Description

of the

ZENITH

Carburetter 48RB

Fitted to the

Gipsy One Engine

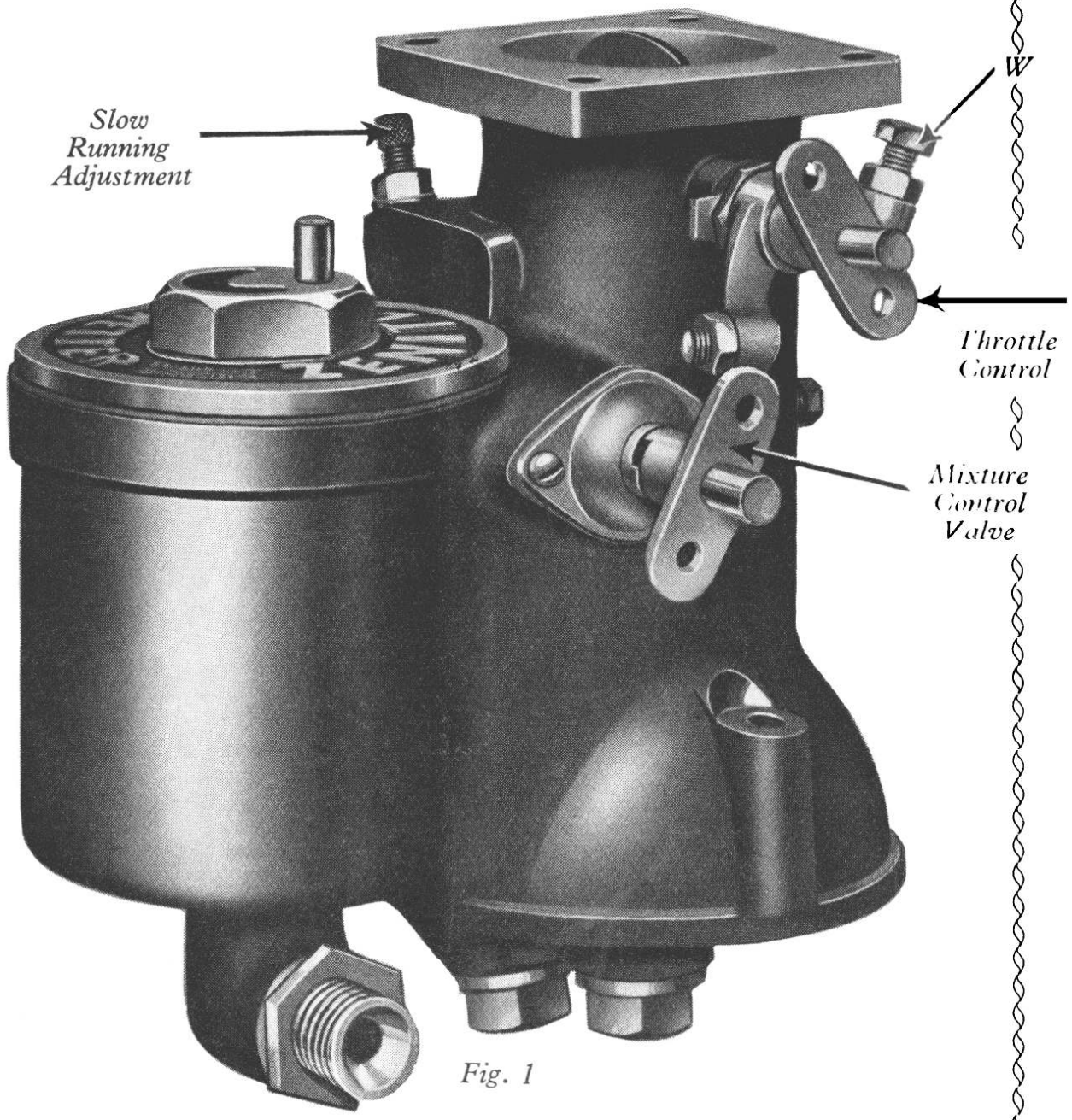

Fig. 1

Zenith Carburetter 48RB

THE Zenith Carburetter 48 RB is standardized on the Gipsy One Engine and works on the same principle as all other Zenith Carburetters.

It contains the usual slow running jet for starting and slow running purposes, and main and compensating jets, ensuring correct measurement of the fuel at all engine speeds.

It differs from the standard carburetter in several important details, however, and a sectional view of this carburetter is shown under Fig. 2.

Petrol enters through the petrol union A, and then passes up through the needle seating B into the float chamber C.

This causes the float D to rise, which acts on the balance weights E and depresses the float needle F on to the seating B.

At a pre-determined level the float needle closes on the seating, and the petrol level is therefore maintained at this pre-determined height.

From the float chamber the petrol passes through the passage G and up through the compensator H.

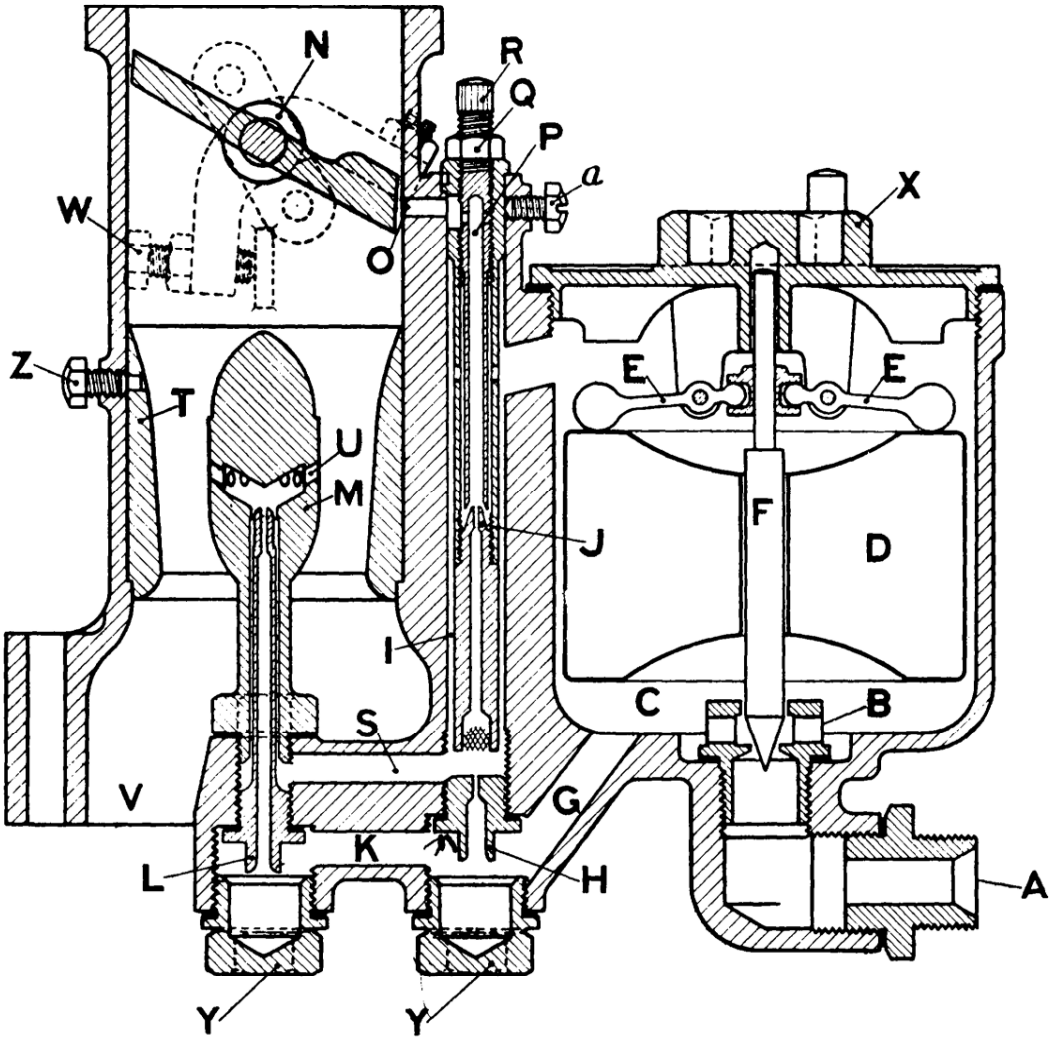

Fig. 2

It then rises into the well I to just below the top of the slow running jet J.

The petrol also passes along the passage K and up through the main jet L.

Consequently, when the engine is stationary, we have petrol standing the same level in the main jet L and the diffuser M which surrounds it, and also the slow running jet J and the float chamber C.

In order to start, the throttle valve N is slightly open, as shown in the diagram.

On the engine being cranked over a strong suction is set up at the slow running outlet O, which is communicated to the top portion of the slow running tube P.

Consequently petrol will be drawn through the jet J up through the tube P and out through O, providing the correct mixture for starting and running slowly.

You will notice from the diagram that the slow running tube is adjustable, as tube P can be moved nearer to or further from the jet J, thereby varying the suction on J.

This is accomplished by loosening the locking nut Q, when the knurled knob R can be screwed down to make the mixture richer, or up to make it weaker.

This, of course, is for starting and slow running.

When the correct position of R has been found, then the locking nut Q must be tightened up again.

When the throttle is opened, petrol that is standing in the well surrounding the slow running tube J, instead of continuing to pass through P, is drawn along the passage S, and up the side of the main jet to the top of the diffuser M.

This is because the suction is diverted from O to the main choke tube T, and is of course communicated at the same time to the holes U, which are perforated around the diffuser tube M.

The suction also draws petrol directly from the main jet L.

Consequently, whilst the engine is pulling, petrol is being supplied not only through the main jet L, but through the compensator H, along S and out through U.

Air naturally enters the carburetter from the intake V.

In order that the throttle valve shall always return to the best slow running position, an adjustable screw W is provided on the throttle lever, which operates against the web on the side of the carburetter. The stop screw should be adjusted so that the throttle returns to the best position for slow running when the hand control is closed.

The float chamber cover X screws into the top of the float chamber and carries the balance weights as shown, whilst the plugs Y, fitted under the carburetter, give access to the main jet and the compensating jet.

The screw Z is fitted for the purpose of locking the choke tube T in position.

Mixture Control Valve.

Now on the side of the carburetter will be found the mixture control valve, as shown by No. 1 of the diagrammatic sketches, Figs. 3 and 4, and the photograph, Fig. 1.

This is for the purpose of enabling the pilot to weaken the mixture for cruising when he has reached the desired altitude, and thereby effect an economy in petrol consumption, or to enable him to compensate for the effect of the lower atmospheric pressure at high altitude.

As is well known, a carburetter that is set to give the correct mixture on the ground gives a gradually increasing richness of mixture as the aeroplane ascends, due to the reduced weight of air entering

the carburetter, so that at high altitudes it is sometimes necessary to reduce the mixture strength by as much as 15 to 20 per cent.

First of all, let us describe the principle on which this altitude valve works.

Now as is well known, the rate of discharge from the main jet, which is in direct communication with the float chamber, is according to the difference in pressure between the air in the float chamber and the air in the mixing chamber over the jet.

By taking advantage of this fact, we have arirved at a means of varying the discharge from the main jet, so that all we do is to provide a means of altering the pressure in the float chamber, thereby varying the difference in pressure between the float and mixing chambers, and consequently the discharge of petrol from the main jet alters accordingly.

Let us examine the diagrammatic sketches, Figs. 3 and 4.

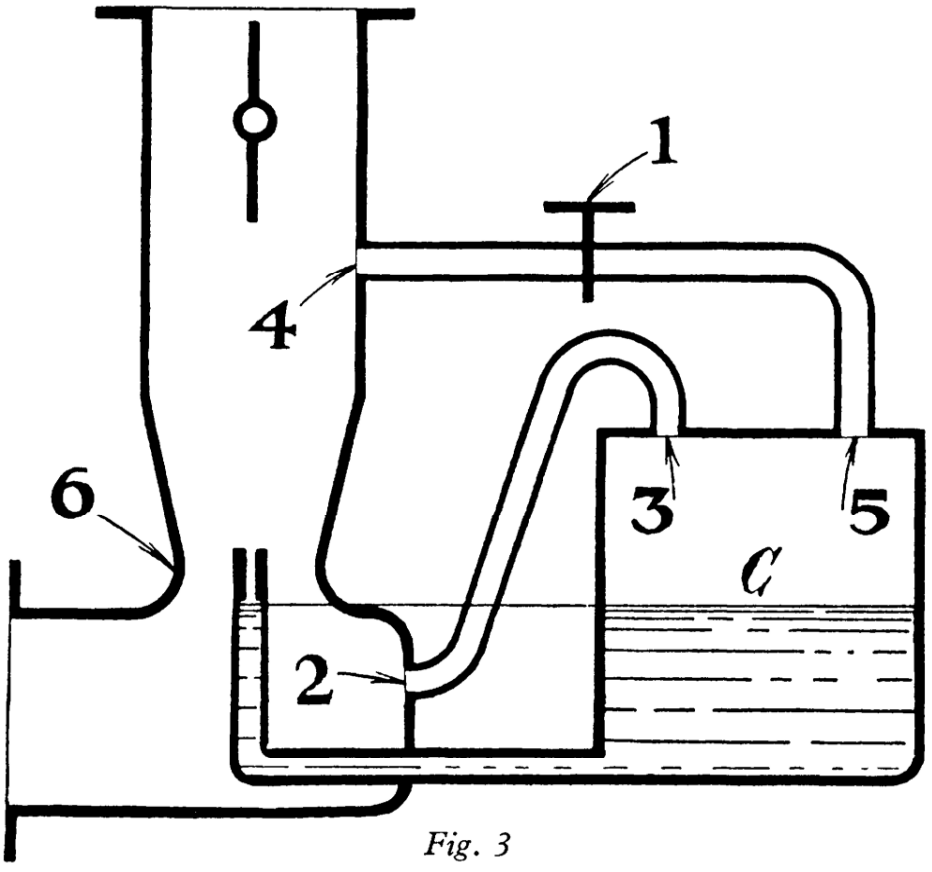

Fig. 3

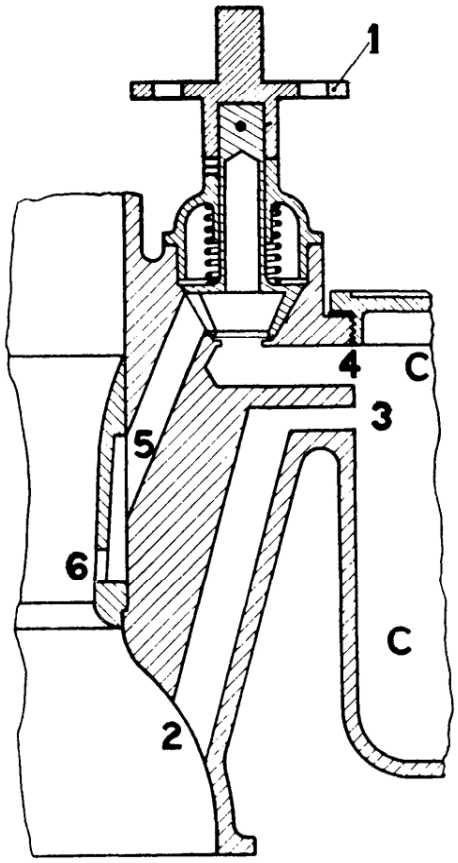

Fig. 4

The float chamber is hermetically sealed.

A communication (2–3) is established between the top of the float chamber and the air inlet of the carburetter.

A second communication (4–5), joining the top of the float chamber to the waist of the choke tube, and a hand-controlled valve 1 is placed in this passage.

Now when the engine is running there will be a certain depression or vacuum in the choke tube at point 6, whilst in the float chamber C atmospheric pressure will obtain owing to its communication to the air intake by means of the passage (3–2).

If the valve 1 is closed the discharge from the main jet will be determined by the depression at 6 less the depression at 3, which of course will be the same as the atmosphere at 2.

Now if the valve 1 is opened, we lower the pressure in the top of the float chamber C, because air will be drawn through the passage (4–5) quicker than it can enter the passage (2–3).

Naturally the pressure in the top of the float chamber will drop and become nearer to that in the choke tube at 6.

Consequently the discharge from the main jet will be reduced for the reasons stated before.

Therefore, by operating the valve 1, it is possible to weaken the mixture considerably, but of course on the ground and at low altitudes this valve must always be kept closed, and should only be opened when the cruising altitude has been reached, or when there are definite signs of woolliness from the engine at high altitudes.

The position of the valve 1 is of course on the side of the carburetter, but in Fig. 3 it has been shown on the top purely for diagrammatic purposes.

As will be seen, it consists of a conical valve held on its seat by means of a spring, and contains a hole which registers with the passage 5 when the valve is in the open position.

MAINTENANCE.

As there are very few working parts in the Zenith Carburetter very little maintenance is necessary, but it might be well to mention one or two points that should receive attention.

From time to time the float chamber cover X should be removed, as well as the float, and the bottom of the carburetter washed out.

Then replace the float chamber cover and be sure to make certain that it makes an air-tight joint, otherwise the mixture control valve will not work properly.

If a carburetter should commence to leak or flood, it may be due to wear on the needle seating, and in this case it would be much better to fit a new needle and seating.

In this case the collar on the float needle in which the balance weights operate should be very carefully adjusted, so that the level is maintained at the correct height, which is between 3–4 mm. below the lower edge of the holes drilled in the top of the diffuser tube.

Important. All removable parts of the carburetter are wired or locked before despatch.

Great care should be taken therefore to replace any locking device or wire when re-assembling the carburetter after making any replacements or adjustments.

Another method of ascertaining the correct height for the petrol is to unscrew the float chamber cover and note when the petrol commences to leak through the holes in the diffuser tube.

When the level is properly set, leakage or flooding should commence when the float chamber cover is unscrewed from half a turn to two-thirds of a complete turn.

If it is necessary to unscrew the float chamber cover more than two-thirds in order for leakage to commence, then the petrol level is too low.

If flooding or leakage commences before the float chamber cover is unscrewed half a turn, then the level is too high.

Never be tempted to grind in the float needle with emery or any other coarse paste. By doing this it ruins both the needle and the seating.

If you think there is a little roughness on either the needle or the seating, then the needle may be lightly ground in with metal polish, but under no circumstances must anything coarser be used.

Make sure that the needle seating B is screwed up tightly.

In the bottom of the slow running tube will be found a small gauze, which should be cleaned out from time to time.

The method of adjusting the slow running tube has already been explained, but we might add that it is removed from the carburetter by first of all loosening the locking screw " a," when the tube can be pulled out of the carburetter, as it is a push fit.

When replacing the tube make sure that the pin on same corresponds with the slot in the carburetter. so that the outlet from the tube corresponds to the drilling O in the carburetter body.

The main and compensating jets are removed from the bottom of the carburetter after the plugs Y have been removed, by means of a special key that is supplied in the tool kit.

Never attempt to reamer out or hammer up these jets, as they have been very carefully calibrated on a flow-meter to give the best results.

The standard setting for the Gipsy One Engine is choke tube 36, main jet 440 c.c., compensating jet 410 c.c., slow running jet 1 mm.

It is advisable to periodically make sure that the diffuser tube M is screwed down tightly on its seating, and that the plugs Y and the petrol union A are also screwed up tightly so as to avoid petrol leakage.

If trouble should occur in the running of the engine, then it can only be owing to dirt, and consequently a thorough cleaning of all the passages and jets in the carburetter should give the necessary improvement. If not, the chances are that the trouble would not be due to the carburetter at all, because there is nothing in it that can vary or alter of its own accord.

Any further help or advice will be gladly supplied on application to the Zenith Carburetter Co., Ltd., 40–42 Newman Street, London, W.1.

NOTES

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