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WORKSHOP MANUAL

CARBURETTERS

AND

ELECTRIC FUEL PUMPS

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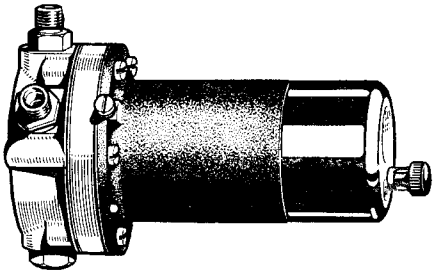
ELECTRIC FUEL PUMPS

SECTION A

CONSTRUCTION AND FUNCTIONING TYPE "L" SINGLE AND DUAL



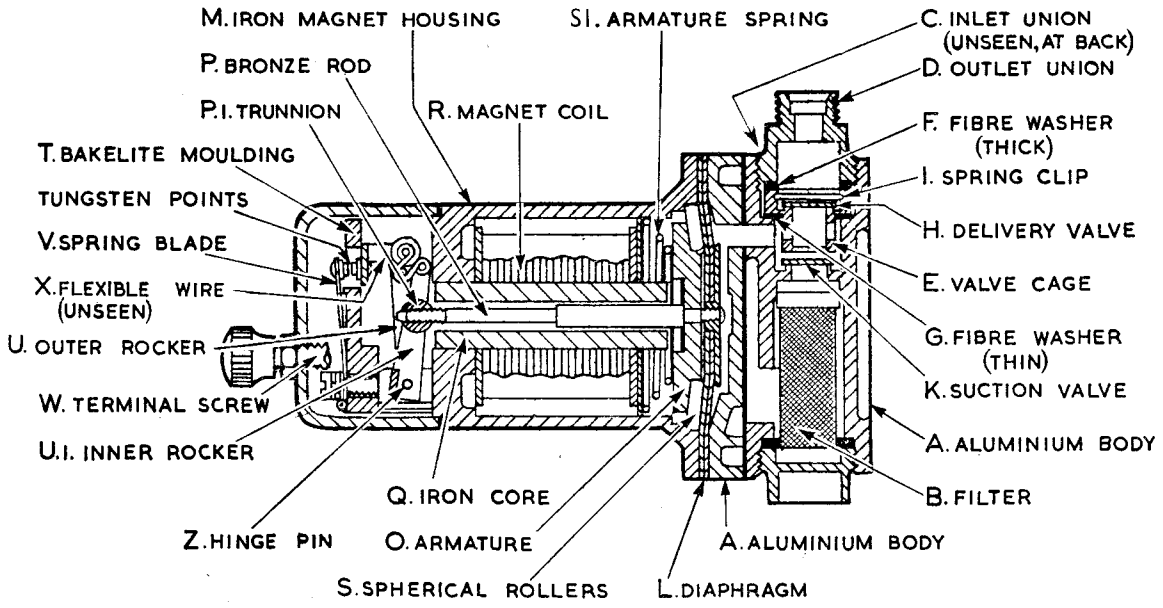


Fig. A.1.

An "L" type pump in section. (See Fig. D.1 for "Dual" type.)

Section A.1

DESCRIPTION

The "L" type pump should be mounted in the region of the engine at approximately carburetter level and in such a position that a minimum of exhaust manifold heat is radiated upon it; also, consistent with that position, the delivery pipe to the float-chamber should be kept as short as possible—the filter plug should be positioned at the bottom and the delivery union at the top.

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

The body "A" is composed of two aluminium die-castings; into the bottom of the larger one the filter "B" is screwed. The inlet union "C" is screwed in at an angle on one side. The outlet union "D" is screwed into the top. This tightens down onto the delivery valve cage "E," which is clamped between two fibre washers "F" and "G." In the top of the cage is the delivery valve, a thin brass disc "H" held in position by a spring clip "I," the suction valve "K" being a similar disc resting on a seating machined in the body. Holes connect the space between the valves to the pumping chamber, which is a shallow depression on the forward face of the smaller body casting. This space is closed by a diaphragm assembly "L," which is clamped at its outer edge between the magnet housing "M" and the body. A bronze rod "P" is screwed through the centre of the armature to which the diaphragm is attached and passes through the magnet core to the contact breaker, which is located at the opposite end. A spring "S.1" is interposed between the armature and the end plate of the coil. There is a fabric joint washer between the larger and smaller body castings.

In a "Dual" type pump (see Fig. D.1) twin filters "B" are held in the lower face of the casting. The inlet union "C" and the outlet union "D" are positioned at the side of the main casting. On the top of the body casting are twin hexagon-headed screwed plugs "F" giving access to the hollow screws "G" which retain the delivery valve cages "E." In the top of the cage is the delivery valve, positioned smooth side downwards and held in place by a spring clip "I," the suction valve "K" being a similar disc resting on the burnished end of an inserted brass tube.

Holes connect the space between the valves to the two pumping chambers, which are shallow depressions in each end face of the body casting. Each chamber is closed by a diaphragm assembly "L," which is clamped at its outer edge between the magnet housing and the body casting.

The magnet consists of a cast-iron pot having an iron core "Q" on which is wound a coil of copper wire "R" which energises the magnet. Between the magnet housing and the armature are fitted eleven spherical-edged brass rollers "S." These locate the armature "O" centrally within the magnet and allow absolute freedom of movement in a longitudinal direction.

The contact breaker (two in "Dual") consists of a small bakelite moulding "T" carrying two rockers "U" and "U.1," which are both hinged to the moulding at

one end of the rocker hinge pin " Z " and are connected together at the top end by two small springs arranged to give a " throw-over " action. A trunnion " P.1 " is fitted into the centre of the inner rocker, and the bronze rod " P " connected to the armature is screwed into this. The outer rocker " U " is fitted with a tungsten point which makes contact with a further tungsten point on a spring blade " V." This spring blade is connected to one end of the coil and the other coil end is connected to the terminal " W." A short length of flexible wire " X " connects the outer rocker to one of the screws which hold the bakelite moulding onto the magnet housing, in order to ensure a good earth.

Section A.2

THE ACTION OF THE 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 earth, thus energising the magnet and attracting the armature. This comes forward, bringing the diaphragm with it, thus sucking fuel 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 " S.1 " then pushes the armature and the diaphragm back, forcing fuel 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.

The spring blade rests against a small projection on the bakelite moulding, and it should 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 ·030 in. (·76 mm.) when the rocker is pulled back against the face of the iron housing.

Section A.3

FAULT DIAGNOSIS

First disconnect the delivery pipe to the carburetter, and if the pump then works, the most likely cause of the trouble is a sticking needle in the float-chamber. Should the pump not work, however, disconnect the lead from the terminal and strike against the body of the pump to see if it sparks and therefore if any current is available. If the current is there, remove the bakelite cover and touch the terminal with the lead when the points are in contact—then if the pump still fails to work it may be due to dirt on the contact faces. This may be cleaned off by inserting a piece of thin card between them and sliding it to and fro. If, however, the pump still fails to work with dirt-free points, check that the bottom filter is not clogged, as this will stop a pump, although a rare happening. Next slacken off the inlet pipe union, and if the pump then operates the trouble is probably due to an obstruction in the pipe line to the rear tank which can possibly be cured by blowing down the line with a tyre pump.

If, however, with the inlet pipe union slackened off, the pump fails to work, or only works slowly and spasmodically, then the trouble is probably due to a fault in the pump itself, such as a stiffened-up diaphragm, or to undue friction in the rocker " throw-over " mechanism, or a combination of both.

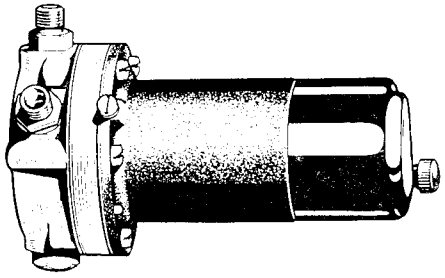
To check over these two matters, unscrew the six flange screws and detach the coil housing and rocker unit from the main body (taking care not to lose any of the eleven rollers under the diaphragm), and then by gently pressing the centre of the diaphragm assembly in and out observe whether the " throw-over " mechanism seems to operate freely. If it does not or there are traces of rust on any of the small steel spindles, lubricate *sparingly* with a spot of thin oil on a matchstick where they pass through the brass rockers. Then turn to the diaphragm, and in order to restore its original pliability ruckle each of the two fabric layers vigorously between the thumb and fingers, after which it can be reassembled and carefully reset for the " throw over " according to the instructions for this operation given in Section D.

If the pump becomes noisy look for an air leak on the suction side. The simplest way to check for this fault is to disconnect the fuel pipe from the carburetter and allow the pump to pump fuel into a pint can. If the end of the pipe is then submerged in the fuel and bubbles come through there must be an air leak, and it must be found and cured. Noise can also be caused by fuel boiling before it gets to the pump. This occurs most particularly on cars on which the fuel pipe runs near the exhaust pipe, and is usually noticed in hot weather when slowing down after driving hard. This trouble can sometimes be overcome by using a different brand of fuel.

If the pump keeps beating without delivering any fuel, it is possible that a piece of dirt is lodged under one of the valves. These can be removed for cleaning by unscrewing the top union and lifting the valve cage out. When replacing it see that the thin hard fibre washer is below the valve cage and the thick one above. A choked filter or an obstruction on the suction side will make the pump very hot and eventually cause a failure.

SECTION B

CONSTRUCTION AND FUNCTIONING TYPE "HP" SINGLE AND DUAL



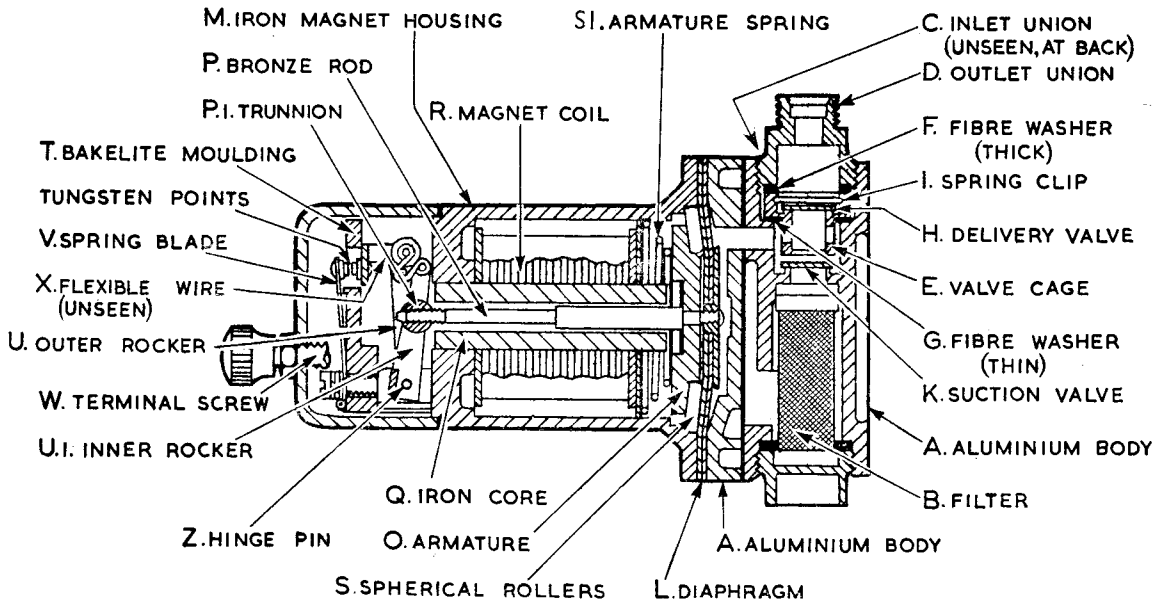


Fig. B.1.

An " HP " type pump in section. (See Fig. D.1 for " Dual " type.)

Section B.1

DESCRIPTION

The " HP " pump, which is identified by a slightly greater length of body than that of the " L " type, gives an increased pressure feed to the float-chamber and may be mounted at any point between the region of the engine and the region over the rear tank. It should be approximately at the height of the carburetter or just below it, and the inlet and outlet unions should point sideways in the 3 o'clock or 9 o'clock positions. It should not be mounted in such a position that it is affected by heat from the engine and the pipe lines should be as short as possible.

The " HP " pump may be fitted with single or double contact points, a condenser, an air bottle or a light spring on the inlet valve.

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

The body " A " is composed of two aluminium die-castings; into the bottom of the larger one the filter " B " is screwed. The inlet union " C " is screwed in at an angle on one side. The outlet union " D " is screwed into the top. This tightens down onto the delivery valve cage " E," which is clamped between two fibre washers " F " and " G." In the top of the cage is the delivery valve, a thin brass disc " H " held in position by a spring clip " I," the suction valve " K " being a similar disc resting on a seating machined in the body. Holes connect the space between the valves to the pumping chamber, which is a shallow depression on the forward face of the smaller body casting. This space is closed by a diaphragm assembly " L," which is clamped at its outer edge between the magnet housing " M " and the body. A bronze rod " P " is screwed through the centre of the armature to which the diaphragm is attached and passes through the magnet core to the contact breaker located at the opposite end. A spring " S.1 " is interposed between the armature and the end plate of the coil. There is a fabric joint washer between the larger and smaller body castings.

In a " Dual " type pump (see Fig. D.1) twin filters " B " are held in the lower face of the casting. The inlet union " C " and the outlet union " D " are positioned at the side of the main casting. On the top of the body casting are twin hexagon-headed screwed plugs " F " giving access to the hollow screws " G " which retain the delivery valve cages " E." In the top of the cage is the delivery valve, positioned smooth side downwards and held in place by a spring clip " I," the suction valve " K " being a similar disc resting on the burnished end of an inserted brass tube.

Holes connect the space between the valves to the two pumping chambers, which are shallow depressions in each end face of the body casting. Each chamber is closed by a diaphragm assembly " L," which is clamped at its outer edge between the magnet housing and the body casting.

The magnet consists of a cast-iron pot having an iron core " Q " on which is wound a coil of copper

wire " R " which energises the magnet. Between the magnet housing and the armature are fitted eleven spherical-edged brass rollers " S." These locate the armature " O " centrally within the magnet and allow absolute freedom of movement in a longitudinal direction.

The contact breaker (two in " Dual ") consists of a small bakelite moulding " T " carrying two rockers " U " and " U.1," which are both hinged to the moulding at one end on the rocker hinge pin " Z " and are connected together at the top end by two small springs arranged to give a " throw-over " action. A trunnion " P.1 " is fitted into the centre of the inner rocker, and the bronze rod " P " connected to the armature is screwed into this. The outer rocker " U " is fitted with a tungsten point which makes contact with a further tungsten point on a spring blade " V." This spring blade is connected to one end of the coil and the other coil end is connected to the terminal " W." A short length of flexible wire " X " connects the outer rocker to one of the screws which hold the bakelite moulding onto the magnet housing, in order to ensure a good earth.

Section B.2

THE ACTION OF THE 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 earth, thus energising the magnet and attracting the armature. This comes forward, bringing the diaphragm with it, thus sucking fuel 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 " S.1 " then pushes the armature and the diaphragm back, forcing fuel 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.

The spring blade rests against a small projection on the bakelite moulding, and it should 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 ·030 in. (·76 mm.) when the rocker is pulled back against the face of the iron housing.

If the magnet is removed from the body for any reason, care should be taken that the rollers " S " do not drop out.

Section B.3

FAULT DIAGNOSIS

First disconnect the delivery pipe to the carburetter, and if the pump then works, the most likely cause of the trouble is a sticking needle in the float-chamber. Should the pump not work, however, disconnect the lead from the terminal and strike against the body of the pump to see if it sparks and therefore if any current is available. If the current is there, remove the bakelite cover and touch the terminal with the lead when the points are in contact—then if the pump still fails to work it may be due to dirt on the contact faces. This may be cleaned off by inserting a piece of thin card between them and sliding it to and fro. If, however, the pump still fails to work with dirt-free points, check that the bottom filter is not clogged, as this will stop a pump, although a rare happening. Next slacken off the inlet pipe union, and if the pump then operates the trouble is probably due to an obstruction in the pipe line to the rear tank which can possibly be cured by blowing down the line with a tyre pump.

If, however, with the inlet pipe union slackened off, the pump fails to work, or only works slowly and spasmodically, then the trouble is probably due to a fault in the pump itself, such as a stiffened-up diaphragm, or to undue friction in the rocker " throw-over " mechanism, or a combination of both.

To check over these two matters, unscrew the six flange screws and detach the coil housing and rocker unit from the main body (taking care not to lose any of the eleven rollers under the diaphragm), and then by gently pressing the centre of the diaphragm assembly in and out observe whether the " throw-over " mechanism seems to operate freely. If it does not or if there are traces of rust on any of the small steel spindles, lubricate *sparingly* with a spot of thin oil on a matchstick where they pass through the brass rockers. Then turn to the diaphragm, and in order to restore its original pliability ruckle each of the two fabric layers vigorously between the thumb and fingers, after which it can be reassembled and carefully reset for the " throw over " according to the instructions for this operation given in Section D, " Repair and overhaul."

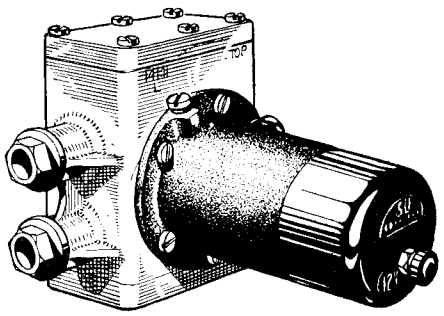
If the pump becomes noisy look for an air leak on the suction side. The simplest way to check for this is to disconnect the fuel pipe from the carburetter and allow the pump to pump fuel into a pint can. If the end of the pipe is then submerged in the fuel and bubbles come through there must be an air leak, and it must be found and cured. Noise can also be caused by fuel boiling before it gets to the pump. This occurs most particularly on cars on which the fuel pipe runs near the exhaust pipe, and this is usually noticed in hot

weather when slowing down after driving hard. This trouble can sometimes be overcome by using a different brand of fuel.

If the pump keeps beating without delivering any fuel, it is possible that a piece of dirt is lodged under one of the valves. These can be removed for cleaning by unscrewing the top union and lifting the valve cage out. When replacing it see that the thin hard fibre washer is below the valve cage and the thick one above. A choked filter or an obstruction on the suction side will make the pump very hot and eventually cause a failure.

SECTION C

CONSTRUCTION AND FUNCTIONING TYPE "LCS"



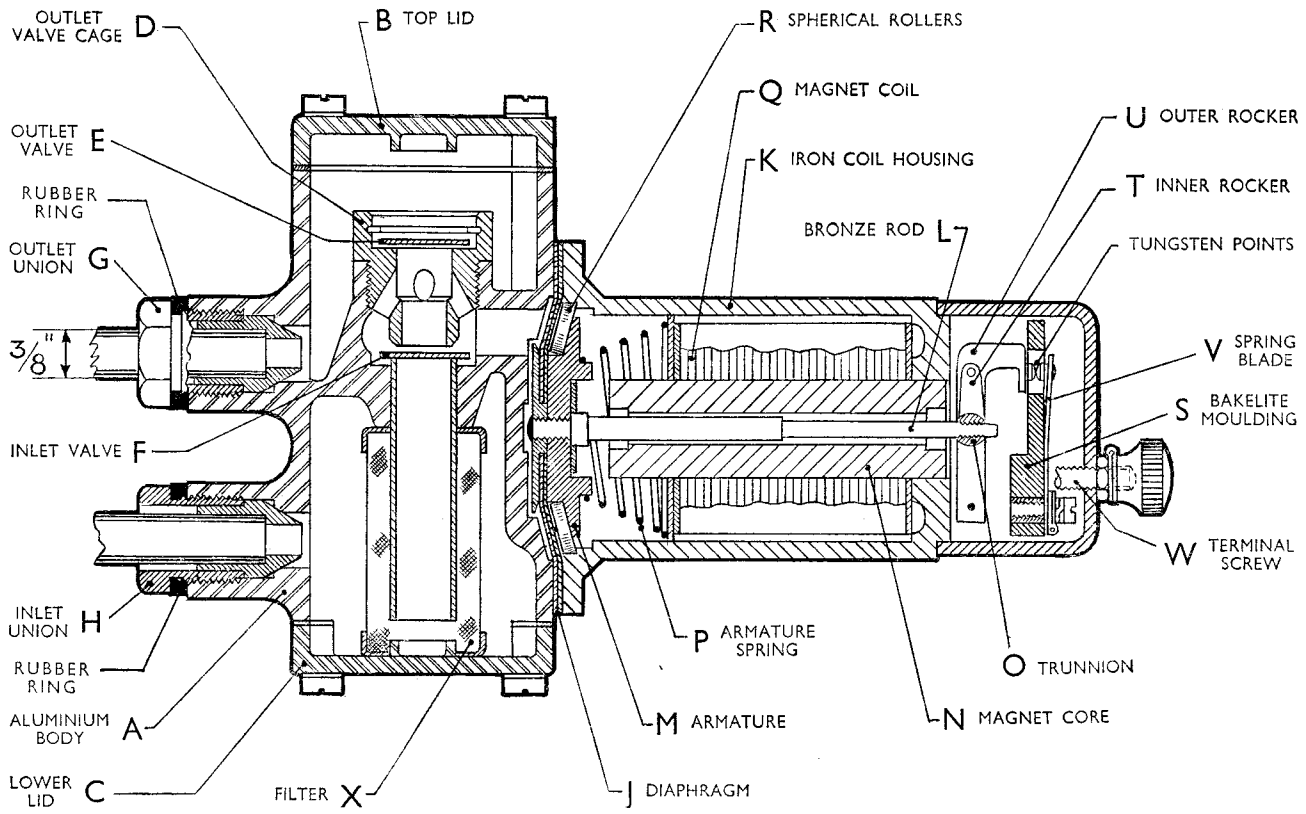


Fig. C.1.

A section through a pump : Type "LCS."

Section C.1

DESCRIPTION

The "LCS" type pump can be mounted at any point between the region of the carburetter and the region over the rear tank, and in the vertical plane should be just level with the carburetter or just below it; whilst consistent with the above locations, the pipe lines should be as short as possible.

Do not mount the pump in a position exposed to close and direct heat radiation from exhaust manifolds, etc.

The pump consists of three main assemblies—the body, the magnet assembly (sometimes also referred to as the coil housing assembly), and the contact breaker.

The body "A" is an aluminium die-casting, to which is attached by 2 B.A. screws two identical lids ("B" the top and "C" the lower), the lower one retaining the filter. The top lid gives access to the cage "D" for the outlet valve "E" and, when the cage is unscrewed, to the inlet valve "F" also. These inlet and outlet valves are thin brass discs and should be assembled smooth side downwards; the outlet valve can be extracted (rarely necessary) after the spring circlip has been detached, and care should be taken not to distort this circlip or the correct valve lift may be affected. A $\frac{3}{8}$ in. diameter hole connects the space between the valves to the pumping chamber, which is a shallow depression in one face of the body casting. This space contains the diaphragm unit "J," which is clamped on its rim between the iron coil housing "K" and the main body "A."

A bronze rod "L" is screwed to the centre of the armature "M," to which the diaphragm is also fastened, and it passes through the magnet core "N" to the trunnion "O" in the contact breaker. An armature return spring "P" is interposed between the armature and the end of the magnet coil.

The magnet consists of a cast-iron housing "K" having an iron magnet core "N" on which is wound a coil of copper wire "Q" which energises the magnet. Between the magnet coil housing "K" and the armature "M" are fitted eleven spherical-edged rollers "R." These locate the armature centrally within the magnet and allow absolute freedom of movement in a longitudinal direction.

The contact breaker consists of a small bakelite moulding "S" carrying two rockers, an inner rocker "T" and an outer rocker "U," which are both hinged to the moulding at one end and connected together at

their top end by two small springs arranged to give a " throw-over " action. A trunnion bearing " O " is fitted into the centre of the inner rocker, and the bronze armature sliding rod " L " is screwed into this.

The outer rocker is fitted with tungsten points, which make contact with corresponding points on the spring blade " V." This blade is connected to one end of the coil and the second coil end is connected to the terminal screw " W."

A short length of flexible wire connects the outer rocker to one of the screws which holds the bakelite moulding, in order to provide a good earth.

This pump has a good delivery head and can be mounted fairly low down on the chassis. On such a layout it is possible for water or spray from the road wheels to find its way onto the pump, and cases have occurred where this water has percolated between the threads of the union nuts on the fuel pipes and their corresponding threads in the aluminium body; corrosion between the threads has followed, ultimately causing the union nuts to become immovable. To cure this a rubber sealing ring (Part No. AUA.4979) has been introduced which should be slipped over the unions before they are screwed into the pump body so that they are nipped between the head of the union and the boss on the pump body to make a watertight seal.

Section C.2

THE ACTION OF THE 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 earth, thus energising the magnet and attracting the armature. This comes forward, bringing the diaphragm with it, thus sucking fuel 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 " P " then pushes the armature and the diaphragm back, forcing fuel 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.

The spring blade rests against a small projection on the bakelite moulding, and it should 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 ·030 in. (·76 mm.) when the rocker is pulled back against the face of the iron housing.

If the magnet is removed from the body for any reason, care should be taken that the rollers " R " do not drop out.

Section C.3

FAULT DIAGNOSIS

First disconnect the delivery pipe to the carburetter, and if the pump then works, the most likely cause of the trouble is a sticking needle in the float-chamber. Should the pump not work, however, disconnect the lead from the terminal and strike against the body of the pump to see if it sparks and therefore if any current is available. If the current is there, remove the bakelite cover and touch the terminal with the lead when the points are in contact—then if the pump still fails to work it may be due to dirt on the contact faces. This may be cleaned off by inserting a piece of thin card between them and sliding it to and fro. If, however, the pump still fails to work with dirt-free points, check that the bottom filter is not clogged, as this will stop a pump, although a rare happening. Next slacken off the inlet pipe union, and if the pump then operates, the trouble is probably due to an obstruction in the pipe line to the rear tank which can possibly be cured by blowing down the line with a tyre pump.

If, however, with the inlet pipe union slackened off, the pump fails to work, or only works slowly and spasmodically, then the trouble is probably due to a fault in the pump itself, such as a stiffened-up diaphragm, or to undue friction in the rocker " throw-over " mechanism, or a combination of both.

To check over these two matters, unscrew the six flange screws and detach the coil housing and rocker unit from the main body (taking care not to lose any of the eleven rollers under the diaphragm), and then by gently pressing in and out the centre of the diaphragm assembly observe whether the " throw-over " mechanism seems to operate freely. If it does not and there are traces of rust on any of the small steel spindles, lubricate *sparingly* with a spot of thin oil on a matchstick where they pass through the brass rockers. Then turn to the diaphragm, and in order to restore its original pliability, ruckle each of the two fabric layers vigorously between the thumb and fingers, after which it can be reassembled and carefully reset for the " throw over " according to the instructions for this operation given in Section D.

If the pump becomes noisy look for an air leak on the suction side. The simplest way to check for this is to disconnect the fuel pipe from the carburetter and allow the pump to pump fuel into a pint can. If the end of the pipe is then submerged in the fuel and

bubbles come through there must be an air leak, and it must be found and cured. Noise can also be caused by fuel boiling before it gets to the pump. This occurs most particularly on cars on which the fuel pipe runs near the exhaust pipe, and this is usually noticed in hot weather when slowing down after driving hard. This trouble can sometimes be overcome by using a different brand of fuel.

If the pump keeps beating without delivering any fuel it is possible that a piece of dirt is lodged under one of the valves. These can be removed for cleaning by unscrewing the top union and lifting the valve cage out. When replacing it see that the thin hard fibre washer is below the valve cage and the thick one above. A choked filter or an obstruction on the suction side will make the pump very hot and eventually cause a failure.

SECTION D

REPAIR AND OVERHAUL

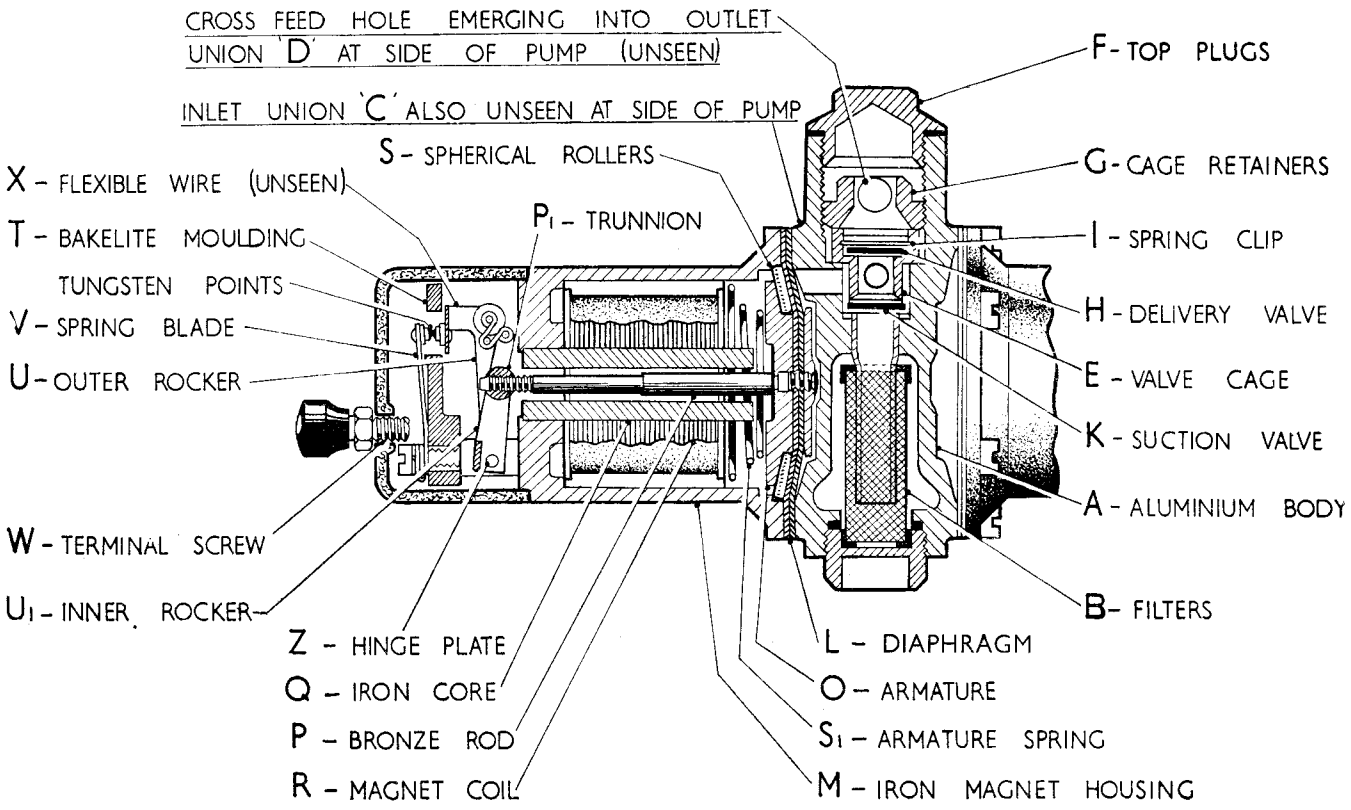


Fig. D.1.

Part-section of a "Dual" type pump.

Section D.1

ASSEMBLING AND TESTING

Should it be found necessary to overhaul an S.U. fuel pump, particular attention should be paid to the condition of the diaphragm, valves, and contact breaker parts.

To examine these parts it is necessary to dismantle the pump completely.

When reassembling, first see that all parts are clean. The valves (H and K) should be fitted with the smooth side downwards. Care should be taken that the valve retaining clip (I) in the delivery valve cage (E) is correctly located in its groove. A thin hard red fibre washer should be fitted under and a medium one above the valve cage and also above the filter plug. The washer on the inlet union is a thick hard red fibre one.

The brass body of the old-type "L" pump has been replaced and entirely superseded by one of aluminium. The only difference besides that of material is the method of manufacture, which results in a minor alteration to the assembly.

In place of the original hot brass stamping with the back plate soldered in position, the aluminium body is an assembly of two pressure die castings held together by the screws which secure it to the cast-iron coil housing, a fabric gasket being used as a seal. These screws are longer than those used with the brass type, and are not interchangeable.

The contact breaker should be assembled onto the pedestal in such a way that the rockers are a free fit on it, but without side play. Excessive side play on the outer rocker permits the points to get out of line. Excessive 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.

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

The contact blade (V) should be fitted next to the bakelite pedestal, that is, underneath the tag. It should rest against the ledge on the pedestal when the points are apart, and it must not be so stiff as to prevent the outer rocker from coming right forward when the points are in contact. The points should just make contact when the rocker is in its mid-way position. The simplest way to check this is to hold the blade in contact with the

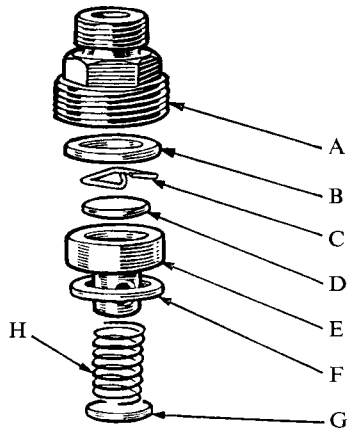


Fig. D.2.

A. Outlet union. B and F. Washers. C. Spring clip. D and G. Valve discs. E. Valve cage. H. Spring.

pedestal, being careful not to press on the overhanging portion, and then to test the gap between the white rollers and the cast-iron body of the pump; it should be ·030 in. (·76 mm.). If necessary, the tip of the blade may be set in order to correct the gap.

The spring washer on the 2 B.A. 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 the brass tag should therefore 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, should be soldered.

The coil end going to the terminal should be soldered to its tag and not to the nut.

The correct order for the assembly on the terminal, Fig. D.6, is spring washer (1) next to the bakelite pedestal, then the tag (2), lead washer (3), countersunk nut (4). A lead washer has been found necessary at this point as some cases of bad connection have been found. This assembly **must never** be shortened by leaving out the spring washer or by any other means, as this would probably result in breakage of the pedestal when the nut holding the cover in position was tightened.

In no conditions should any attempt be made to move the core of the magnet. This can only be located in position correctly with special press tools.

The armature spring should be fitted with its large diameter in the mouth of the pot and the small diameter resting against the armature. **Do not stretch the spring.**

The armature should be adjusted as follows: **The contact blade on the pump must be swung to one side while the adjustment is being made.** Care should be taken to see that an impact washer (26), Fig. D.4, is fitted in the recess in the armature, and the latter should then be screwed in and the rollers put in position. There are eleven of these. Do not use jointing compound on the diaphragm.

The magnet assembly should then be held in the left hand in an approximately horizontal position and the armature pushed in with the thumb of the right hand, pressing firmly but steadily.

If the contact breaker throws over, the armature should be screwed in farther until it does not. It should then be unscrewed one-sixth of a turn at a time until a point is found at which the contact breaker just throws over, care being taken that the armature is not jerked in but pressed in with a steady pressure. The armature should then be unscrewed a further two-thirds of a turn, that is, four holes, and the setting is correct. **Do not forget that this is to be done with the points out of contact.** 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.

The cast-iron magnet body should then be placed in position on the main body, the drain hole in the former being in line with the filter plug on the main body, that is, at the bottom.

Care should be taken to see that the magnet body sits down on the main body before the screws which hold them together are inserted. If one of the rollers has fallen out of position, it will get trapped between the

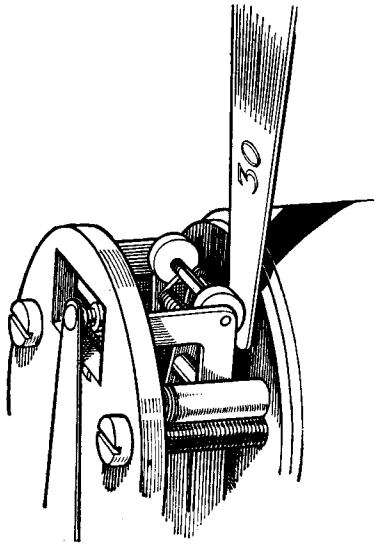


Fig. D.3.
The correct gap at the points.

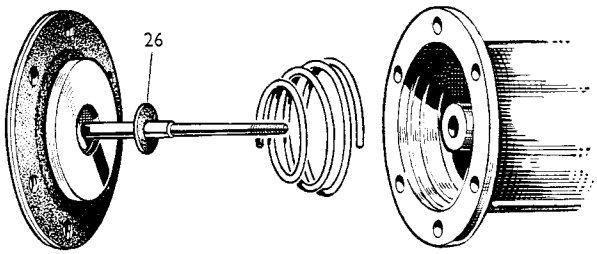


Fig. D.4.
The impact washer (26).

two parts and will cut a hole in the diaphragm. Five screws and the earthing terminal should then be fitted to hold the two parts together. (Later models have six screws and a separate earthing screw in a boss on the magnet casting.) These should not be screwed right home at first. Before tightening them down it is absolutely necessary to stretch the diaphragm to its outermost position. This is most easily effected by using a special forked wedge which can be obtained from Nuffield Exports Ltd. or, if conditions permit, can be made from ordinary mild steel to dimensions given in Fig. D.7.

This is inserted between the white rollers on the outer rocker and pressed in 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 this is not available the diaphragm may be stretched by holding the points in contact by inserting a matchstick under one of the white fibre rollers and passing a current through the pump. While the diaphragm is held in this position the six screws (one an earthing terminal on early models) should be tightened down fully.

Three important points are frequently overlooked :—

(1) Keep the blade out of contact while setting the diaphragm.
(2) Press steadily and firmly on the armature—do not bump—while setting.
(3) Stretch the diaphragm to the end of its stroke while tightening the screws.

The pump should then be put on test. It is best to use a cutaway cover while testing the pump, as this prevents the hinge pin from falling out and at the same time makes it possible to observe the action of the contact breaker.

The test apparatus illustrated in Fig. D.5 can be supplied by Nuffield Exports Ltd.

When the pump is switched on it should prime promptly, and the paraffin (kerosene), which is normally used for testing, should rise in the glass tube until it flows over the top of the pipe having a $\frac{5}{32}$ in. (3·9 mm.) hole drilled in it. If the output of the pump is not up to normal, the $\frac{5}{32}$ in. (3·9 mm.) hole will be able to carry all the paraffin (kerosene) pumped and the liquid will not flow over the top.

This therefore constitutes a simple form of flowmeter which establishes in a simple manner whether the pump is giving a sufficient output or not. If by any chance there is any air leak in the pump or in its connections, bubbles will be seen coming out of the pipe projecting downwards into the flowmeter. Bubbles will certainly come through here for a short while after starting up, but they should cease after the pump has been running for a minute or so. The tap should then be turned right off and the pump should stand without repeating for at least 15 seconds. If it repeats, the foot valve is not seating correctly.

The tap should then be turned on slightly to see if the pump idles satisfactorily, and that the outer rocker comes forward till it makes contact with the pedestal, and while it is in this position the tip of the blade should be pressed inwards gradually to reduce the stroke of the pump. However much this stroke is reduced, the pump should go on pumping normally until it fails altogether owing to there being no gap left. If instead of pumping it buzzes, it usually indicates excessive flexibility in the diaphragm. This, of course, is not likely to be experienced with a new diaphragm. The tap should

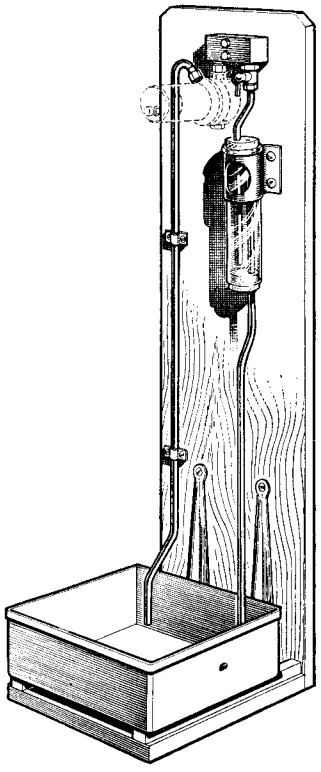


Fig. D.5.
A pump test rig.

then be turned on again and the pump tested on 8 volts, or on 4 volts if it is a 6-volt pump, and it should work satisfactorily under these conditions, although probably with a reduced output.

It is as well to let the pump run for ten minutes or so before carrying out these various tests. The cover, which is black for 12-volt and brown for 6-volt, should then be fitted and held in place with an ordinary brass nut and an insulated dome nut fitted on the end of the terminal. The voltage of the pump can always be identified by the colour of the sleeving on the coil ends, this being red, black or brown for 12-volt and green for 6-volt.

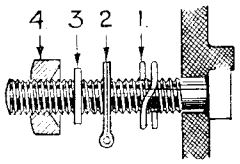


Fig. D.6.

The terminal assembly.

Note.—A special attachment is required for testing type " HP " pumps. This attachment is easily fitted and can be obtained through the usual channels.

TEST DATA

BRIEF TECHNICAL DATA FOR THE THREE BASIC TYPES OF S.U. FUEL PUMP

Figures quoted are for the single pump, but it should be noted that the dual editions of the "L" or the "HP" are the same, except that the maximum output is just over double.

Type	Recommended Mounting Position	Fuel Pipe Outside Diameter	Maximum Output gal./hour	Maximum Suction Lift (approx.)	Maximum Output Lift (approx.)
" L "	In region of engine, at approximately carburetter level . .	$\frac{5}{16}$ in. single $\frac{3}{8}$ in. dual	8 (36 litres)	48 in. (122 cm.)	24 in. (61 cm.)
" HP "	Amidships or over rear tank, at carburetter level or just below	$\frac{5}{16}$ in. single $\frac{3}{8}$ in. dual	10 (45 litres)	33 in. (81 cm.)	48 in. (122 cm.)
" LCS "	Amidships or over rear tank, at carburetter level or just below	$\frac{3}{8}$ in.	$12\frac{1}{2}$ (56 litres)	33 in. (81 cm.)	48 in. (122 cm.)

Section D.2

DEFECTS IN OPERATION

In the event of trouble, first disconnect the fuel delivery pipe from the pump. If the latter then works, the most likely cause of the trouble is a sticking needle in the float-chamber of the carburetter. Should the pump not work, disconnect the lead from the terminal and strike it against the body of the pump to see if it sparks and therefore if any current is available in the wire. If the current is there, remove the bakelite cover and touch the terminal with the lead. If the pump does not operate and the points are in contact and a spark cannot be struck off the terminal, it is probable that there is some dirt on the points. These may be cleaned by inserting a piece of thin 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 carburetter is depressed, the points fail to break, it is possible that there is either an obstruction in the suction pipe, which should be cleaned by blowing down it with a tyre pump, or something in the pump itself which is preventing a correct movement. This may be due either to the diaphragm having stiffened or to foreign matter in the roller assembly which supports the diaphragm. The diaphragm should therefore be removed, and the whole assembly cleaned and re-assembled in accordance with the instructions given in Section D.1.

If the pump becomes noisy, look for an air leak on the suction side. The simplest way to check up on this is to disconnect the fuel pipe from the carburetter and allow the pump to pump fuel into a pint can. If the end of the pipe is then submerged in the fuel and bubbles come through, there must be an air leak, and it must be found and cured. Noise can also be caused by fuel boiling before it gets to the pump. This occurs most particularly on cars on which the fuel pipe runs near the exhaust pipe, and this is usually noticed in hot weather when slowing down after having been driving hard. This trouble can often be overcome by using a different brand of fuel.

If the pump keeps on beating without delivering any fuel, it is possible that a piece of dirt is lodged under one of the valves. This can be remedied by removing the top lid and unscrewing the valve cage in order to examine both valves, in the case of the " LCS " pump, removing the outlet union in the case of the " L " or " HP " pumps and the valve covers in the case of dual pumps.

FORK FOR DIAPHRAGM STRETCHING. Material—Mild Steel

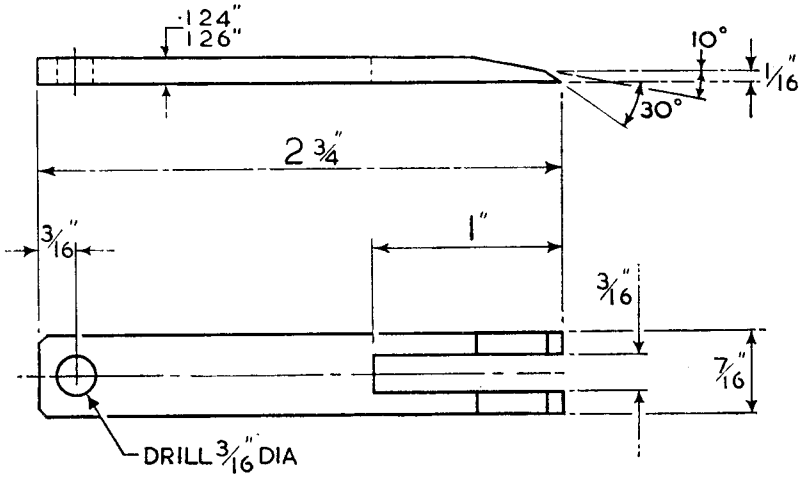


Fig. D.7.
Dimensioned sketch for manufacture of wedge.

A choked filter or an obstruction on the suction side will make the pump get very hot and eventually cause a failure. Make sure also that the six flange screws clamping the diaphragm are tight.

Section D.3

SPECIAL NOTE ON PRE-1938 PUMPS

On pumps issued prior to 1938 the cast-iron coil housing is not entirely suitable by itself for assembly with the neoprene (synthetic rubber) type of diaphragm.

In the past these coil housings were made suitable by an additional part, a thin white fabric distance ring, positioned between the diaphragm and the face of the coil housing, but these rings are no longer available, and all these "old" coil housings will be gradually withdrawn from service.

These old housings may be identified by measuring (fairly accurately) the distance from the large end, face down, to the edge of the second step. On the old housing this dimension is between ·193 and ·203 in. (4·8 and 5 mm.). On the current model it is deeper, and should measure between ·213 and ·223 in. (5·3 and 5·5 mm.).

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