipe from the front carburettet, the snap-lock ball joint from the accelerator relay shaft, and the two throttle return springs.

Release the two mixture control cables from the carburettet levers. Remove the engine breather hose from the rear air cleaner. Pull off the rubber connector for the ignition vacuum control pipe from the top of the rear carburettet body.

Remove the four nuts, spring washers and plain washers securing each carburettet flange and withdraw the two carburettets as a unit complete with the float chamber overflow pipes.

Detach the throttle interconnecting shaft, remove the fuel bridge pipe, and separate the carburetters.

Reverse the above procedure when replacing the carburetters and, in addition, check the throttle linkage and re-adjust if necessary.

Section DDD.12

CARBURETTETS (CONVERTIBLE MODEL Mk. III)

The Austin-Healey 3000 Mk. II Sports Convertible (Series III) is equipped with twin S.U. carburetters, type HD8. Each carburettet is attached by four studs and nuts to a detachable one-piece six port induction manifold (see Section A.36).

The construction and servicing of the HD8 carburettet are basically similar to that of the HD6 type described in Section D.12. For the description and servicing procedure applicable to the carburetters fitted to Mk. III Convertible models, refer to Sections D.12 and 13.

Section DDD. 13

FUEL PUMP Type AUF 301 (LATER CONVERTIBLE MODEL MK. III)

Removing

Remove the right-hand seat pan, disconnect the inlet and outlet pipes, earth and feed connections. Remove the nuts securing the pump to the mounting bracket and lift away the assembly.

Disassembling

Contact breaker

(1) Remove the insulated sleeve, terminal nut, and connecting bracket with its shakeproof washer. Remove the tape seal (if fitted) and take off the end-cover.

(2) Unscrew the 5 B.A. screw which holds the contact blade to the pedestal and remove the condenser from its clip. Remove the washer, the long coil lead, and the contact blade.

Coil housing and diaphragm

(3) Unscrew the coil housing securing screws, using a thick-bladed screwdriver to avoid damaging the screw heads.

(4) Remove the earthing screw.

(5) Remove the coil housing from the body.

(6) Remove the diaphragm and spindle assembly by unscrewing the diaphragm anti-clockwise until the armature spring pushes the diaphragm away from the coil housing. It is advisable to hold the housing over the bench so that the 11 brass rollers will not fall on the floor. The diaphragm and its spindle are serviced as a unit and should not be separated.
Pedestal and rocker

7. Remove the end-cover seal washer, unscrew the
terminal nut, and remove the lead washer. This
will have flattened on the terminal tag and is best
cut away with cutting pliers or a knife. Unscrew
the two 2 B.A. screws holding the pedestal to the
coil housing and remove the earth terminal tag.
Tip the pedestal and withdraw the terminal stud
from the terminal tag. Remove the pedestal and
rocker mechanism.

8. Push out the hardened steel pin which holds the
rocker mechanism to the pedestal and separate
the two.

Body and valves

9. Unscrew the two Phillips screws securing the valve
clamp plate, remove the valve caps, valves, sealing
washers, and filter.

NOTE.—Disassembling of the delivery bow-
smoothing device should only be undertaken if its
operation is faulty, and if the necessary equipment
for pressure-testing after assembly is available. On
this understanding proceed as follows:

10. Remove the four B.A. screws to release the air
bottle cover. Remove the ‘O’ ring, plastic dia-
phragm, and joint washers.

11. Remove the single 2 B.A. screw, securing the inlet
air bottle cover. Remove the cover and gasket.

12. Unscrew the inlet and outlet connections.

Inspecting

If gum has formed, the parts in contact with the fuel
may have become coated with a substance similar to
varnish. This has a strong stale smell and may attack the
neoprene diaphragm. Brass and steel parts so affected
can be cleaned by being boiled in a 20 per cent solution
of caustic soda, dipped in a strong nitric acid solution,
and finally washed in boiling water. Light alloy parts
must be well soaked in methylated spirits and then
cleaned.

13. Clean the pump and inspect for cracks, damaged
joint faces, and threads.

14. Examine the plastic valve assemblies for kinks or
damage to the valve plates. They can best be
checked by blowing and sucking with the mouth.

15. Check that the narrow tongue on the valve cage,
which is bent over to retain the valve and to
prevent it being forced out of position, has not
been distorted but allows a valve lift of approxi-
mately ⅜ in. (1-6 mm.).

16. Examine the delivery air bottle diaphragm and
diaphragm and end cover for damage. If in doubt renew the

17. Examine the inlet air bottle cover for damage.

18. Examine the valve recesses in the body for damage
and corrosion; if it is impossible to remove the
corrosion, or if the recess is pitted, the body must
be discarded.

19. Clean the filter with a brush and examine for
fractures, renew if necessary.

20. Examine the coil lead tag for security and the lead
insulation for damage.

21. Examine the contact breaker points for signs of
burning and pitting; if this is evident, the rocker
assembly and spring blade must be renewed.

22. Examine the pedestal for cracks or other damage,
in particular to the narrow ridge on the edge of the
rectangular hole on which the contact blade
rests.
### THE AUF 301 FUEL PUMP COMPONENTS

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Fig. DDD.13
Setting the correct relative positions of blade and rocker contact points.

(23) If fitted, examine the non-return vent valve in the end cover for damage, ensure that the small ball valve is free to move.

(24) Examine the diaphragm for signs of deterioration.

(25) Renew the following parts: all fibre and cork washers, gaskets, and 'O' section sealing rings, rollers showing signs of wear on periphery, damaged bolts, and unions.

Reassembling

Pedestal and rocker

NOTE.—The steel pin which secures the rocker mechanism to the pedestal is specially hardened and must only be replaced by a genuine S.U. part.

(26) Invert the pedestal and fit the rocker assembly to it by pushing the steel pin through the small holes in the rockers and pedestal struts. Then position the centre toggle so that, with the inner rocker spindle in tension against the rear of the contact points, the centre spring is above the spindle on which the white rollers run. This positioning is important to obtain the correct 'throw-over' action. It is also essential that the rockers are perfectly free to swing on the pivot pin and that the arms are not binding on the legs of the pedestal.

If necessary the rockers can be squared up with a pair of thin-nosed piers.

(27) Assemble the square-headed 2 B.A. terminal stud to the pedestal, the back of which is recessed to take the square head.

(28) Assemble the 2 B.A. spring washers, and put the terminal stud through the 2 B.A. terminal tag, then fit the lead washer and the coned nut with its coned face to the lead washer. (This makes better contact than an ordinary flat washer and nut. Tighten the 2 B.A. nut and finally add the end-cover seal washer.

(29) Assemble the pedestal to the coil housing by fitting the two 2 B.A. pedestal screws, ensuring that the spring washer on the left-hand screw (9 o'clock position) is between the pedestal and the earthing tag. Fit the condenser wire clip base under the earthing tag.

(30) Tighten the screws, taking care to prevent the earthing tag from turning as this would strain or break the earthing flex. Do not overtighten the screws or the pedestal will crack.

Do not fit the contact blade at this stage.

Diaphragm assembly

(31) Place the armature spring into the coil housing with its large diameter towards the coil.

(32) Before fitting the diaphragm make sure that the impact washer is fitted to the armature. (This is a small neoprene washer that fits in the armature recess). Do not use jointing compound on the diaphragm.

(33) Fit the diaphragm by inserting the spindle in the hole in the coil and screwing it into the threaded trunnion in the centre of the rocker assembly.

(34) Screw the diaphragm until the rocker will not 'throw-over'; this must not be confused with jamming the armature on the coil housing internal steps.

Fig. DDD.14
The contact gap setting on earlier-type rocker assemblies.

1. Pedestal.
2. Contact blade.
3. Upper rocker.
4. Inner rocker.
5. Trunnion.
6. Coil housing.

A. -00 in (0.8 mm.)

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(35) Fit the 11 brass centralizing rollers by turning back the diaphragm edge and dropping the rollers into the coil recess. The pump should be held rocker end downwards to prevent the rollers from falling out.

On later-type rocker mechanisms with adjustable fingers fit the contact blade and adjust the finger settings as described under those headings, then carefully remove the contact blade.

(36) Holding the coil housing assembly in an approximately horizontal position, push the diaphragm spindle in, firmly but steadily. Unscrew the diaphragm, pressing and releasing with the thumb until the rocker just 'throws over'. Now turn the diaphragm back (unscrew) to the nearest hole and again 4 holes (two-thirds of a complete turn). The diaphragm is now correctly set.

(37) Press the centre of the armature and fit the retaining fork at the back of the rocker assembly. This is done to prevent the rollers from falling out when the coil housing is placed on the bench prior to fitting the body, and is not intended to stretch the diaphragm before tightening the body screws.

Body components

(38) The valve assemblies are retained in the body by a clamp plate secured with self-tapping screws. The inlet valve recess in the body is deeper than the outlet recess to allow for the filter and extra washer. Another feature of these pumps is the incorporation of an air bottle on the inlet and a flow-smoothing device on the delivery side.

The inlet air bottle is a chamber in the body casting blanked off by a single cover and joint washer held by a single screw. The delivery flow-smoothing device is formed by a perforated meta

Plate which is in contact with a plastic barrier backed by a rubber diaphragm, all held in position by a spring and end-cap retained by a vented cover. This assembly seals the delivery chamber in the body.

(39) Screw in the inlet and outlet connections with their sealing rings. Assemble the outlet valve components into the outlet recess in the following order: first a joint washer, then the valve, tongue side downwards, then the valve cap.

(40) Assemble the inlet valve into the inlet recess as follows: first a joint washer, then the filter dome side downwards, then another joint washer, followed by the valve assembly tongue side upwards, then the valve cap.

(41) Take care that both valve assemblies nest down into their respective recesses, place the clamp plate on top, and tighten down firmly to the body with the two screws.

(42) Replace the inlet air bottle cover with its joint washer and tighten down the central screw.

(43) Place the sealing washer in the bottom of the delivery air bottle, place the plastic diaphragm dome side downwards, then add the 'O' section sealing ring and tighten down the cap with its four screws.

Body attachment

(44) Fit the joint washer to the body, aligning the screw holes.

(45) Offer up the coil housing to the body, ensuring correct seating between them.

(46) Line up the six securing screw holes, making sure that the cast lugs on the coil housing are at the bottom, insert the six 2 B.A. screws finger-tight, Fit the earthing screw with its Lucar connector.

(47) Remove the roller-retaining fork before tightening the body securing screws, making sure that the rollers retain their position; a displaced roller will cut the diaphragm. It is not necessary to stretch the diaphragm before tightening the securing screws. Tighten the screws in sequence as they appear diametrically opposite each other.

Contact blade

(48) Fit the contact blade and coil lead to the pedestal with the 5 B.A. washer and screw. When a condenser is fitted the tag on it is placed under the coil lead tag.

(49) Adjust the contact blade so that the contact points on it are a little above the contact points on the rocker when the points are closed, also that when the contact points make or break, one pair of point wipes over the centre line of the other in a symmetrical manner. As the contact blade is
A checking rig for the fuel pump is obtainable from the S.U. Carburettor Co. Ltd.

1. The 1/8 in. (4 mm.) dia. hole is 2 in. (51 mm.) below the top of the pump.

   provided with a slot for the attachment screw, some degree of adjustment is possible.

(30) Tighten the contact blade attachment screw when the correct setting is obtained.

Contact gap setting
(31) Check that when the outer rocker is pressed onto the coil housing, the contact blade rests on the narrow rib or ridge which projects slightly above the main face of the pedestal. If it does not, slacken the contact blade attachment screw, swing the blade clear of the pedestal, and bend it downwards a sufficient amount so that when repositioned it rests against the rib.

Earlier-type rocker assemblies
(32) Check the gap between the points indirectly by carefully holding the contact blade against the rib on the pedestal without pressing against the tip. Check if a 0.030 in. (0.76 mm.) feeler will pass between the fibre rollers and the face of the coil housing. If necessary, the tip of the blade can be set to correct the gap.

Modified rocker assemblies
(33) Check the lift of the contact blade above the top of the pedestal with a feeler gauge, bending the stop-finger beneath the pedestal, if necessary to obtain a lift of 0.035±0.005 in. (0.9±0.13 mm.).

(34) Check the gap between rocker finger and coil housing with a feeler gauge, bending the stop-finger, if necessary, to obtain a gap of 0.070±0.005 in. (1.8±0.13 mm.).

End cover
(35) Tack all spare cable into position so that it cannot foul the rocker mechanism. Ensure that the end-cover seal washer is in position on the terminal stud, fit the bakelite end-cover and look washer, secure with the brass nut, fit the terminal tag or connector, and the insulated sleeve.

(36) The pump is now ready for test. After test replace the rubber sealing band over the end cover gap and seal with adhesive tape. This must be retained when the pump is not mounted internally in a moisture-free region.

Testing
(37) Check that the pump points are correctly gapped.

(38) In order to observe the action of the contact breaker assemblies fit a cut-away cover to the pump.

S.U. test rig
(39) Mount the pump on the test rig using the appropriate adaptor set, and connect to a 12-volt battery.

Churchill test rig
(40) Secure the pump in the clamping ring with the outlet connection uppermost. Connect to a 12-volt battery and with the switch in the 'OFF' position clip the connector to the pump. Connect the delivery and suction pipes to the pump.

(41) Use clean paraffin (kerosene) in the sump pan to a depth of at least 2 in. (51 mm.).

Priming
(42) Unscrew the regulator valve (Churchill only), switch on, and the pump should prime from dry in 10 to 15 seconds. Allow the pump to run for a minute to stabilize the flow.

Air leak check
(43) When the pump is first started air bubbles will be mixed with the fluid discharged into the flow meter (S.U.) or the flow glass (Churchill). These bubbles should cease after the pump has been running for a minute or two. If bubbles continue to appear there is an air leak in the suction side of the pump or the connecting unions, and must be rectified.
Valve seat check
(64) Operate the pump for about 10 minutes and then turn the tap (S.U.), or regulator valve (Churchill) right off. The pump should not heat for at least 20 seconds. If pumping action takes place within 20 seconds the inlet valve is not seating correctly and must be renewed.

Delivery check
(65) S.U.
Partially open the tap and check that fuel is delivered to the glass jar. Gradually depress the spring blade to reduce the stroke; the pump should continue working with increasing frequency until it eventually stops due to there being no gap left between the points.

Churchill
Adjust the regulator valve to give the feet of paraffin (kerosene) reading in the pressure gauge (see 'GENERAL DATA'). When the correct reading has been obtained the pump flow may be read directly from the appropriate colour scale on the flow glass (see 'GENERAL DATA').

Reduced voltage check
(66) Operate the pump as described in 'Delivery check' and reduce the voltage to 9.5 by incorporating a variable resistor and voltmeter on the feed side of the testing circuit and check that the pump is functioning satisfactorily.

Sparking check
(67) Switch on the pump and check for excessive sparking between the points. A small degree of sparking is permissible, but a special leak wire in the solenoid winding is designed to reduce sparking to a minimum. If excessive sparking is evident the solenoid assembly must be renewed.

Refitting
Reverse the removal procedure.

Fault diagnosis
1. Suspected fuel feed failure
   Disconnect the fuel line at the carburettor and check for flow.
   (a) If normal, examine for obstructed float-chamber needle seating or gummed needle.
   (b) If normal initially, but diminishing rapidly and accompanied by slow pump operation, check for correct tank venting by removing the filler cap. Inadequate venting causes a slow power stroke, and excessive burning of the contact points.

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![Fig. DDD.17](image)

A checking rig for S.U. fuel pump available from V. L. Churchill and Co. Ltd. The rig measures output in gallons of paraffin (kerosene) per hour, against required suction and delivery heads.

1. Pressure gauge.  
2. Flow glass.

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filler cap. Do not pass compressed air through the pump, as this would cause serious damage to the valves.

(iv) Faulty diaphragm action
If the previous operations fail to locate the trouble, stiffening of the diaphragm fabric or abnormal friction in the rocker 'throw-over' mechanism is to be suspected. To remedy these faults, the coil housing should be removed and the diaphragm flexed a few times taking care not to lose any of the 11 rollers (when fitted) under it. Prior to reassembly, it is advisable to apply a little thin oil to the 'throw-over' spring spindles at a point where they pivot in the brass rockers. The diaphragm armature assembly should then be assembled and set in accordance with the instructions given under that heading.

2. Noisy pump
Air leaks. If the pump is noisy in operation, an air leak at one or other of the suction lines may be the cause.

Such a leak may be checked by disconnecting the fuel pipe from the carburettor and allowing the pump to discharge into a suitable container with the end of the pipe submerged. Continuous bubbles at this point will indicate an air leak. Rectify the fault as follows:

(a) Check that all connections from the fuel tank to the pump are in good order.
(b) Check that the inlet union is tight.
(c) Check that the coil housing securing screws are well and evenly tightened. Air leaks on the suction side cause rapid operation of the pump and are the most frequent cause of failure.

3. Pump operates without delivering fuel
If the pump operates without delivering fuel the most likely causes are:

(a) A serious air leak on the suction side, or,
(b) Foreign matter lodged under one of the valves, particularly under the inlet valve; remove and clean.

To remedy (a) see para 2 above.