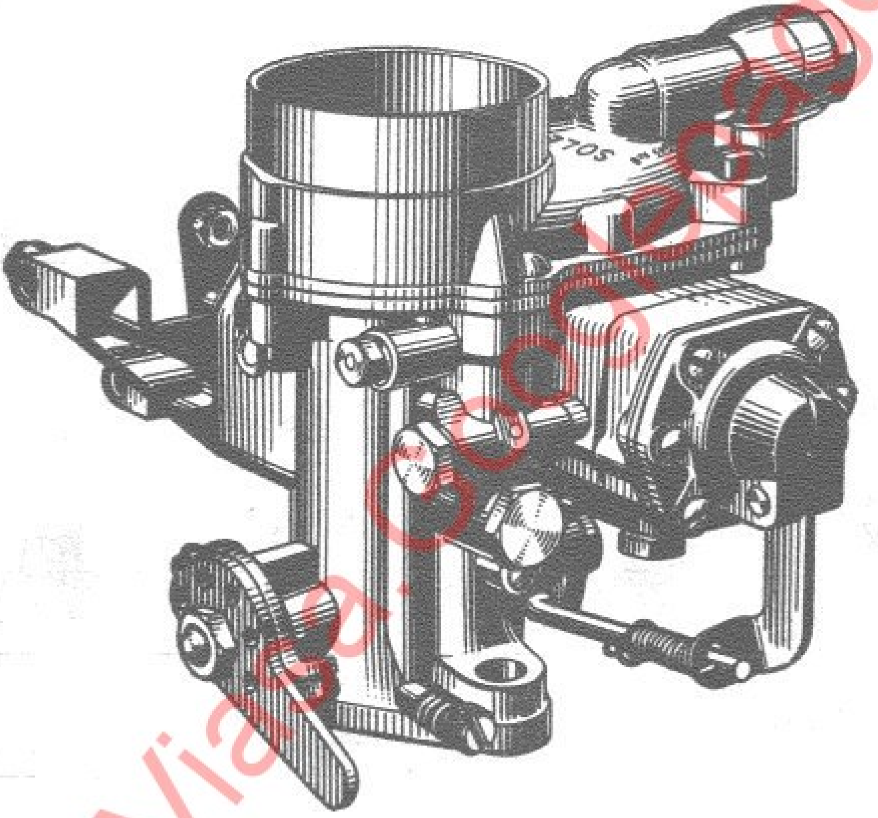
SOLEX

INSTRUCTION BOOK



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FOREWORD

This Solex instruction book has been compiled and published with a desire to assist mechanics both in South Africa and the Federation towards a better understanding of the functions of the Solex carburettors; to help you diagnose faults as they arise, and to make it as easy as possible to repair and recalibrate our products in your workshops. A study of this book will be well worth while, and its publication is the result of co-operation between our factory in England and our distributors in this country. We offer it to you in the hope that you will make good use of it and that it will help you to solve any problem you are faced with concerning Solex carburettors.

Identification of Carburettors

It is most important to identify any carburettor before attempting repairs. Once identification is certain it is then easy to order the correct replacement parts by part numbers. It would be advisable for all garages and service stations to order a complete Solex Manual from our nearest distributor. These Manuals are very reasonable in price and give you complete information concerning Solex products, including settings, lists for individual carburettors, jet sizes, together with make of automobile and carburettor model number. Solex carburettors have the model number on the body; for example, model 32 BIO is designed for the Standard Vanguard. The letter B indicates the carburettor is a B type, letter I means the unit is down draught, and 0 indicates the carburettor is fitted with a zero starter. The full list of these letters and their interpretation are as follows:—

- A. Bi-Starter.
- AT. Progressive Thermostarter.
- B. B Type Carburettor.
- C. Monobloc.
- D. Right Hand Carburettor.
- E. Economy Device.
- F. Diecast.
- G. Left Hand Carburettor.
- H. Horizontal Carburettor.
- I. Down Draft Carburettor.
- L. Bronze Throttle Body or Bronze Carburettor.
- IH. Semi-Downdraft Carburettor 45°.
- N. Non-Spillable.
- O. Zero Starter.
- OS. Offset 0° F Strangler.
- P. Pump.
- R. Governor.
- S. Self Starter.
- T. Thermostarter.
- V. Vertical Carburettor.
- W. Waterproof.
- X. Gas Carburettor.
- Z. Dust Proof.

It must be appreciated that a number of Solex carburettors having the same model number are designed to fit different makes of vehicles, however these carburettors are not interchangeable from one vehicle to the other. Therefore, in addition to the model number, each carburettor is given a specification number and it is this specification number which identifies the carburettor to a specific vehicle. In the case of the 32 BIO mentioned above for the Standard Vanguard, the specification number is S. 1545/0, therefore when ordering a new carburettor for this vehicle it would be necessary to quote 32 BIO/S. 1545/0 to ensure getting the correct carburettor. The specification number is not stamped on the carburettor, but this information is in the Solex Manual, so you will appreciate the importance of having a Solex Manual in your possession. This specification number is also printed on the cardboard carton in which the carburettor is packed for shipment at our factory. In case you have no manual, it is highly important when ordering carburettors to state the model number and the make and year of manufacture of the vehicle.

Repair Part Packages

We manufacture two types of repair part packages, the major package which contains everything to recondition the carburettor and the minor package which contains all the necessary jets and gaskets that are needed to ensure peak economy after 20,000 miles of operation. When ordering these repair packages it is necessary to quote the model number of the carburettor, the name of vehicle and year of manufacture, or, if you have a Solex Manual, quote the specification number which you will find in the settings list. We also market gasket sets, needles and seatings, etc.

Affect of Altitude on Carburettors

All carburettors are calibrated at our factory for sea level operatoins unless specified otherwise. Atmospheric air pressures decrease in relation to heights above sea level. This affects the mixture delivered from the carburettor, and the higher the altitude the richer the mixture becomes. This also affects economy and it is advisable to replace standard jets with one size leaner at altitudes above 4,000 feet. Care must be taken not to make the mixture too lean, otherwise loss of power and overheating of engine can result.

Economy

If Solex carburettors are calibrated correctly they dill deliver an economical mixture. In time, however, parts and jets wear, and all carburettors should be periodically dismantled and cleaned in some solution that will dissolve the gum and dirt that has accumulated, and all worn parts should be replaced. Our Solex Repair Part Packages are made up to assist you to do a good repair job on our products. If you remove the gum and dirt, use a Solex repair package and recalibrate the carburettor according to our specifications, the carburettor will again be in the same condition as it was when new. This repair job should be done at 20,000 to 25,000 miles if peak economy is to be maintained. It is false economy to replace old parts and jets, and the cost of these repair packages is more than compensated by the saving in petrol costs and the satisfaction of knowing the job has been well done.

Some Causes of Carburettor Flooding

Cause	*Remedy*
High float level setting	Adjust to specifications
High fuel pump pressure	Reduce pump pressure
Worn needle and seating	Replace with new needle and seating
Punctured float	Replace with new float
Dirt under needle	Fit fuel filter

Some Causes of Flat Spot on Acceleration

Cause	*Remedy*
Low float level	Adjust to specifications
Leaking pump diaphragm	Replace with new diaphragm
Leaking intake check valve	Replace with new valve
Leaking discharge check valve	Replace with new

Remember a flat spot is usually caused by a lean mixture.

When buying replacement parts for Solex carburettors insist upon genuine Solex material. The same care and attention in manufacture is given to replacement parts as is given to the manufacture of the original carburettor. We have a good organisation in South Africa and the Federation, and any one of our distributors will be happy to assist you at any time.

C. W. BROWN,

South African Factory Representative.

LECTURE

BY

S. N. LAING
Solex Ltd., London

Subject: SOLEX CARBURETTOR—HOW IT FUNCTIONS AND NOTES ON SERVICING

INTRODUCTION

The main purpose of this book is to describe the functioning and servicing of Solex carburettors.

There are, no doubt, many mechanics who know the carburettor fairly well. Others may not be so well acquainted. However, before going ahead we will take the opportunity of running through a little of the history and development of Solex.

Early in the 1900's, just about the same time as Henry Ford was making his first car, the Solex carburettor, vastly different to its present form, was designed and patented in France. Its success was almost immediate and it was adopted by the French motor industry which, at that time, was well to the front in automobile design, indeed, as it is today. Shortly after, Solex was introduced to Great Britain. And now, in addition to France and Great Britain, there are Solex factories in Germany, Italy and Spain, turning out a total of several million carburettors per year.

To date, more than 25,000,000 Solex carburettors have been made.

And now the carburettor. What it is and the duties it must perform.

In the first instance it must be regarded as a metering instrument and its very first duty is to meter quantities of fuel and air in certain proportions over the whole range of engine performance. This proportion of air and fuel is by no means a fixed quantity covering the whole range of engine speeds and loads. To obtain the best in terms of road performance and economy the proportion of air and fuel must be forever changing in order to suit the varying conditions encountered. Modern carburettors are designed to this end.

The proportion of fuel to air is called the mixture ratio and is generally expressed in terms of the ratio of air to fuel by weight.

Secondly, the carburettor must atomise or pulverise the fuel as it passes into the air-stream, so that evaporation takes place in the induction system. On no account must the carburettor be held responsible for the vaporisation of the fuel. It can usefully help to this end by good atomisation during delivery, but evaporation mainly will take place in the inlet tract, the complete evaporation of the heaviest fractions taking place in the cylinder itself.

It is quite safe to say that the general efficiency of an engine is dependent on the carburettor unit more than any other single component part. Its duties are substantial and its job of work a difficult one. Generally, it is little understood, yet it is invariably something with which to tinker, at which to swear and usually after which to despair.

The working day of a carburettor consists of having to cope with constantly changing speeds and loads common to road vehicle operation and, during all this, must handle accurately the fuel/air mixture requirement that the engine demands at the moment. The work is all the more difficult when it is realised that it is responsible for handling two mediums, namely, air and liquid fuel, one differing from the other very widely in density and inertia effects.

In spite of the high performance level of the present-day petrol-engine its economy and thermal efficiency still lag behind that of the compression-ignition engine. This is not due to any functional irregularity in the carburettor itself but rather to the substantial difference in compression pressures and the changing conditions of pressure, heat and pulsations under which fuel evaporation must take place; the three latter conditions having, no doubt, some adverse effect on the equal distribution of the mixture to the cylinders.

Before discussing the different conditions under which a carburettor is called upon to perform we will, at this stage, continue with some information on the servicing of Solex carburettors.

Notes on Servicing

The first and most important point to remember is that standard carburettor settings are the result of long periods of careful and analytical test work, both on the engine test-bed and during road-running, and are, therefore, correct to within very close plus or minus flow limits, whether the setting has been designed to emphasise the maximum power of the engine or to give the maximum in fuel economy.

Where servicing is required, then, it is very necessary to keep in one's mind the fact that the official carburettor setting is the best one and any change should only be considered as a very last resort. Further, it is absolutely essential to establish the cause of any reported trouble and not to assume that this or that jet is too small or too large and then proceed to make a jet change. After all, "weak" mixtures could be the result of a particle of dust lodged in a jet or, on the other hand, "richness" could result from, say, economy device diaphragm failure. And these points can only be found by careful investigation and examination of the carburettor.

Another important point to keep in mind is that an irregularity in the ignition system or a faulty engine fuel-pump can very often produce engine running conditions indicative of faulty carburation and, to save time and trouble, these points should be carefully checked before proceeding to make any sort of adjustment.

Like the carburettor, both the ignition system and the engine fuel-pump are specialised items and, because of the interconnected or allied nature of their work in relation to the carburettor and carburation, it will be found that most service stations and/or agencies are equipped to give specialised service and advice covering all three items.

During periodic examination of the carburettor, when it may be found that a gasket, needle-valve or volume-control screw requires replacing, it is advisable to take advantage of the Minor-repair and gasket sets which are available for this purpose. In this way, not only can the carburettor be easily maintained in sound working order, but lost time and inconvenience in waiting for a part or parts can be prevented by having the repair and gasket sets at hand.

Where the carburettor is seen to be worn no work should be undertaken in an attempt to restore it to its original satisfactory state by experimenting with different sizes of jets, etc. This cannot be done and such work will be found to have been wasted. It will be far more satisfactory and cheaper in the long run to fit a new carburettor.

Under normal usage, together with periodic maintenance checks and using the Minor-repair and gasket sets where necessary, satisfactory and efficient service will be given by the carburettor for up to some 30,000 miles. After this figure wear in the moving parts will start to interfere with the performance of the unit and it is at this point that replacement should be considered.

When fitted to the engine as a component part, the Solex carburettor forms a strong and robust unit capable of withstanding the constant vibration and periodic shocks common to engine and vehicle operation. On the other hand, like all precision metering or measuring instruments, it demands a degree of careful handling during the operations of dismantling, inspection and re-assembly, if it is to continue to give useful and satisfactory service.

Dismantling

Where a carburettor has been removed from an engine for external and/or internal inspection it should firstly be given a wash, irrespective of its degree of dirtiness, in some spirit, preferably petrol, before being placed on a thoroughly clean work-bench; the part of the bench to be used to be entirely free of other parts.

Should the carburettor be of three casting build, i.e., float-chamber cover, main-body and throttle-tube, it is advisable first to remove the throttle-tube, followed by the float-chamber cover, float gear and float. The remaining parts need not follow any strict order. Care, however, should be exercised in the case of pump-type carburettors. In this instance the small pump-circuit non-return ball/s should be removed from the channelling before up-ending the carburettor. This will prevent loss and possible inconvenience. The ball/s may be either of ground glass or steel. It is most important, however, that the parts, as they are removed from the carburettor, be placed in a suitably sized, clean and entirely empty container. In this way a complete check can be made of the parts, thus ensuring that the correct number will be at hand when re-assembly starts.

Examination for Wear

In the Solex carburettor, being of the open choke or "static" type, i.e., the air and petrol orifices are fixed, there are very few moving parts.

The most obvious point of wear is, of course, the throttle-spindle and its bearings in the throttle-tube. Illustrations 15 and 16 show examples of this form of wear. These are, however, extreme cases, but nevertheless, a slight sloppiness in these parts will pass a quantity of unregistered air which will adversely affect the idling and certain part-throttle conditions where the depression in the inlet-manifold is relatively high. A point worth mentioning here is that wear of this sort can be brought on prematurely by fixing a throttle-return spring directly on to the throttle-lever. This increases unnecessarily the load on the throttle-spindle and bearings and should be strictly avoided. By this method of return, wear can also take place in the throttle-tube itself, as show in figure 2. An extra return-spring, if found necessary, should be fitted on the throttle-control linkage well back from the carburettor.

Figure 3 shows another point of wear, that of the needle-valve. Apart from the part shown in the small circle it is most likely that the internal orifice seating will have undergone a similar degree of wear. This, then, will raise the float-chamber fuel level and, in turn, cause the fuel orifice to meter petrol in excess of requirements.

From illustration 16, figure 4, can be seen a distorted float-chamber cover. This condition can be brought about by carelessly tightening down one end of the cover and then proceeding to do likewise to the other end. The proper procedure is to tighten down each end a little at a time, thus bringing down the cover in a uniform manner, and then finally applying at each end the required degree of tightness. Apart from allowing a certain degree of fuel spillage due to vehicle vibration, this condition would tend to raise the fuel-level and, where an internally vented carburettor was concerned, enrich the mixture strength throughout the whole operating range.

Figure 5 shows a well used main-jet assembly. Its appearance, however, indicates that it has lain idle for some considerable time and also been subjected to dampness. Hence the white deposit covering most of its surface. In a case such as this, where the hexagon and feed holes of the carrier portion are in good condition, the deposit can be removed and the carrier only used again. The jet must not be put back into service. As the deposit has no doubt found its way into the metering orifice of the jet only a scraping operation would bring about its removal. And this must not be done. To scrape or probe the jet would seriously enlarge the orifice, thus causing rich fuel flows. A new jet would be required.

Figure 6 shows damage to the needle end of the volume-control screw. This should immediately be scrapped as the bent portion would damage the orifice and, secondly, prevent a satisfactory adjustment to the idling mixture.

In illustration 17, figure 8, can be seen damage to the top surface of a float. This, too, will cause a raising of the fuel-level with consequent alteration to the metering characteristics of the jet.

Figures 9 and 10 show the effect of carburettor flange distortion. Again, this condition will result from finally tightening down one end of the flange before any tightening effect has been applied to the other end, i.e., the flange should be brought down uniformly as described in the case of the float-chamber cover. Distortion can also take place by departing from the specified thickness of flange-washer and replacing it with a thicker washer of some soft material. In all cases where a thick washer is specified the material will be found to be very hard. In this case, then, for the purpose of sealing, a thin paper-like joint would be fitted to both top and bottom surfaces.

A distorted flange results in air-leakage which will cause loss of control of the idling speed and weakening of the mixture throughout the whole range of operation and particularly at part-throttle conditions. In severe cases the volume control screw and by-pass orifices can become distorted, together with a jamming effect on the throttle-valve.

Figure 11 shows wear on the starter-carburettor disc-valve. Although this could be termed a moving part it is not subjected to the almost continual movement of, say, the throttle-valve. Genuine wear, therefore, only takes place after a long period of service. However, since the disc-valve is spring-loaded on to the main-body starter face for the purpose of sealing, premature wear can take place where very small particles of dirt, carried along by the petrol, lodge between the two faces and are thus subjected to a grinding action. In the case where the grinding or scoring shows to some advanced degree there is every chance that a leak will occur between the inlet-manifold and starting system, when the system is supposedly out of action. It must be kept in mind that, when the engine is idling, the disc-valve is under a depression of some 17-19 inches of mercury. Figure 11 shows some such degree of wear.

Parts such as gaskets, face-joints, diaphragms, etc., should also be strictly checked for wear and where any sign of depreciation is seen replacement with a new part should be made, always bearing in mind that even a thin joint plays an important part in the correct functioning of the carburettor.

The illustrations just seen gave examples of wear in the extreme and must not be taken as a guide as to when replacement is necessary. The parts should not have been allowed to depreciate to such a degree and in such a case poor vehicle performance would have been reflected a very long time before that indicated by the illustrations.

Summing up at this stage, then, where any doubt exists regarding the suitability of a part it is always advisable to replace with new material. After all, the relatively low cost of carburettor parts will be outweighed many times over by restoring the carburettor, and, in turn, the performance of the vehicle to their original satisfactory state. And it is most important that any spare-part required should be of genuine Solex make and not of dubious or unknown manufacture. Genuine Solex spare-parts are as meticulously manufactured as the original equipment, which is as it should be in order that each and every part functions as intended.

RE-ASSEMBLY

Before this operation starts it is advisable to swill all metal parts in clean petrol, to be followed by blowing through the jets and channelling of the main castings with a pressure air-line (not necessarily of high pressure).

Of the three main castings, i.e., if the carburettor is of three casting build, it is advisable first to refit the float, float-gear, all jets on the top surface of the main-body and then the float-chamber cover. In this way the air-intake spigot provides a suitable surface on which to rest the carburettor for the purpose of refitting the throttle-tube. The remaining parts need not follow any particular order.

It is advisable, finally, to make sure that all jets, screws, etc., are properly tightened.

If the parts container is now seen to be empty it is fairly certain that all parts have been refiitted to the carburettor.

FAULT DIAGNOSIS

It is always advisable to, in the first instance, carefully consider any report regarding a carburettor fault.

In many cases an air-leak in some part on the engine side of the carburettor or an irregularity in the ignition system can make an engine behave as though the carburettor was at fault. With this in mind, then, a careful examination should first be made on all pipe-work and unions together with a check on the ignition system.

However, for the purpose of this discussion, it must be assumed that the carburettor is at fault.

For example, then, when a report states that the vehicle performance is unsatisfactory due to weak mixture it must not be assumed that the main-jet or pump-jet is too small and therefore requiring a larger size jet. It must always be kept in mind that standard carburettor settings are correct to within very close plus or minus flow limits and where the carburettor is now unsatisfactory the reason must be that something has caused the carburettor to go wrong.

In the majority of cases, where "weakness" is reported, the cause is a particle of dirt lodged in the jet/s, particularly so where the idling jet is concerned, it being the smallest metering orifice in the carburettor. Since, in most cases, all petrol jets in the Solex system are accessible from the outside it is quite a simple matter to remove one or all of the jets for examination and blowing through with an air-line if thought necessary.

In a number of cases weak mixture has been traced to the carburettor flange nuts having loosened back, thus causing an air-leak. Or, the filter (if fitted) in the float-chamber banjo feed-union becoming clogged and restricting the flow of petrol to the float-chamber.

On the other hand, "richness" in the fuel/air mixture can be brought about by a particle of dirt lodging between the needle and seat of the float-chamber needle-valve, thus causing the needle-valve to lose control of the fuel-lever. Other causes may be due to leaking pump and/or economy device diaphragms or a slightly fractured float.

In fault-finding it is advisable to first ascertain, as closely as possible, the point on the vehicle operating range that is being adversely affected. This helps in some measure to narrow down the field of investigation and to provide a starting-off point. Finally, as stated earlier, it is often very rewarding to hold a fairly wide view of any query, even to including the source of petrol supply, namely, the main fuel tank.

The following general points are of every day importance:—

(*a*) *Volume-control screw.*—The purpose of this screw is to allow adjustment to the idling or slow-running mixture, in accordance with the demands of the engine. Clockwise rotation of the screw will effect "weakness" in the mixture strength and vice versa.

(*b*) *Slow-running screw.*—This screw is located in the throttle-spindle abutment-plate and is used in conjunction with the volume-control screw. Clockwise rotation will open the throttle-valve and vice versa, thus increasing and decreasing the idling speed.

(*c*) Under the starter-carburettor system it is essential that a cold engine be started with the throttle-valve set as for normal idling.

(d) Pressure of fuel to the carburettor should not exceed 2½ lbs. per sq. in.

We can now move on to the carburettor proper and describe how it carries out the functions of:

(*a*) Starting the engine.

(*b*) Slow-running or "idling".

(*c*) Part-throttle operation.

(*d*) Full-throttle operation.

(*e*) Acceleration.

These five headings are, broadly, the stages under which a vehicle operates.

First, starting the engine.

In order to start a cold engine under cold atmospheric conditions it is necessary to obtain a fuel/air mixture much richer than normal. This comes about by the fact that the lower the engine temperature the lower will be the pressure of the fuel-vapour in the manifold and consequently a smaller amount of fuel will be evaporated in a given time. A richer mixture therefore is required to ensure that sufficient volatile fractions are present in the fuel to cause the engine to fire and continue running. It is well to remember that a cold engine and low air temperature provide conditions that are the exact opposite to those which are conducive to good carburation under normal running conditions.

In this direction, then, the Solex carburettor usually employs a system called the "starter carburettor". This is a small, self-contained unit forming part of the main-body of the carburettor. In this way, apart from being supplied with petrol from the float-chamber, it carries its own petrol and air jets and can be said to be entirely independent of the main carburettor setting.

Today there are four versions in use. For the purpose of everyday reference they are called:

(*a*) Bi-starter—(manually operated).

(*b*) Zero-starter—(manually operated)

(*c*) Progressive starter—(manually operated).

(*d*) Auto-starter—(thermally operated).

Broadly speaking, all four types depend, basically, on the rotation of a disc-valve for the supply and regulation of the mixture to the engine.

At this juncture it would be advisable to state clearly that, as the commencement of flow of air and petrol depend on depression on the engine side of the throttle-valve (depression being created by the piston displacement), a cold engine in particular must be started with the throttle-valve in the position as set for idling.

We can now show a diagrammatic view of the Bi-starter, illustration 1. This starter has two operating positions, i.e., the control knob on the car dashboard is pulled fully out for the initial start (full-rich position) and pushed back approximately half-way (mid-position) for warming-up running.

The illustration shows the path of the petrol from the float-chamber, through the starter jet (G.S.) and into the starter-carburettor via a channel in the starter casting-face and the disc-valve. Air enters the starter-carburettor via the air-jet (G.A.), the mixture then leaving the starter-carburettor on its way to the engine via orifice C (in the disc-valve) and the channel leading down to below the throttle-valve. At the moment of the engine firing and running the mixture is automatically weakened by the entry of air through the atmospheric air-bleed well, situated on the top of the starter-jet. The half-way position provides a further weakening of the mixture by virtue of the disc-valve rotating and so bringing into line a smaller orifice (in the valve) to match up with the petrol feed channel in the starter-face, together with an increased quantity of air passing through the air-jet.

This starter lay-out should give satisfactory engine starting under temperature conditions down to around 20°F. It should be kept in mind, however, that satisfactory cold-starting is not the total responsibility of the starting system. A great deal depends, amongst other things, on inlet-manifold lay-out, shape and size of valve-porting and spark-plug position.

The second illustration, No. 2, shows the zero-starter.

This lay-out was designed to give ease of starting down to 0°F. and possibly slightly below, i.e., say, minus 5°F. to minus 10°F.

Again the disc-valve (CC) is used. The petrol path from the float-chamber and the ultimate mixture path to the engine can be seen to be similar to the Bi-starter. The main difference here is the addition of an air-valve (T). This is of disc form and is lightly spring-loaded for the purpose of sealing off the air port during the initial cranking period. In this way very little air enters the starter-carburettor, thus providing means of obtaining a very rich mixture. At the moment of engine firing and running the increased manifold depression is transmitted to the air-valve which, being subjected to atmospheric pressure on the opposite side, is moved along its spindle and away from the air port, thus allowing air, through the jet (G.A.), to enter the system and combine with the petrol issuing from the feed orifice. The mixture then following the path as shown, i.e., feeding into the engine at a point below the throttle-valve. As with the Bi-starter, an automatic weakening of the mixture takes place by air entering through the atmospheric air-bleed. In some instances the Zero-starter carries two air-jets. This is to permit a large air-flow so that sufficient power can be developed to overcome the quite substantial resistance set up within an engine when subjected to some 30 degrees of frost. The Zero-starter also uses two operating positions, full-rich and mid-position.

The next illustration, No. 3, shows the Progressive-starter.

This is a rather comprehensive lay-out, combining as it does the Zero principle, together with the means of providing a fast-idle action, quick drive-away function and a progressive action of the starter system, as its name implies.

Here again the disc-valve and lightly-loaded air-valve are used, their function during the starting of an engine being identical with that described under the Zero-starter.

The fast idle condition was introduced in order to prevent engine-stalling during the warming-up period.

It will be appreciated, for obvious reasons, that it is advisable quickly to dispense with that part of the starting system which provides the rich mixture for the initial start. At the same time it will be realised that an engine cannot be expected to run satisfactorily at the normal idling speed and mixture strength when the general engine temperature has hardly started to rise.

By admitting air, then, to the starter system through channel (Z), situated near the discharge end of the main choke-tube, a mixture is formed by petrol issuing from the main-feed orifice and passing through a small orifice in the slightly modified disc-valve. In this way, a suitably proportioned mixture is obtained to cause the engine to idle at a higher rate than normal, thus preventing stalling of the engine when the vehicle is made to stop soon after making the initial start, i.e., when the engine temperature is still very low. The mixture discharges into the engine through the normal starter outlet. The range of fast-idle speeds is selective, i.e., any suitable speed can be found by progressively pushing in the starter-cable control-knob on the dashboard of the car from around about mid-travel to the off position. As the control-knob approaches the off position so the speed of the fast-idle is reduced.

The quick-drive-away function allows the vehicle, with the starter-carburettor in any operative position, to be driven away immediately after the engine has been started under cold conditions. In this instance channel (Z) feeds mixture to the engine in the opposite direction to the arrows shown. This will readily be appreciated when the action of the throttle-valve is considered. On opening the throttle-valve to drive away, the point of maximum depression moves away from the engine side of the valve and approaches the area of the main choke-tube; thus bringing channel (Z) under depression and consequently the mixture feed to the engine as described.

The progressive action of the starter-carburettor is as its name implies. A progressively weaker mixture is obtained immediately the starter-lever moves away from the full-rich position and travels towards the off-position.

The condition under which this is effected may be described as follows:—

While running on the full-rich position of the starter-carburettor the petrol jet (G.S.) is under maximum communication with the inlet manifold and it can be said that the petrol flow is metered in accordance with the degree of depression acting on the jet.

Now, since the disc-valve (dd) and air-valve (T) are mounted on the starter-lever spindle any movement of the lever, say, a few degrees towards the off-position, will reduce the communication between inlet manifold and petrol-jet, i.e., the area through orifice (C) will have been reduced and the large orifice (H) in the disc-valve will have partially moved away from petrol feed-channel (D); this communication gradually being taken over by a smaller orifice. And, since the air-valve (T) has also been rotated, an increase in the inlet area through the valve will permit an increase in the air supply to the starter-carburettor.

The result of this will be a weakening of the mixture strength; the petrol flow having been reduced by the combination of reduced communication and, therefore, depression on the jet and the entry of additional air. And under this condition the control of the metering of the petrol will have passed from a function of depression, as previously, to a static-head effect above the jet.

The process of progressively decreasing mixture strengths will continue as the starter-lever moves nearer the off-position; the metering of the petrol continuing under the orderly control of a gradually decreasing static-head effect.

At a point, then, just before the off-position, the petrol, due to its greater density and a state of equilibrium taking place between the petrol levels in the float-chamber and starter well, will gradually cease to flow, leaving only a wisp of air to flow through the emulsion orifice connecting the atmospheric air-well and the petrol starter well. Any further movement of the starter-lever in the off direction will then put the starter-carburettor out of action, leaving the running of the engine under the control of the throttle-valve as set for normal idling.

The small spring-loaded ball used in conjunction with the starter-lever for the purpose of indicating mid-position on, say, the bi-starter need not be used on the progressive starter. Its presence could be termed a refinement inasmuch as it quickly locates the mid-position should the atmospheric conditions allow a cold start to be made in that position or, alternatively, quickly indicates the mid-position immediately after making a start in the full-rich position.

And, finally, the Auto-starter. Illustrations 18, 19 and 20.

This lay-out provides to the starting system a means of automatically controlling its action. Thus the driver is relieved of the necessity of putting the starter in and out of action.

Here again the rotating disc-valve controls the supply and regulation of mixture to the engine. In this case the spindle of the disc-valve is attached to a bi-metal spring which is enclosed in a thermally-sealed chamber. One end of the spring is attached to the chamber in such a way that an increase in temperature allows the spring to expand and turn the disc-valve in a rotary movement. Heat is conveyed to the spring-chamber by means of atmospheric air passing through a U-shaped Inconel tube which is located in the exhaust manifold. As the temperature in the manifold increases so does that of the air passing through the tube and it is this gradual increase in temperature which progressively expands the spring and in turn rotates the disc-valve until the ports in the valve pass the ports in the starter-face, thus causing the starter-carburettor to go out of action. The passage of warm air is brought about by the depression in the inlet-manifold being transmitted through a small orifice which connects up with the spring-chamber. This air ultimately feeds into the engine.

On one carburettor which uses the Auto-starter the means by which the initial rich-mixture is obtained is by a depression operated diaphragm-valve which closes and opens the main starter-well to the atmospheric air.

In another case the flow of rich mixture comes under the control of a small spring-loaded piston. With the engine stationary, or during the initial cranking to start, the piston uncovers a fairly large petrol orifice which is directly connected to the main starter-well. At the point of firing and running the resultant inlet-manifold depression assists the downward movement of the piston which then covers the petrol orifice, thus causing the petrol to flow through a smaller orifice and thereby weakening the mixture.

When fitting a carburettor carrying an Auto-starter it is advisable to locate the heating element ("U" tube) as near as possible to the carburettor. In this way the heat losses between the heating element and the spring-chamber are reduced to a minimum.

The volume of mixture handled by an Auto-starter is controlled by an orifice in the disc-valve. This can be a maximum of 6.0 mm. diameter. There is no adjustable GA jet.

The period of time over which the Auto-starter operates is variable and can be controlled in three ways, namely:—

(*a*) The length of Inconel tubing exposed to the exhaust gases. A short length will keep the starter in operation over a long period and vice versa.

(*b*) Weight of air flowing through the heating element ("U" tube).

During the initial experimental tests to establish a suitable time period of operation this weight of air is controlled by an adjustable air-bleed orifice screwed into the atmospheric end of the Inconel tubing. By reducing the size of the orifice a lengthening of the time period of operation will result.

On establishing a suitable size of orifice the adjustable jet at the end of the Inconel tubing is dispensed with and replaced by a corresponding size of orifice within the carburettor body itself. From the illustration can be seen the location of the orifice and, in this way, the warm air from the spring-chamber can pass into the engine.

(*c*) The length of tubing between the heating element and the carburettor. A reduction in the length of this tubing will reduce the period of operation.

Before finishing with the starter system it should be pointed out that the starter-carburettors are not interchangeable one with the other. For example, the orifices in the disc-valve of a progressive-starter match-up, at certain positions of the starter-lever, with orifices in the main-body starter-face. And this can only be true where the carburettor has been machined to use a progressive starter. In other words, a progressive starter must not be fitted to a carburettor initially intended to employ a Bi-starter.

Having started the engine we can now move to the function of idling.

Next to the rich-mixtures necessary for starting from cold, the function of idling calls for the richest part of the operating range under running conditions. This is due to several factors, the chief of which is the high percentage of residual gases left in the cylinder head. This, together with the low compression pressures under idling conditions, produce slow and irregular combustion unless a quite substantial enrichment of the fuel/air mixture takes place.

Smooth, low-speed idling is dependent on a number of factors other than adjustment to the carburettor. These may be:—

(*a*) Sensible mixture distribution to the cylinders.

(*b*) Spark-plug location.

(*c*) Width of spark-plug gap.

(*d*) Shape of the cylinder head.

(*e*) Valve timing.

As will be appreciated, the throttle-valve during idling always takes up an almost closed position, whereby a great pressure difference is obtained across the valve. In this way the density or weight of the mixture to the engine is of a very low value, thus producing the very low power required for idling the engine.

Under this throttle-valve position, however, there exists almost a total lack of air velocity and, consequently, depression at the choke-waist, and because of this no delivery of fuel mixture from the main discharge is possible. Under such a condition, then, the engine would completely fail to run. This point, however, is overcome by taking advantage of the low pressure or depression area which exists on the engine side of the throttle-valve when near the closed position to cause fuel mixture to flow through a path called the slow-running or idling circuit which terminates at a point below the throttle-valve.

The Solex idling circuit can be either of the Mono-jet or Bi-jet principle. The illustration No. 4 illustrates the Mono-jet system under working conditions. The fuel path can be traced from the float-chamber, through the main-jet and into the main discharge well. From a point near the bottom of the well the fuel flows in an upward direction through channel (CL) to connect with the metering orifice of the idling or pilot jet. On passing through the metering orifice the fuel, now mixed with air, passes down channel (CN) to the volume control-screw (W), at which point the mixture discharges into the engine. As will be seen, the point at which the petrol flows through the metering orifice is also the point at which the petrol mixes with air passing through an air orifice, called the pilot-air-bleed jet (U). The mixture, on its downward path and at a point just before passing through the volume control-screw, meets with additional air passing through an orifice termed the by-pass, thus increasing further the emulsification of the mixture.

The main purpose of the by-pass orifice, however, is to act as a mixture discharge to the engine when the throttle-valve has been moved away from the idling position as would happen when, say, the vehicle is driven away. The dotted throttle-valve shows this condition. This mixture discharge, then, ensures that the engine will accelerate smoothly at the critical condition between fade out of the mixture issuing from the volume control-screw, due to the opening of the throttle-valve, and sufficient flow of mixture from the main discharge to maintain smooth running of the engine.

The Bi-jet system is, generally, very similar. The difference here, however, is that the petrol from the float-chamber feeds directly to the pilot-jet instead of first passing through the main-jet. Briefly, this system is used on, say, single or twin-cylinder engines whose induction pulsation effects are such that a small-sized main-jet is called for at full-throttle running and which may be too small for satisfactory part-throttle operation. In other words, the pilot jet of a Bi-jet system continues in operation over a very wide part-throttle range and thus assists the main jet in this respect.

From idling we now pass on to part-throttle operation.

Since the majority of road running is carried out under part-throttle conditions, i.e., any throttle position between idling and full-open throttle, it is this part of the carburettor range to which attention must be paid if economy in fuel consumption is to be obtained.

From illustration No. 5 we can see a plain carburettor, i.e., no pump or economy device fitted, operating at a part-throttle condition. In this case the mixture to the engine is under the control of the choke-tube, main-jet, air-correction jet, emulsion tube and, of course, the throttle-valve. The arrows indicate the intake of air which is metered to the engine by the choke-tube (K) to a value dependent on the size of the choke-tube and the pressure difference acting across the waist of the tube. This difference in pressure is that of atmospheric air and the depression brought about by the induction displacement of the engine pistons. The fuel path can be traced from the float-chamber to the main-jet (G) where it is metered in accordance with the depression existing in the waist of the choke-tube and the combined correction value of the air-correction jet (a) and emulsion tube (et).

For most four-cylinder engines this type of carburettor would be found satisfactory. As far as part-throttle fuel economy is concerned this is derived from an inherent factor of the four-cylinder engine itself. And this inherent factor is the induction pulsation effect transmitted to the choke waist and in turn to the fuel metering orifice and which is at maximum value when running at full-throttle. In most cases the effect of a pulsating air-stream past the jet orifice is to enrich the fuel delivery per unit quantity of air than if the same quantity of air was metered through the choke under a steadier flow such as, say, through a similar carburettor fitted to a six-cylinder engine of the same swept volume and, of course, running under similar conditions. This means that at a given full-throttle condition the fuel metering orifice of the four-cylinder engine would be slightly smaller than that of the similar sized six-cylinder unit. And at part throttle some economiser action could be expected by virtue of the partially opened throttle-valve damping out much of the pulsation, thus making the air-flow over the fuel discharge orifice relatively smooth.

It is usual to find, on six-cylinder engines, a carburettor employing an economy device which permits the part-throttle range to be as weak as is consistent with smooth and satisfactory running of the engine, while maintaining satisfactorily the full-throttle requirements.

On Solex carburettors this device can be either depression or mechanically operated. Briefly, the circuit permits the flow from the main-jet which has been found satisfactory for part-throttle running, to be augmented by a flow through a suitably calibrated jet at about, say, 80% load capacity and which remains from that point onwards throughout the full-throttle range.

Illustrations 6 and 7 show both the depression and mechanically operated versions. Unfortunately, illustration 6 shows the depression operated unit operating at full-throttle conditions, which will be described later. The petrol flow, however, can be traced from the float-chamber to a non-return valve (Ci) and then to a chamber (Pc). Imagining, then, the throttle-valve to be at a part-throttle position. In the inlet manifold there would exist a fairly high degree of depression which would be transmitted via channel (d) to the depression chamber (Dc) where it would act on the double diaphragm (Mn). Under the depression the diaphragm would move to the left, thus closing the cup-valve (H) on to its seating. The valve can be seen attached to the diaphragm spindle. The petrol path between chamber (Pc) and jet (GP) would now be closed, thus preventing a flow through jet (GP).

We have, then, an economy type carburettor operating at part-throttle in a similar manner to that of the plain carburettor described earlier, i.e., the mixture to the engine being controlled by the choke-tube, main-jet, air-correction jet, emulsion tube and, of course, the throttle-valve.

From illustration 7 we can see the layout of the mechanically operated version. Here the carburettor is operating at the idling condition. Again the petrol path can be traced from the float-chamber to a non-return valve (Ci) and then to a chamber (Pc). As will be seen, the petrol path between chamber (Pc) and jet (GP) is under the control of a spring-loaded ball which is operated by diaphragm spindle (S) when sufficient throttle-valve movement has been made. The interconnecting linkage between throttle-spindle and the operating diaphragm can be seen. Also seen in the layout is a second jet (Gu). It is fed from chamber (Pc) and its position in the circuit by-passes the spring-loaded valve. The flow from this jet first passes through jet (GP) before discharging into the waist of the choke-tube via injector pipe (i). It is called an economy jet. Its purpose is to allow of a very fine adjustment to the part-throttle mixture strengths. An instance may be as follows:—

Assuming that a main-jet and pump-jet (GP) have been established for full-throttle running and that at part-throttle the main-jet was found to be too small for satisfactory operation. By fitting, then, a small size economy jet (Gu) the part-throttle mixture strengths would be enriched slightly without interfering with the full-throttle requirements. As stated earlier, the economy jet by-passes the spring-loaded economy-valve and in doing so flows in parallel with the main jet.

This jet can also be fitted to the depression operated economy device.

Illustration 8 shows a combined version, i.e., a depression operated economy device and a mechanical accelerating pump.

The function of the depression operated section is as described on illustration 6. The depression in the inlet manifold at part-throttle is transmitted via channel (d) to the depression chamber (Mn) and causes it to move to the left. In doing so the spring-loaded economy valve (Bv) takes up the closed position, thus leaving only the main-jet for part-throttle running.

The mechanically operated section ensures a ready fuel discharge through injector pipe (i) for acceleration purposes at any degree of throttle movement.

Illustration 9 shows a layout which gives the opposite effect, at part-htrottle, i.e., instead of shutting off fuel, it discharges fuel at this throttle position.

This sort of treatment would very likely be required where the induction pulsation effect is pronounced at the choke-waist, such as on a single or twin-cylinder engine, or maybe a six-cylinder engine using two or three carburettors.

As described earlier, the effect of a pulsating air-stream past the jet orifice at full-throttle is to cause a certain degree of richness. This being so, the main-jet, which has been found satisfactory for full-throttle running, now proves too small for part-throttle operation, due to the position of the throttle-valve damping out much of the pulsation effect. Hence the need for part-throttle enrichment. As the action of the valve (H) is reversed so that fuel flow through it will be shut off at full-throttle.

Having cruised at part-throttle we can move on to full-throttle operation and the function of acceleration.

At full-throttle the point of lowest pressure throughout the whole induction system is at the waist of the choke-tube and it is at full-throttle that the maximum weight or density of mixture passes the throttle-valve to allow the engine to develop its maximum power at the speed at which it is running.

In order to bring in the function of acceleration we can imagine that the throttle has been snapped open from any part-throttle condition just described.

The plain carburettor, i.e., no pump or economy device, as shown on illustration No. 5, would look like illustration No. 10. Here the throttle-valve is fully open and the maximum weight of mixture is passing to the engine, according to the particular speed at the moment. The fuel mixture for power throughout the full-throttle range is again under the control of the choke-tube, main jet, air-correction jet and emulsion tube.

At the moment of snap-opening the throttle fuel would be discharged from the main well for the purpose of acceleration (more will be said about the well later). The ability of a four-cylinder engine to accelerate without any special means of injecting a discharge of petrol derives from the pumping action on the fuel orifice brought about by the pulsating air-stream at the waist of the choke-tube and from the usually short inlet manifold.

Where a four-cylinder engine has been tuned to give absolute maximum power there is a chance that flexibility at low speed full-throttle and some part-throttle condition would be quite unsatisfactory, due to a low mixture velocity, stemming from the necessarily large size of choke-tube.

In this case an accelerating pump, as shown on illustration 11 would be of assistance. The layout is mechanical and on moving open the throttle diaphragm (Mn) is displaced to force petrol through jet (GP) and in turn injector pipe (i). As will be seen, the injector pipe is in a high pressure area and not subjected to choke-tube depression. In this way the flow of petrol ceases after the throttle movement has been made.

On the economy type carburettors, as fitted to six-cylinder engines for example, the fuel mixture for acceleration and full throttle operation is supplied simultaneously by the unit which, up to the present has been called an economy device, and which now takes on the additional duties of an accelerating pump.

From illustration 6 we can see the depression operated pump with economy device in action at full-throttle. It will be recalled that, at part throttle and a fairly high degree of depression in the inlet manifold, valve (H) was on its seating and the running of the engine was being carried out on the main jet only. On opening the throttle to the fully-open position, then, the manifold depression drops to a value where the pump-spring (Sp) suddenly expand and quickly displaces the double-diaphragm, thus forcing petrol through jet (GP) and channel (i) and finally into the bottom of the main well. This action causes the level of the petrol in the well to rise suddenly for a very brief moment and, in doing so, supplies a quick discharge of fuel to the engine for the purpose of acceleration. Assuming the throttle-valve to remain in the open position the full-throttle mixture requirements will then be met by the petrol passing through the main jet and pump jet (GP) according to their calibrations and the depression existing in the choke waist, together with the metered air passing through the choke-tube.

A similar state of affairs exists where the combined mechanical and depression operated unit (illustration 8) is concerned. A difference here being the discharge of petrol from pump jet (GP) passing through an injector pipe (i), the discharge end of which is situated in the choke waist.

A further example of the injector-pipe type of discharge can be seen on illustration 12. As will be seen, the system is depression operated.

From illustration 7 can be seen the mechanically operated version.

Although the means by which the diaphragm is displaced and the point of delivery of petrol from pump jet (GP) differ from that of the depression operated version the duties in both cases remain generally similar.

From an acceleration point of view it is possible that the injector pipe discharge lends itself to a more direct form of delivery, and where the inlet manifold is fairly long this may be an advantage.

Another difference between the two types may be described as follows:—

With the mechanically operated system the opening of the economy-valve is entirely dependent upon the throttle position, irrespective of engine speed and load.

In the case of the depression operated version the functioning of the economy-valve relies entirely upon manifold depression. Since the depression is a function of both speed and load the system will operate when the manifold depression falls to a certain degree irrespective of throttle position. In other words, when a vehicle is climbing a hill and the gradient is such that the engine revolutions are reduced for any given throttle opening the valve will operate and enrich the mixture passing to the engine. In this way the dictates of the engine, as far as fuel is concerned, are followed more closely. A great deal depends, however, on the characteristics of the engine whether an automatic or mechanical means of operation is used.

At this point, then, we have passed through, in a broad sense, all the stages of operation, i.e., from cold-starting to full-throttle operation.

Function of the Float-chamber and Associated Parts

Generally speaking, the float-chamber is a part of the carburettor that is taken for granted. Too often it is taken as being just a space in which to hold a quantity of petrol. This, of course, is true, but only to a small degree. When studied carefully it will be found that the float-chamber and its associated parts play a very important part in the proper functioning of the carburettor.

In the science of Hydraulics (and the carburettor is a good example of this science) a quantity of liquid standing above a jet orifice, and therefore exerting a certain pressure on the orifice, is called a static-head. And for any reduction in pressure at the other end of the orifice a flow of liquid through the orifice will take place.

This, then, is the first duty of the float-chamber and its parts, that of holding a quantity of fuel at a certain predetermined level above the fuel metering orifice.

Illustration 13 shows two types of float-chamber. In both cases fuel is fed to the float-chamber feed-union, either by gravity or mechanical pressure means, and enters the float-chamber via the needle-valve (NV) orifice. During the initial flow of fuel into the chamber the float, due to its weight being less than the weight of the volume of fuel it displaces, will become buoyant and will be carried upward as the fuel continues to enter the chamber. On contacting the needle-valve the float will be resisted in its upward movement by the effective head of fuel acting above the needle-valve orifice and fuel will continue to enter the chamber. This condition will cause a gradual submersion of the float until such time as the pressure of the displaced fuel causes an upward thrust on the float capable of balancing the effective head of fuel above the needle-valve orifice, thus allowing the needle-valve to shut off the flow of fuel to the chamber.

It will be appreciated, for obvious reasons, that the fuel level in the chamber must stand at a certain distance below the fuel discharge outlets and, while the initial calculations ensure that this will be so within close commercial limits, any slight final adjustment to the level can be made by altering the thickness of the fibre washer (FW) fitted to the needle-valve. Washer thicknesses available for this purpose are 1.0 mm., 1.5 mm. and 2.0 mm.

An outstanding point with regard to the Solex float-chamber is the simplicity by which the correct fuel-level is determined. Unlike other more complicated makes, where the fuel-level is established by a process of float-arm adjustment and the use of a special gauge, the Solex fuel-level is governed simply by the float-chamber cover (initial machining dimension determining the height of needle-valve), float, needle-valve and needle-valve fibre-washer and if these are correct to specification then the fuel-level will be in order. Any slight final adjustment, as stated earlier, can be carried out by altering the thickness of the fibre-washer.

The size of the needle-valve seat is of great importance and is related to the fuel flow requirement at peak R.P.M. and to the type of fuel feed in use.

In the case of gravity feed the needle-valve would be subjected to a pressure of, say, 0.60 to 0.65 lb. per sq. in., while under mechanical pump feed the pressure would be in the region, in most cases, of 2.0 to 2.5 lb. per sq. in. In the first instance, then, the needle-valve orifice would be required to be on the large side since the low pressure could be balanced by the upward thrust of the float and the orifice would be sufficiently large to pass the fuel flow at maximum R.P.M. Under mechanical pump feed a small orifice would be recommended as the upward thrust of the float remains unchanged but the pressure on the needle-valve and, consequently, the float, is greatly increased and unless the size of the orifice is carefully chosen, flooding will undoubtedly occur.

On the other hand, too small an orifice under gravity feed, might lead to fuel starvation at peak R.P.M.

A point that should be kept in mind is that the effective head of fuel above the needle-valve orifice has quite an effect on the fuel in the float-chamber, even although no flooding occurs.

Float-chambers can be either externally or internally vented, i.e., the surface of the fuel in the float-chamber can be either subjected truly to the prevailing atmospheric pressure in the case of external venting or, in the second case, to the pressure obtaining in the air-intake area of the carburettor which, under certain conditions of running, will be just slightly less than the true value, but can be assumed, for all practical purposes, to be at the prevailing atmospheric pressure.

Today, almost all carburettors use the internal venting system. Apart from ensuring that all air to the carburettor passes through the air-cleaner, its main advantage is that the fuel-air mixtures remain unaffected under progressive clogging of the air-cleaner by dust and foreign matter.

As far as the float mechanism is concerned it will be seen from figure 1 that the float acts directly on the needle-valve and exerts a certain pressure on the seating.

Figure 2 shows the float acting through a leverage and, in this way and for a given size of float-chamber and float, an increased pressure is transmitted to the needle-valve seating, thus enabling the system to cope with, say, any slight increase in the effective head of fuel acting above the needle-valve orifice. Or, on the other hand, the leverage provides a means of obtaining a similar needle-valve pressure as figure 1, with the use of a smaller chamber and float.

Accelerating Well

If, after a period of low speed, light-load running, the throttle is suddenly opened to accelerate the engine, the following conditions will arise.

The low pressure condition existing in the inlet-manifold during the light-load running will be suddenly exposed to atmosphere, resulting in a momentary rush of air at high velocity through the choke-tube. Immediately after the initial rush the velocity will then follow the pumping rate of the engine pistons which, under the circumstances, will be of a low value. In the meantime, the fuel, by reason of its greater density, its surface tension relative to the metal of the discharge orifice and near negative head acting across the jet, will be unable to follow immediately the first rush of air through the choke-tube, resulting, for a few revolutions of the engine following the opening of the throttle, in a charge of mixture too weak for satisfactory combustion.

This sort of condition could be overcome by placing a quantity of petrol between the throttle-valve and discharge orifice and above the constriction of the fuel metering orifice. In other words, a well of petrol.

Hence the Solex well for acceleration.

Described simply, it could be said to be similar to a "U" tube manometer where one arm of the "U" is open to atmosphere and the other to a point of lower pressure.

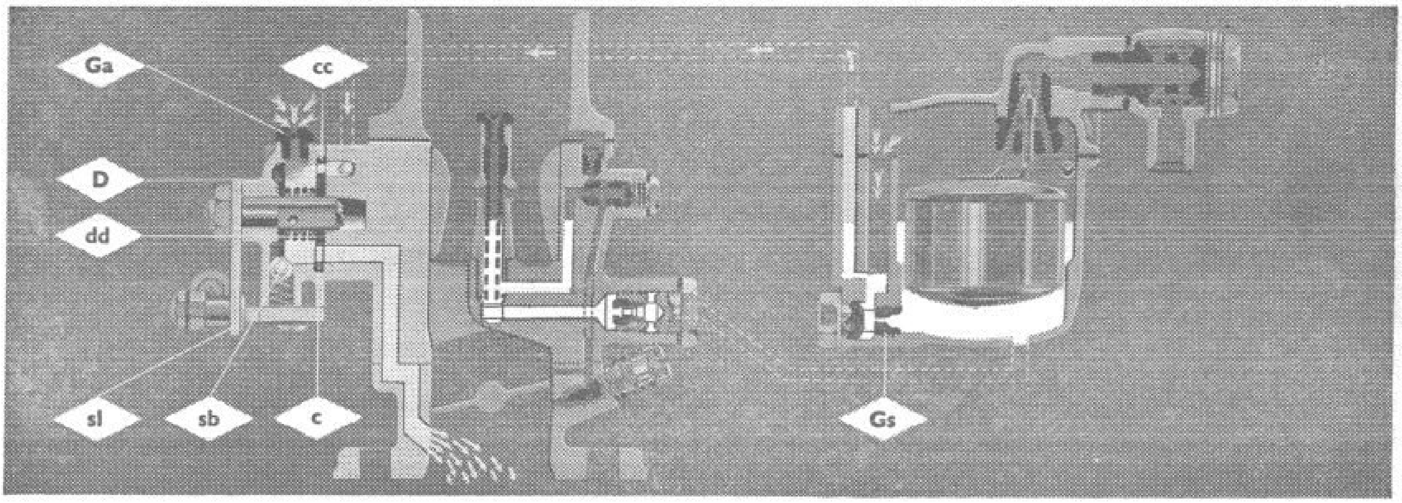
In the build-up of the Solex well the manometer effect is obtained by the Emulsion-tube (ET) being placed inside the cylindrical portion (CP) which carries the discharge ports (00). In this way, the petrol in the outer portion or annulus is separated from that in the inner portion or emulsion-tube.

The depression created in the choke waist, then, is transmitted to the petrol in the annulus from which it readily discharges, by virtue of the higher pressure atmospheric air entering through the emulsion-tube and acting on the petrol contained therein.

So that the surface tension of the petrol at the discharge orifice is broken down and to provide a certain degree of atomisation in order to assist in the evaporation process, it is necessary to introduce small charges of air into the petrol stream.

As will be seen (illustration 14) this is admirably and easily carried out on the Solex well system.

By drilling a series of small holes in the emulsion-tube (as seen on the illustration) the petrol is both atomised by small air charges passing through from the inside of the tube to the annulus and corrected for flow as the load or air-flow through the choke-tube increases. The degree of correction is dependent upon the level of the petrol standing in the well, i.e., under very light-load running the top holes only will be uncovered and passing air into the petrol stream. As the load or air-flow through the choke-tube increases the petrol level will drop and uncover the remaining holes, thus relieving the jet metering orifice of some of the choke-tube depression.



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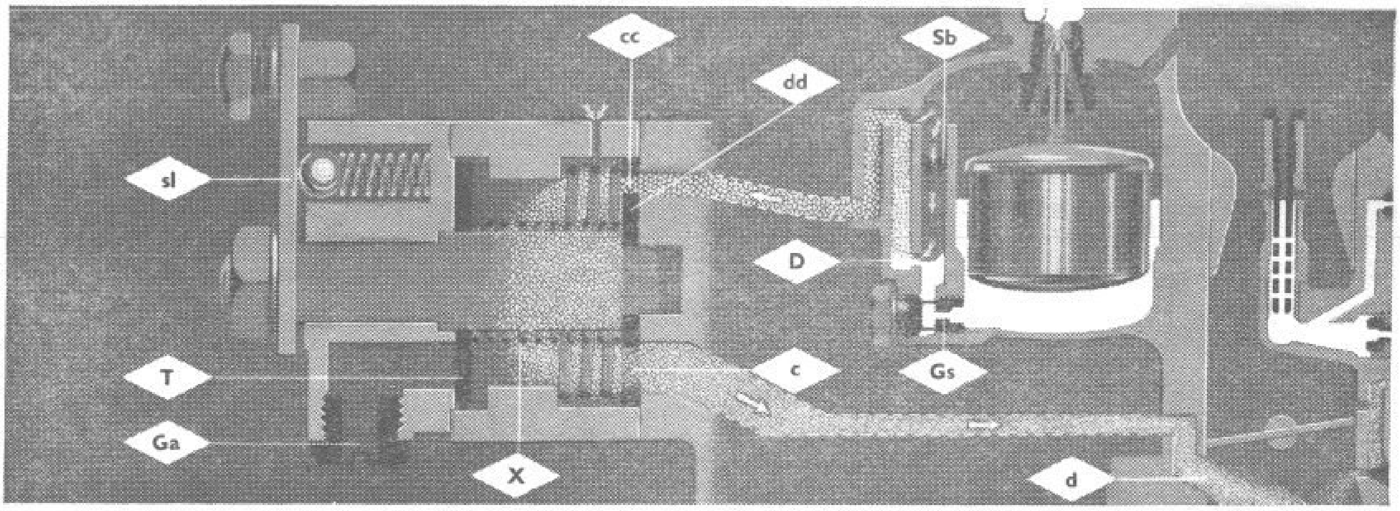

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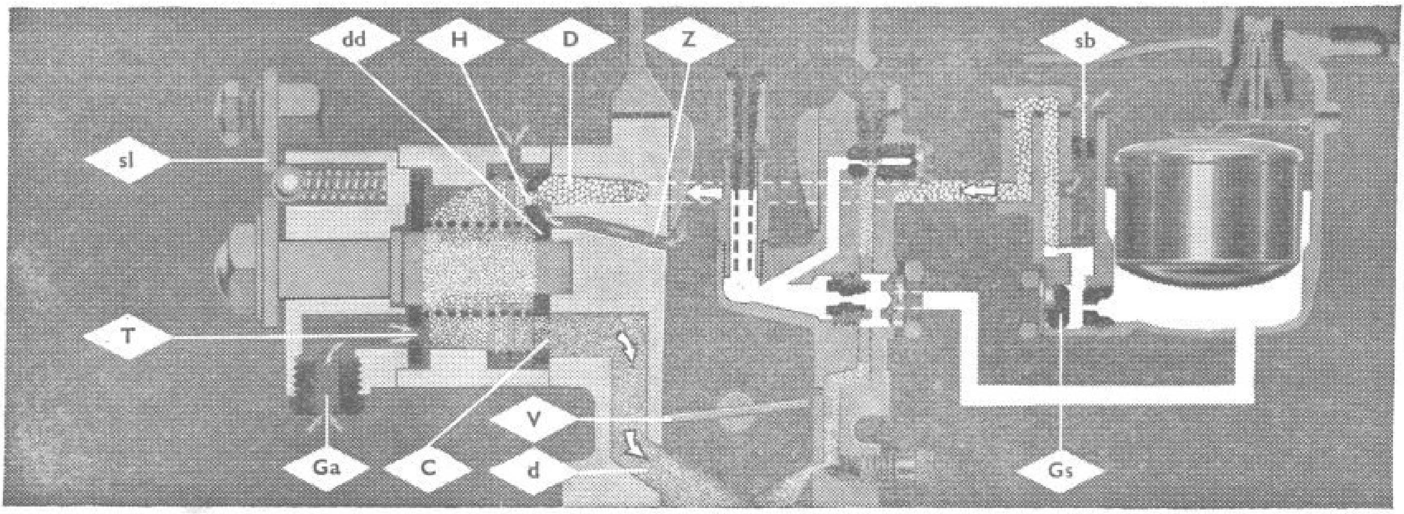

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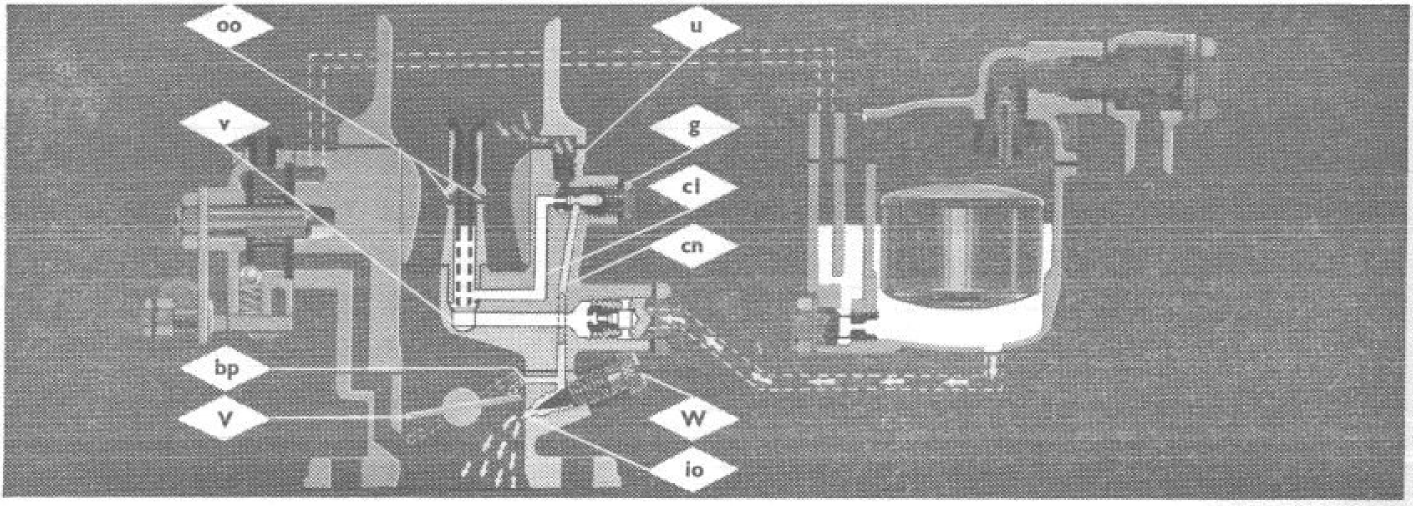

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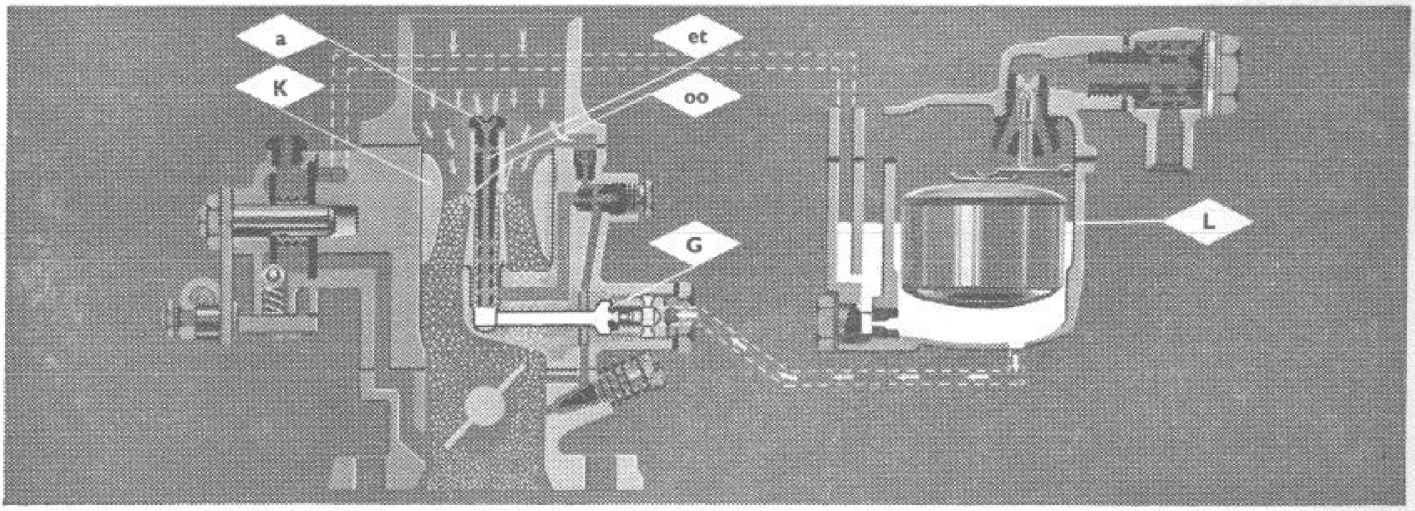

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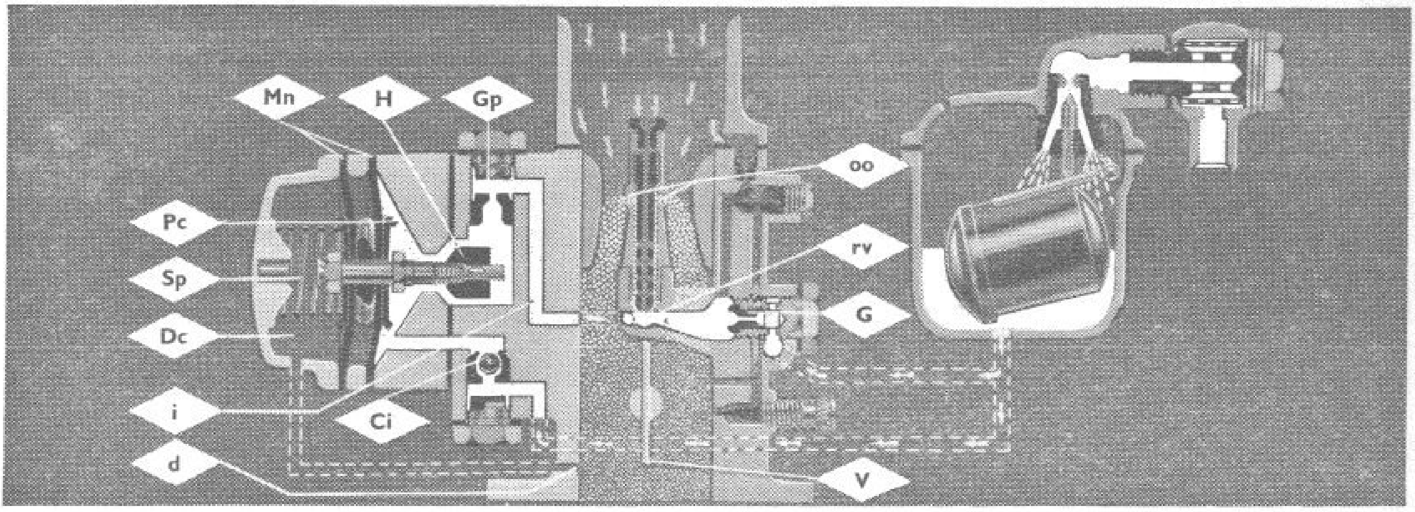

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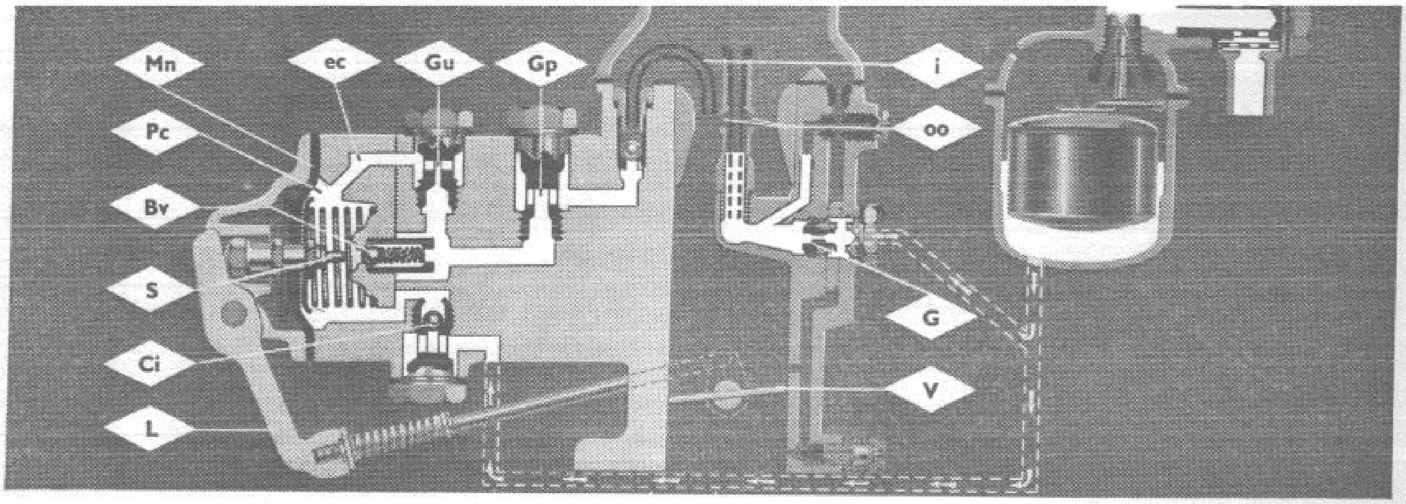

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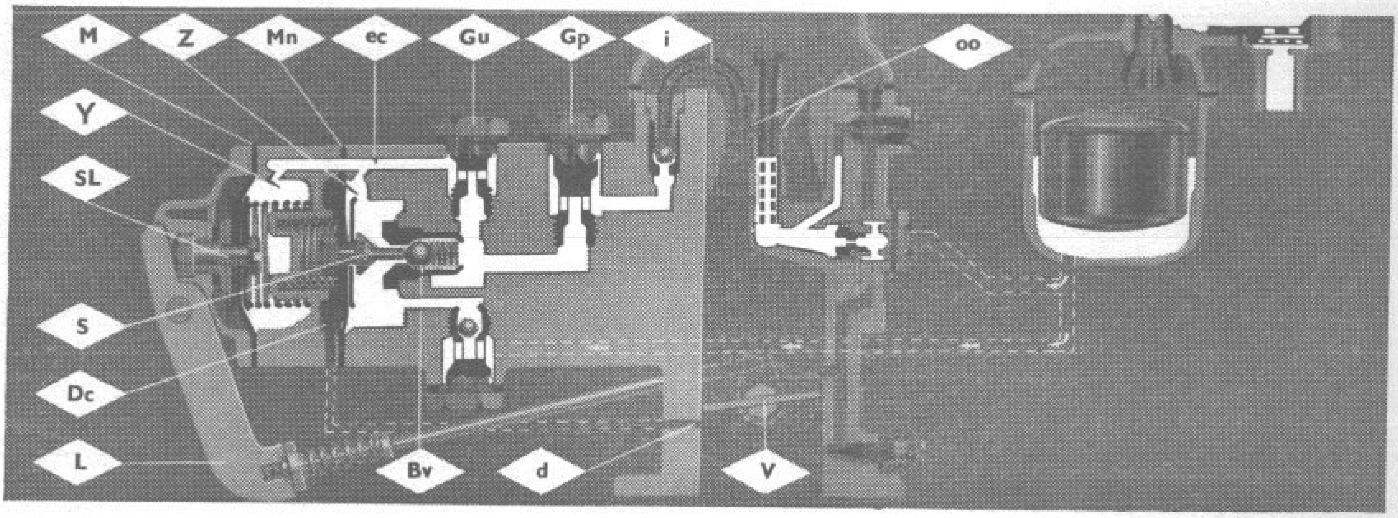

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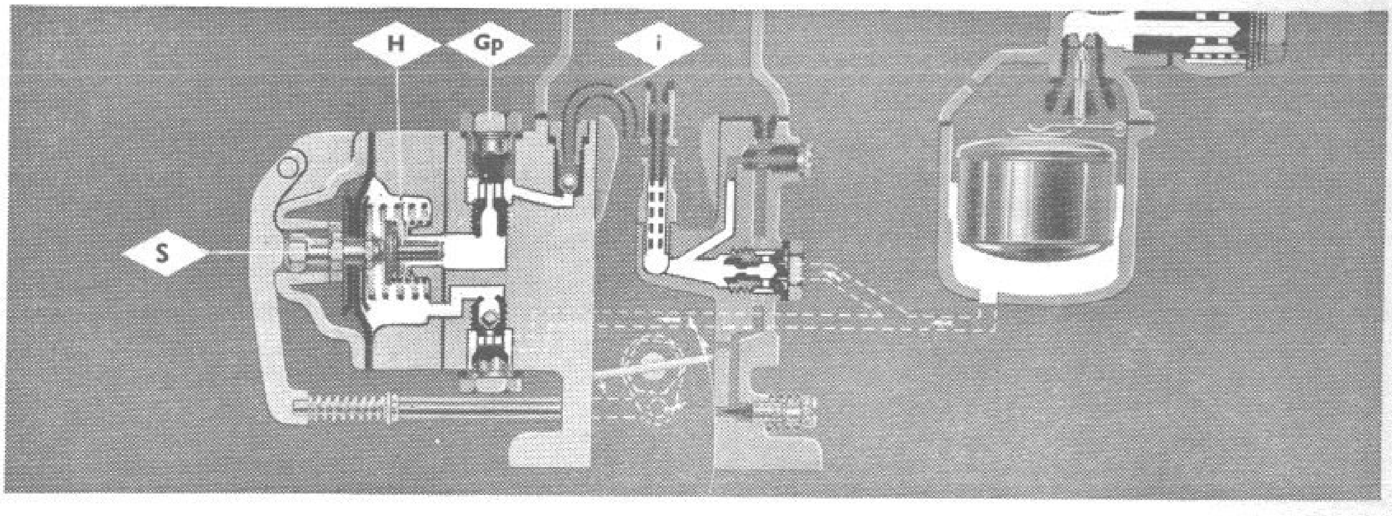

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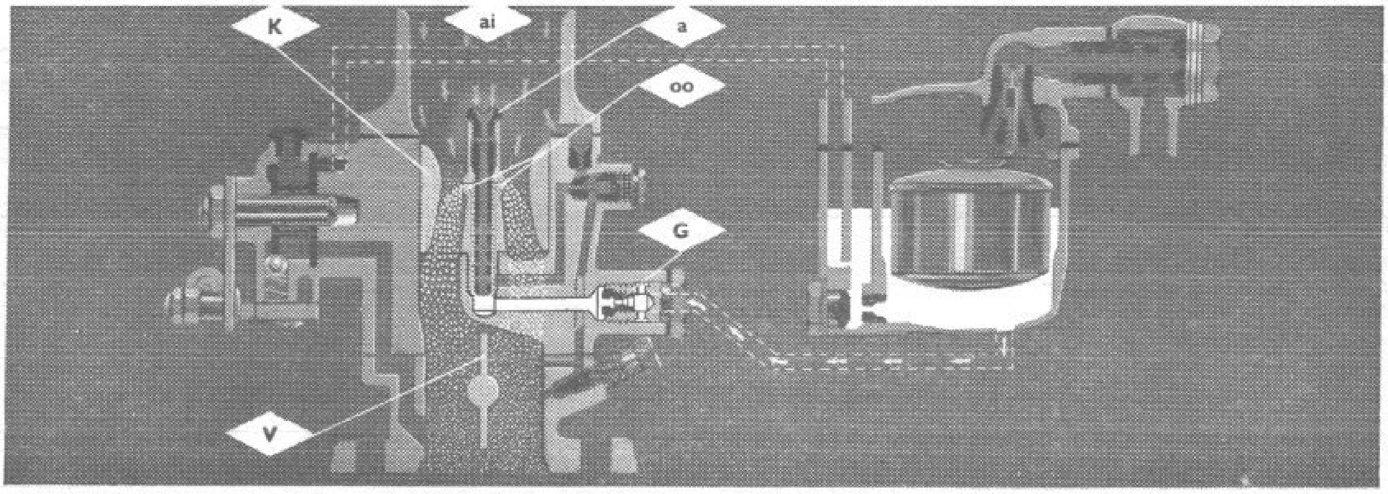

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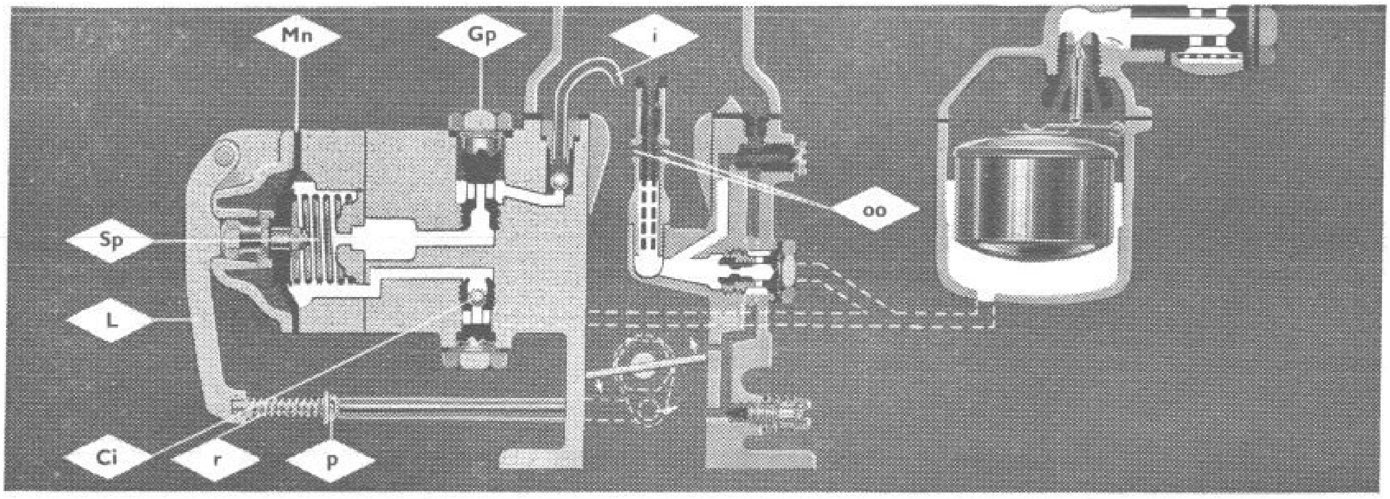
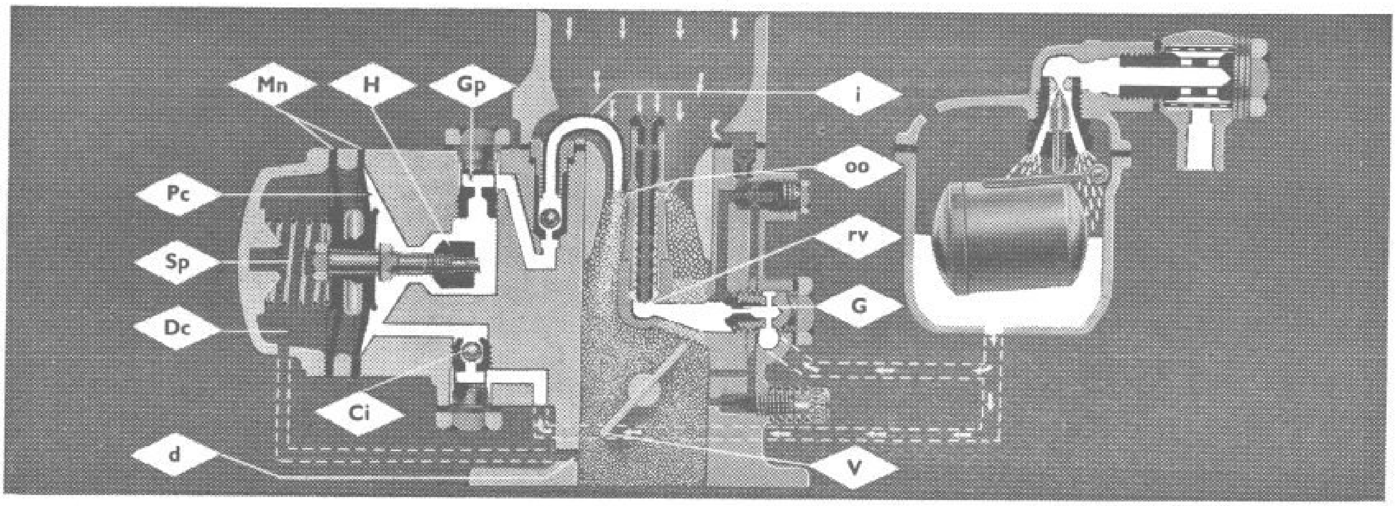


ILLUSTRATION No. 11



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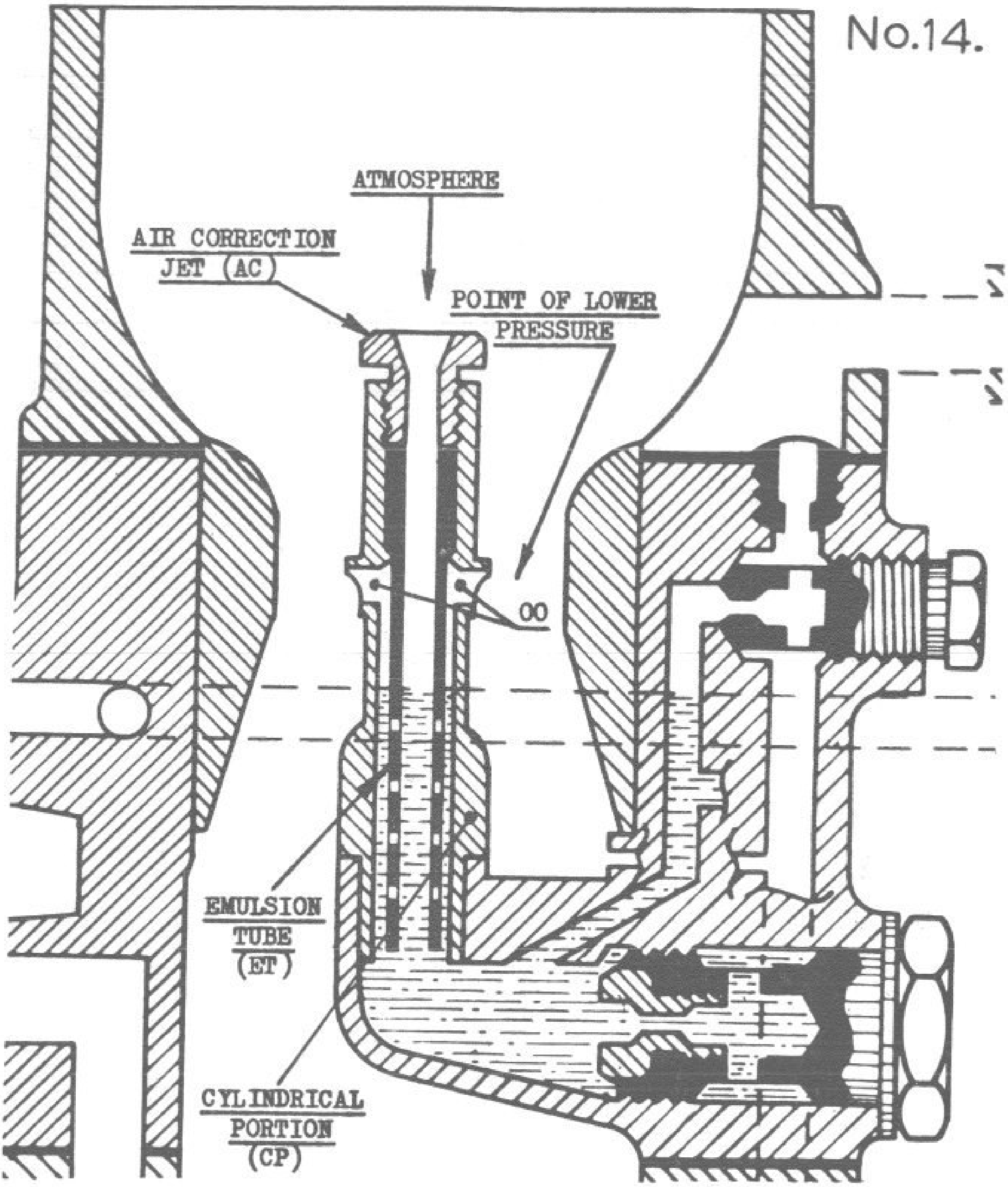

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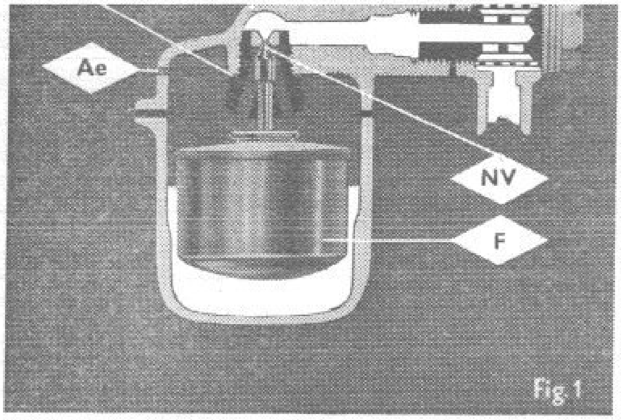


Fig. 1

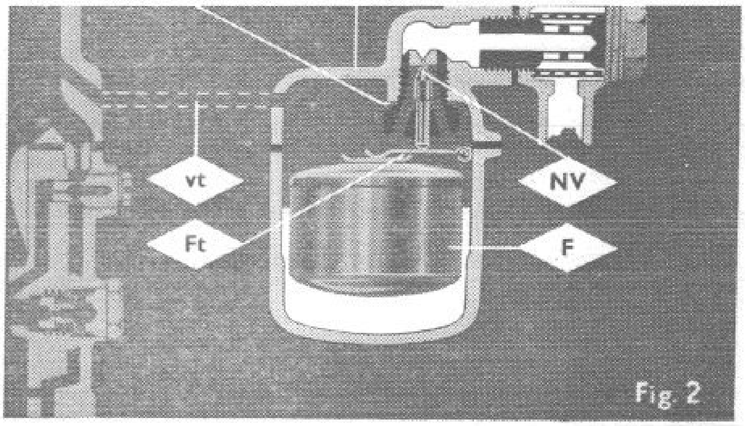
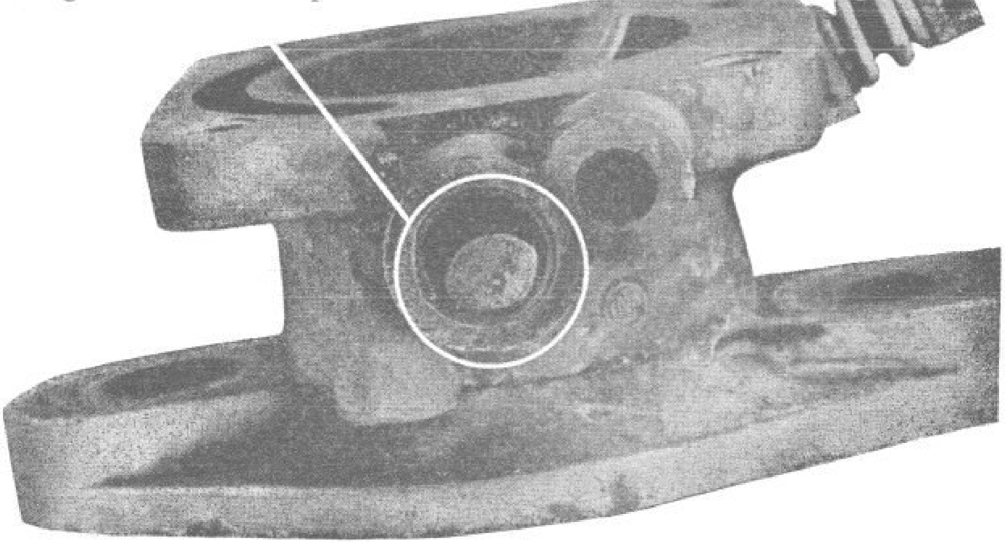


Fig. 2

ILLUSTRATION No. 13

Fig. 1 Worn throttle spindle



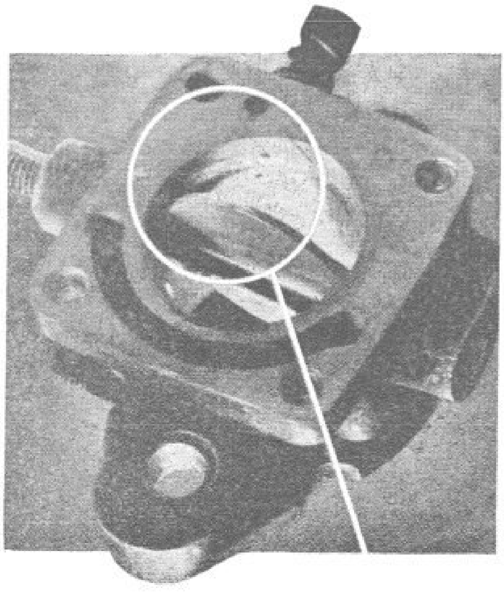


Fig. 2 Butterfly wear causing air leakage when throttle is closed

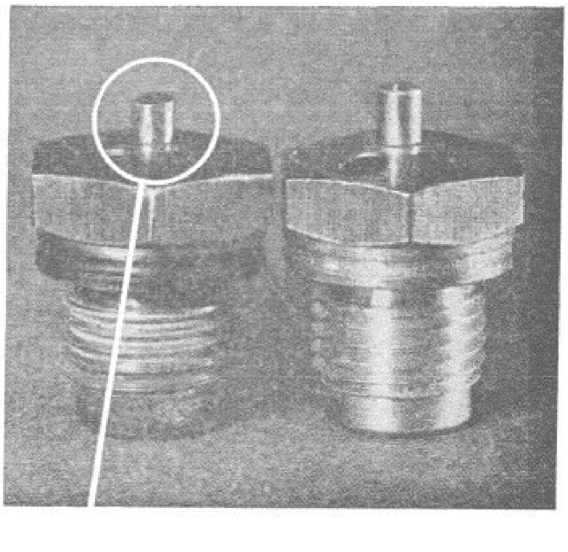


Fig. 3
Worn needle valve. New needle valve.

ILLUSTRATION No. 15

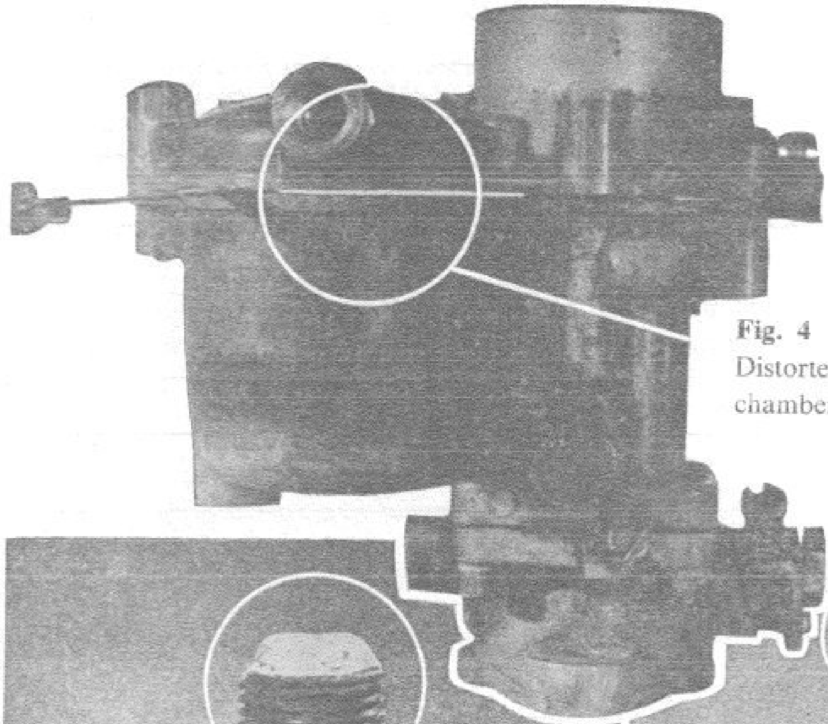


Fig. 4 Distorted float chamber cover.

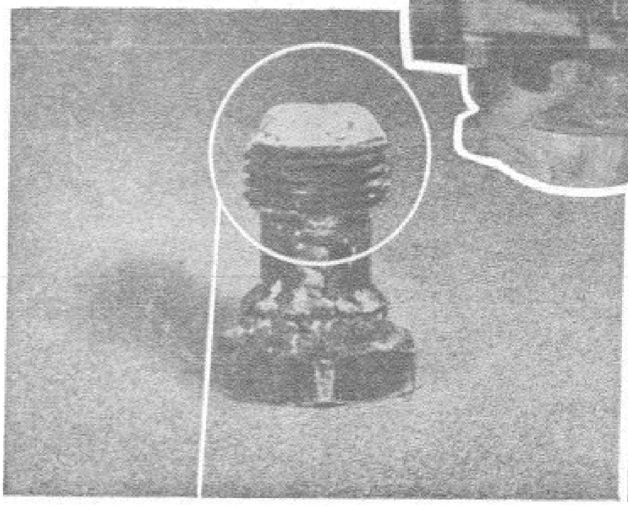


Fig. 5 Jet completely covered by deposit.

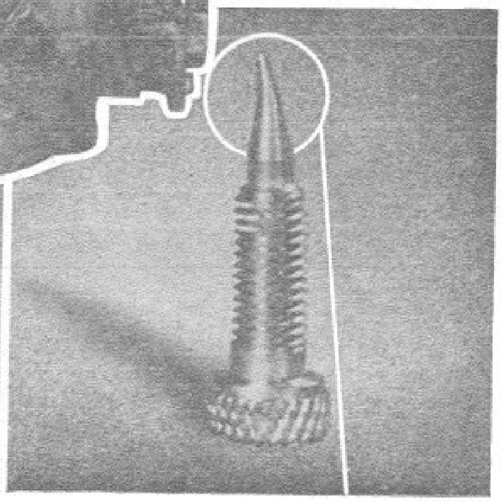


Fig 6 Bent volume control screw.

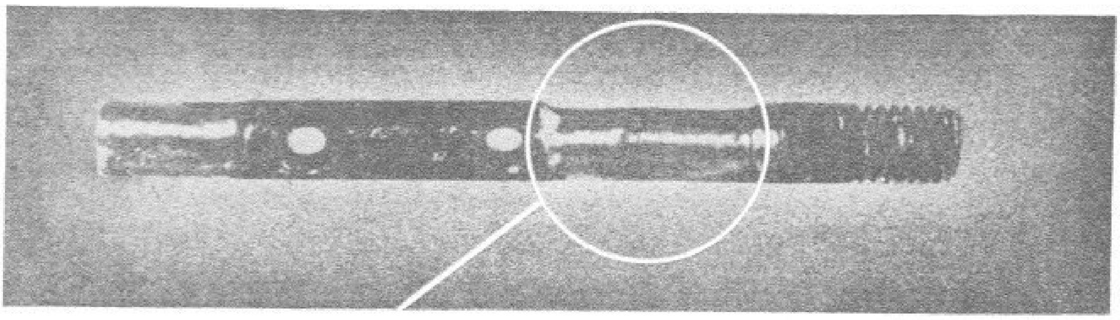


Fig. 7 Worn Spindle.

ILLUSTRATION No. 16

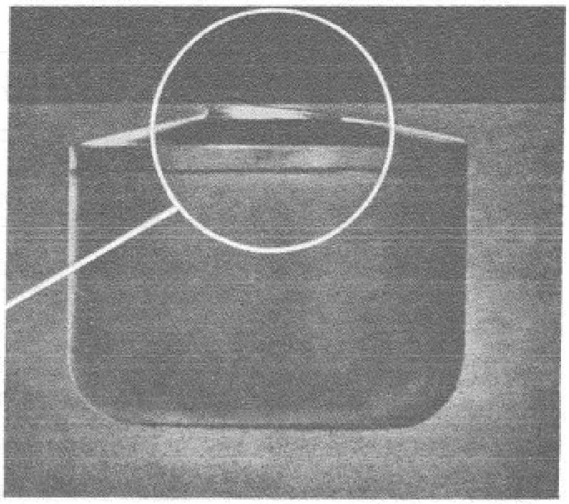


Fig. 8 Dented float causing flooding

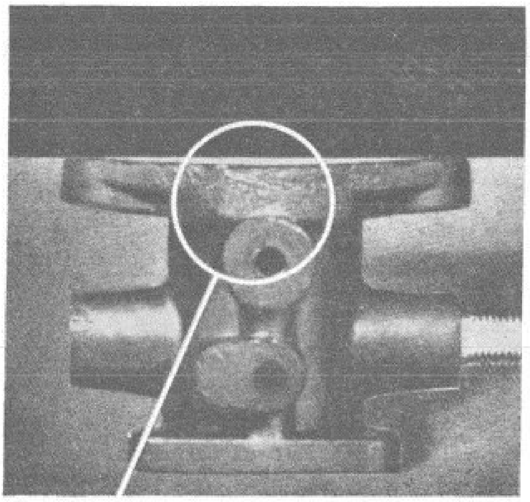


Fig. 9
Throttle chamber showing distorted flange.

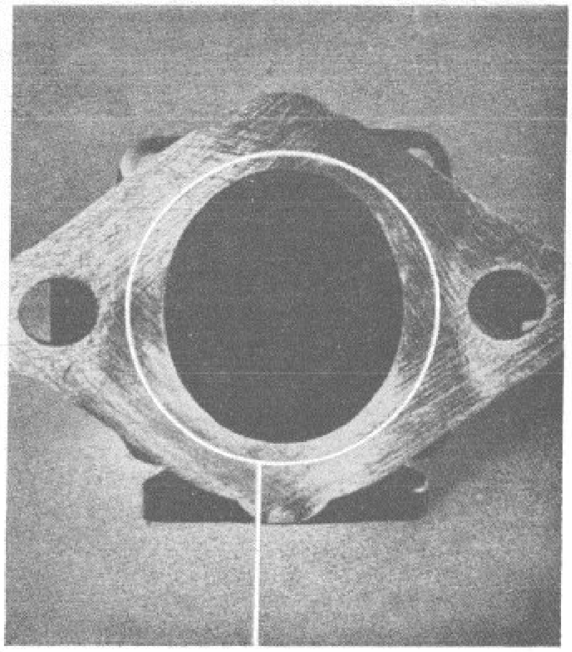


Fig. 10 Ovality in the throttle bore measurements diametrically 37 mm. and 42 mm.

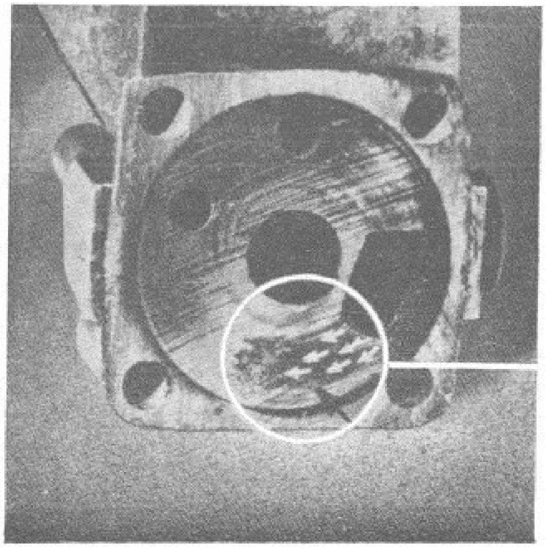
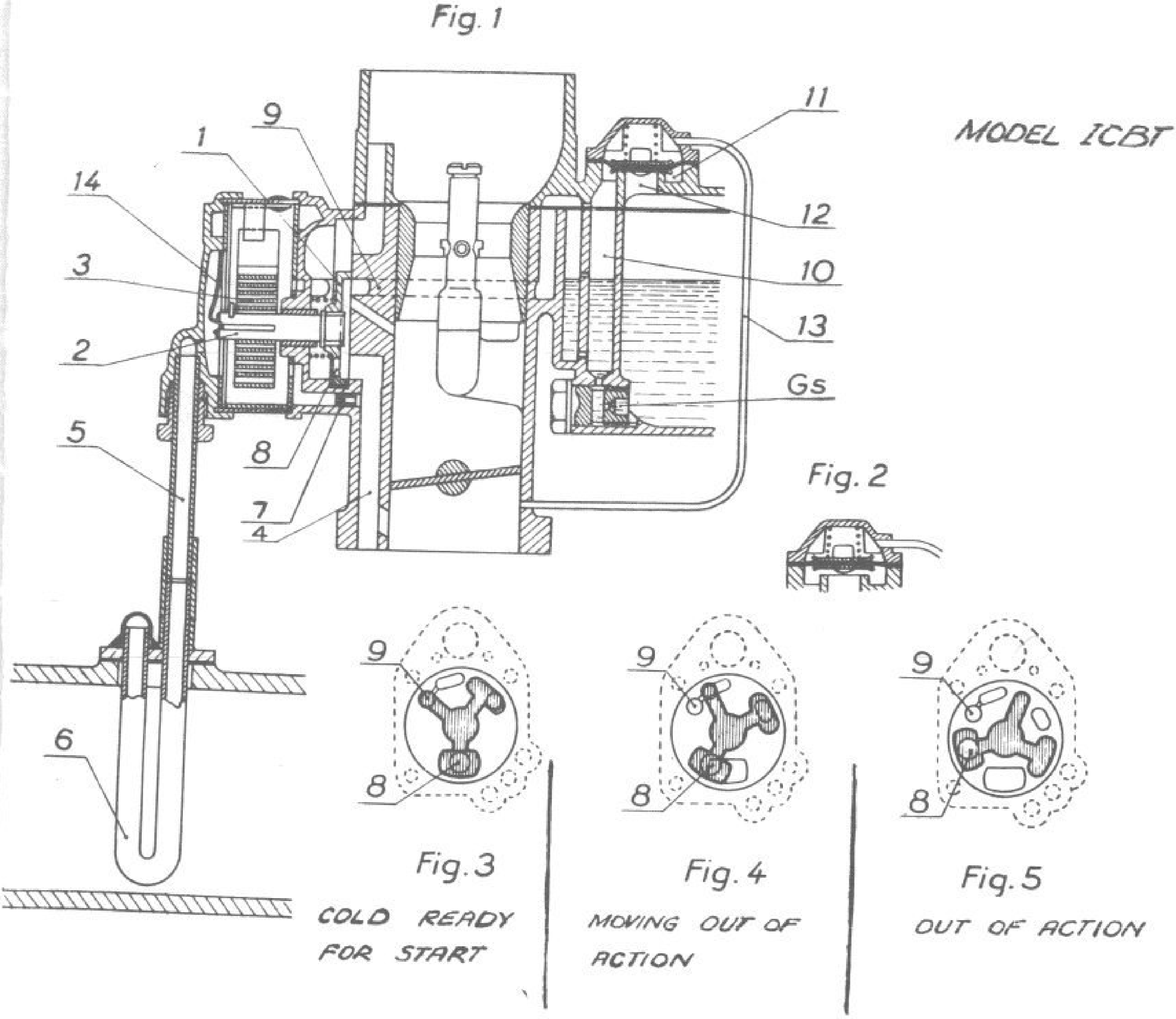


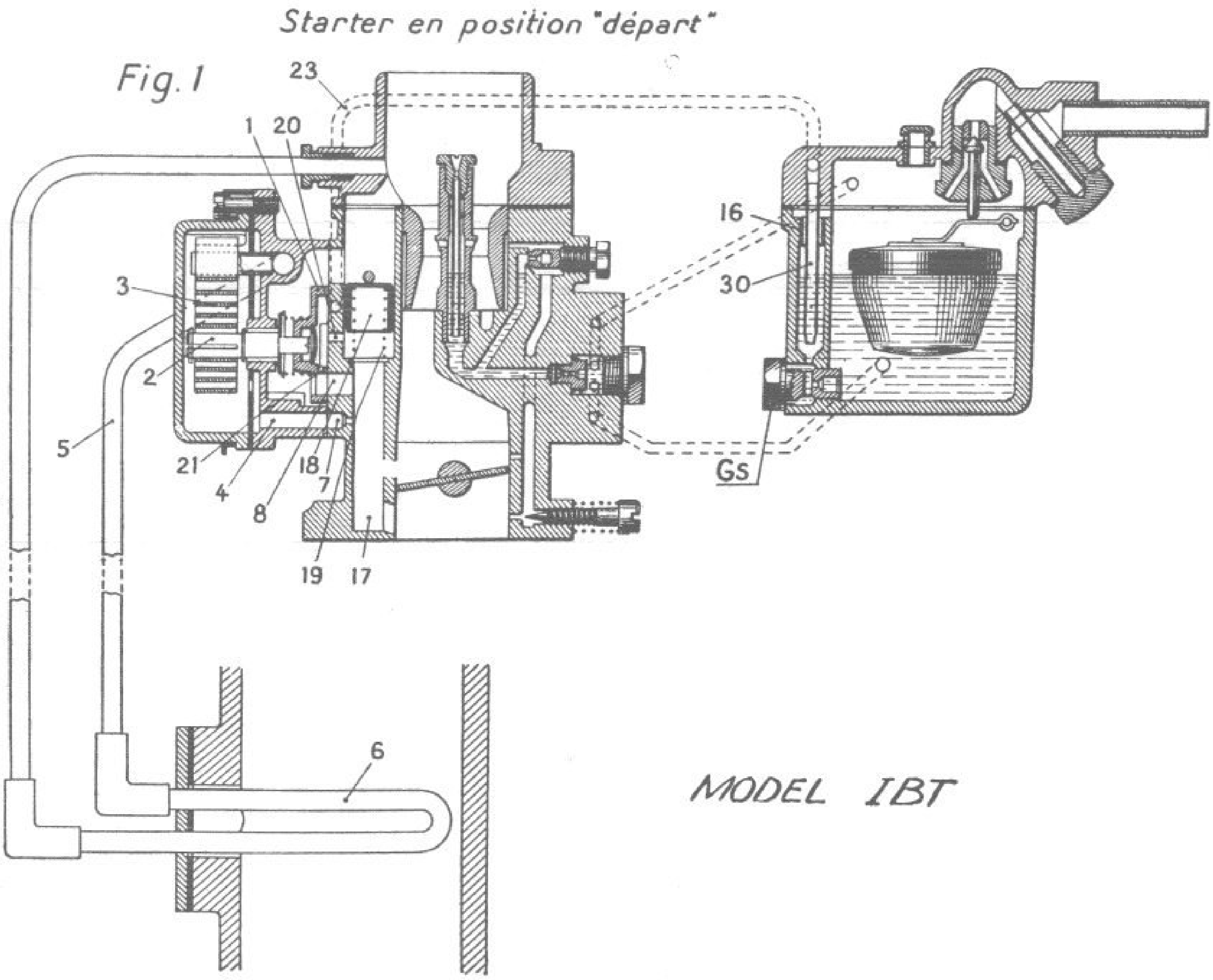
Fig. 11
Showing starter valve leakage.

ILLUSTRATION No. 17



Slide No. 18

ILLUSTRATION No. 18



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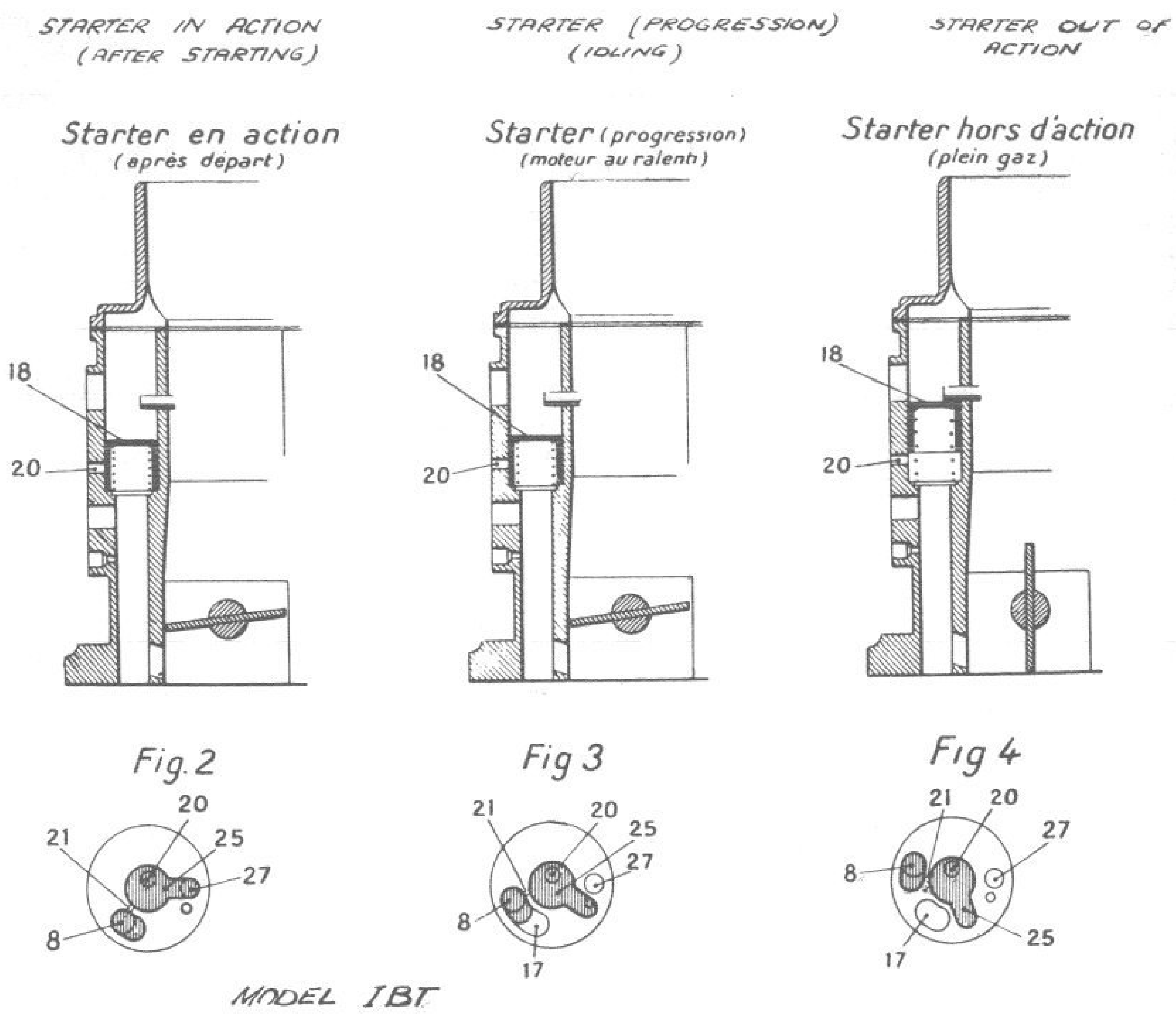

Slide No. 20

ILLUSTRATION No. 20

SOLEX

The SERVICE Carburettor

Artcraft, C. T.