Section:- 4, Engine

Subject:- Tuning Carburetter(s)

Effective on:- All Types

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No. of Sheets 4 **Sheet No.** 1

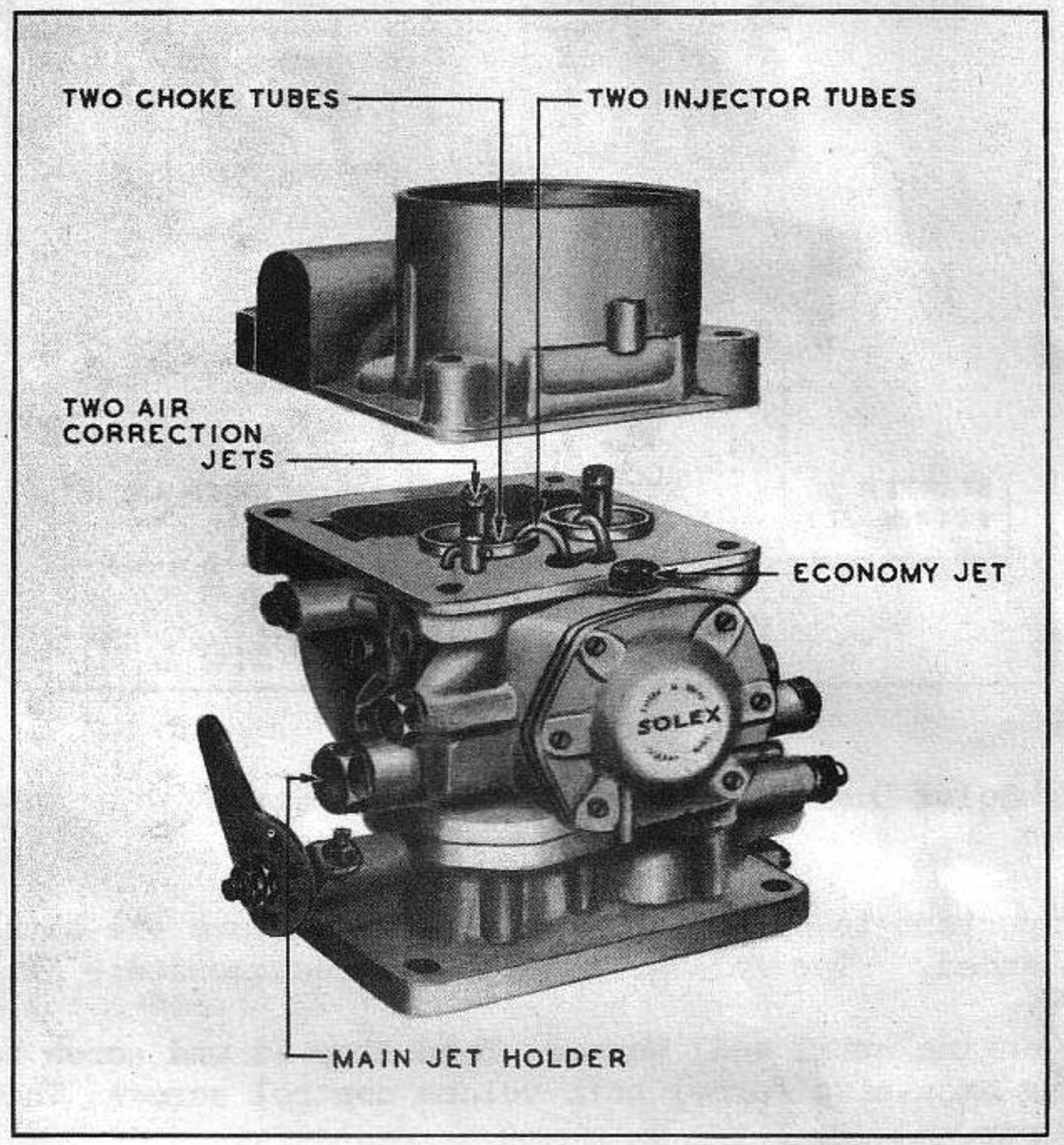

Fig. 1.
Solex Dual Port Downdraught Carburetter.

CARBURETTER TUNING

(a) Type 400/85 - Engine with single Solex Dual Port Downdraught carburetter

This carburetter is fitted with a special manifold connected with the water circulation system, so that the mixture intake to the engine is preheated.

The carburetter comprises three units; a progressive starter in the form of an auxiliary starting carburetter, the main carburetter, and an acceleration and economy device to compensate for the widely varying conditions of rapid acceleration and cruising at very low power. These three units are integral with one another, being all contained within the body of the carburetter, see fig. 1.

For operation and adjustment of the carburetter the following instructions should be adhered to, and the illustrations, fig. 1 and 2, will show clearly where adjustments may be made.

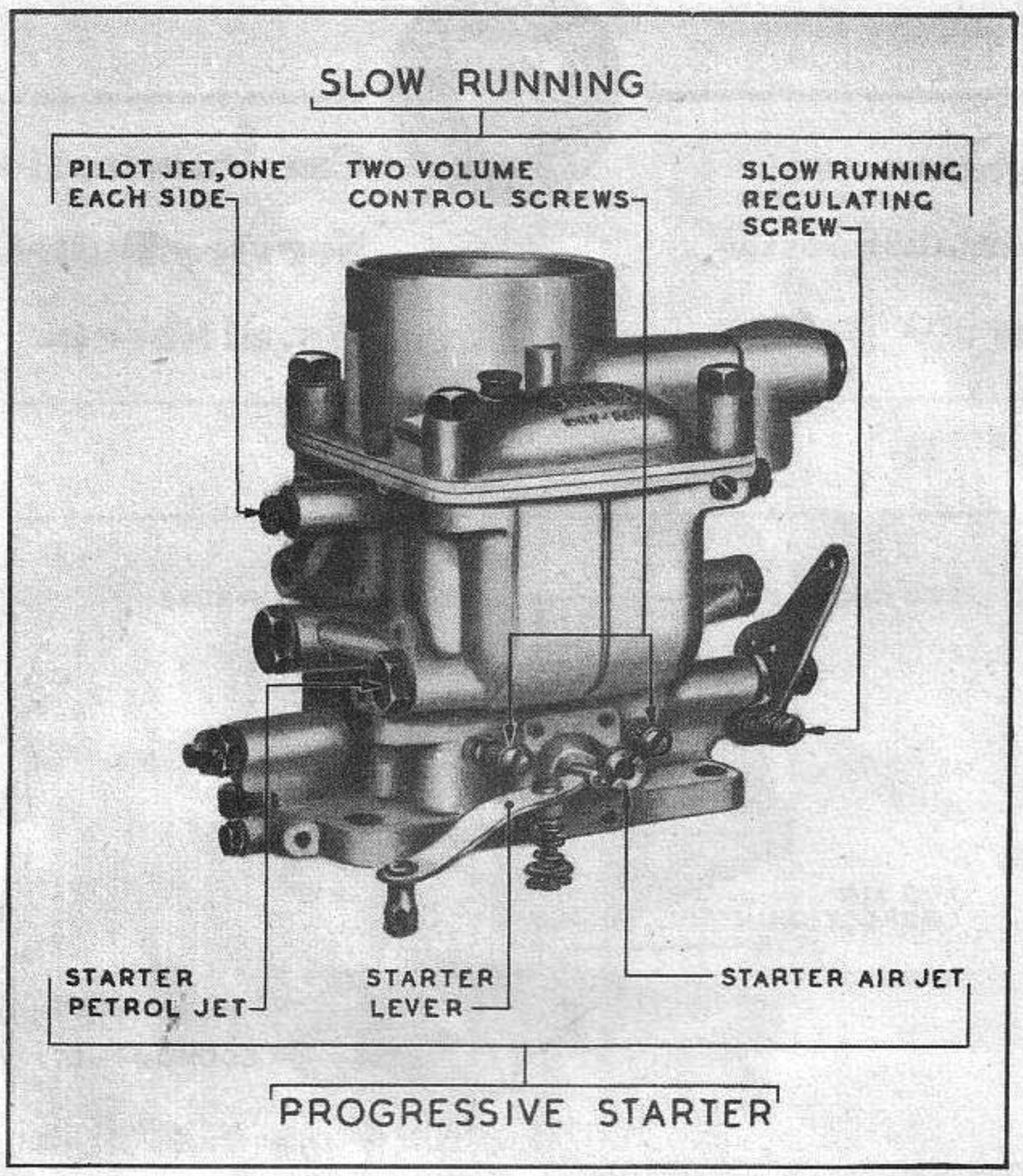

Fig. 2.
Solex Dual Port Downdraught Carburetter.

To set the idling

It is important to ensure that the idling mixture via both throttles is correctly balanced. The following method is recommended:-

1. Run the engine until well warmed. Then stop it and screw home fully (though not using excessive force) both volume control screws. Then unscrew them two full turns.

2. Start the engine: check its idling speed, adjusting the speed using the throttle stop screw.

3. If during this adjustment, the engine "hunts", screw in both volume control screws carefully - each the same amount.

4. If, on the other hand, the engine fires erratically, the mixture is too weak, and the volume control screws must be slackened still more. The engine is very sensitive to these adjustments - the volume control screws MUST be adjusted in unison.

NOTE:- The volume control screws should not be unscrewed more than three turns, otherwise a flat spot will occur higher in the carburation range.

5. If it is found impossible to obtain good idling, check the points of the volume control screws to ensure that they are clean and undamaged. Remove the two pilot jets (situated above the main jets and marked "55") to ensure that they are clean. All the carburetter assembly screws must be tight, and the flange washer forming an airtight seal.

The pump assembly

The Solex pump assembly constituting the accelerating and economy device is purely automatic in action and actuated by the depression in the manifold. The absence of any mechanical control precludes the possibility of derangement.

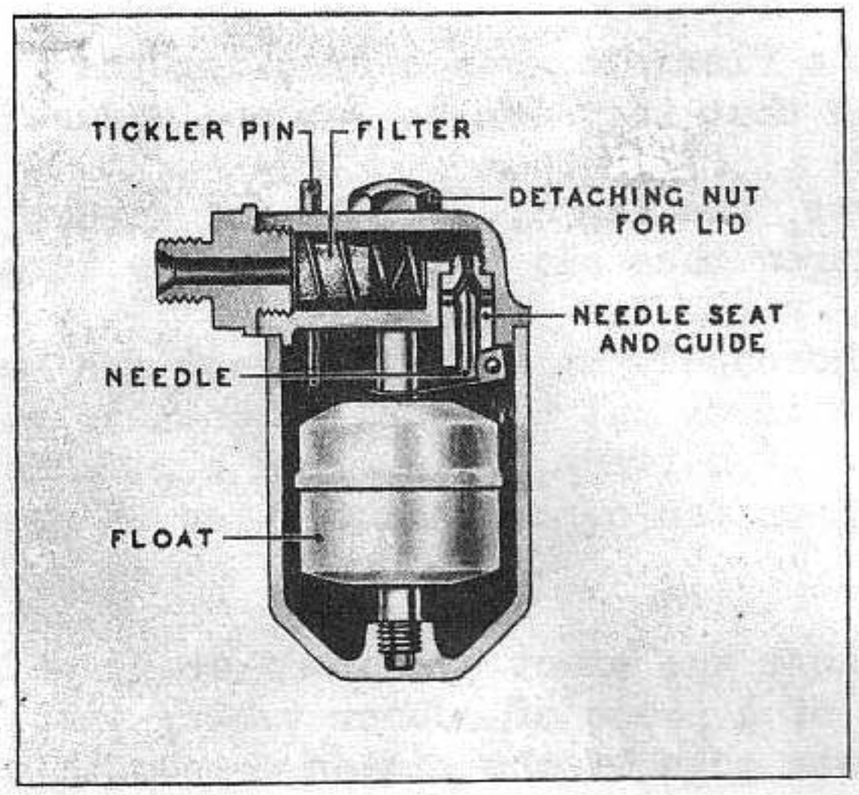

Fig. 3

Float chamber, of S.U. Carburetter.

(b) Type 400/85A and 85B - Engine with three S.U. Carburetters

Routine maintenance of the S.U. carburetters once they are properly set is confined to lubricating the pistons in the suction chambers every 1500 miles or so with light machine oil, and occasionally clearing the filters in the float chambers, see fig. 3.

On the S.U. carburetter the only possible adjustments are (1) to ensure that the correct needle is fitted and to make certain that the jet is properly centered, (2) to set the jet correctly for idling. The recommended needle sizes are as follows:-

Type 85A engine, Needle size.....F.H.
Type 85B engine, Needle size.....F.K.

The needles and jets are set and carefully checked before a car leaves the works, and it is inadvisable to disturb either unless absolutely necessary, but after some time in service the slow running setting of the jet may possibly require adjusting. If for any reason the needle is removed, it must be re-fitted so the shoulder on it is flush with the face of the piston.

The three carburetters have fixed jets on the front and rear units and a controllable jet on the centre unit operated by a rich mixture control on the instrument panel, but in all cases the method of jet adjustment is similar, consisting of screwing the jet adjusting nut in or out until the correct idling speed for the engine is reached, this setting being the correct adjustment for the whole range of engine speeds. The nut is screwed in to weaken and out to enrich it.

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On the front and rear carburetters, the jet adjusting nut has a knurled rim for finger adjustment, drilled with six small holes for more accurate estimation of the degree to which they are to be set, whilst the centre carburetter has a hexagon nut whose corners correspond to these holes in the other nuts. The correct setting will be found approximately 1 to $1\frac{1}{2}$ turns out from the fully screwed in position.

Tuning

1. Check that the pistons are moving freely and that the jets are correctly centred, by first removing the air cleaner and intake body and moving the pistons with the finger. There should be no sign of sticking and the pistons should return freely to their original positions when released.

2. Slacken the clamping bolts on the flexible rods connecting the throttle spindles of each carburetter so that they can be set individually.

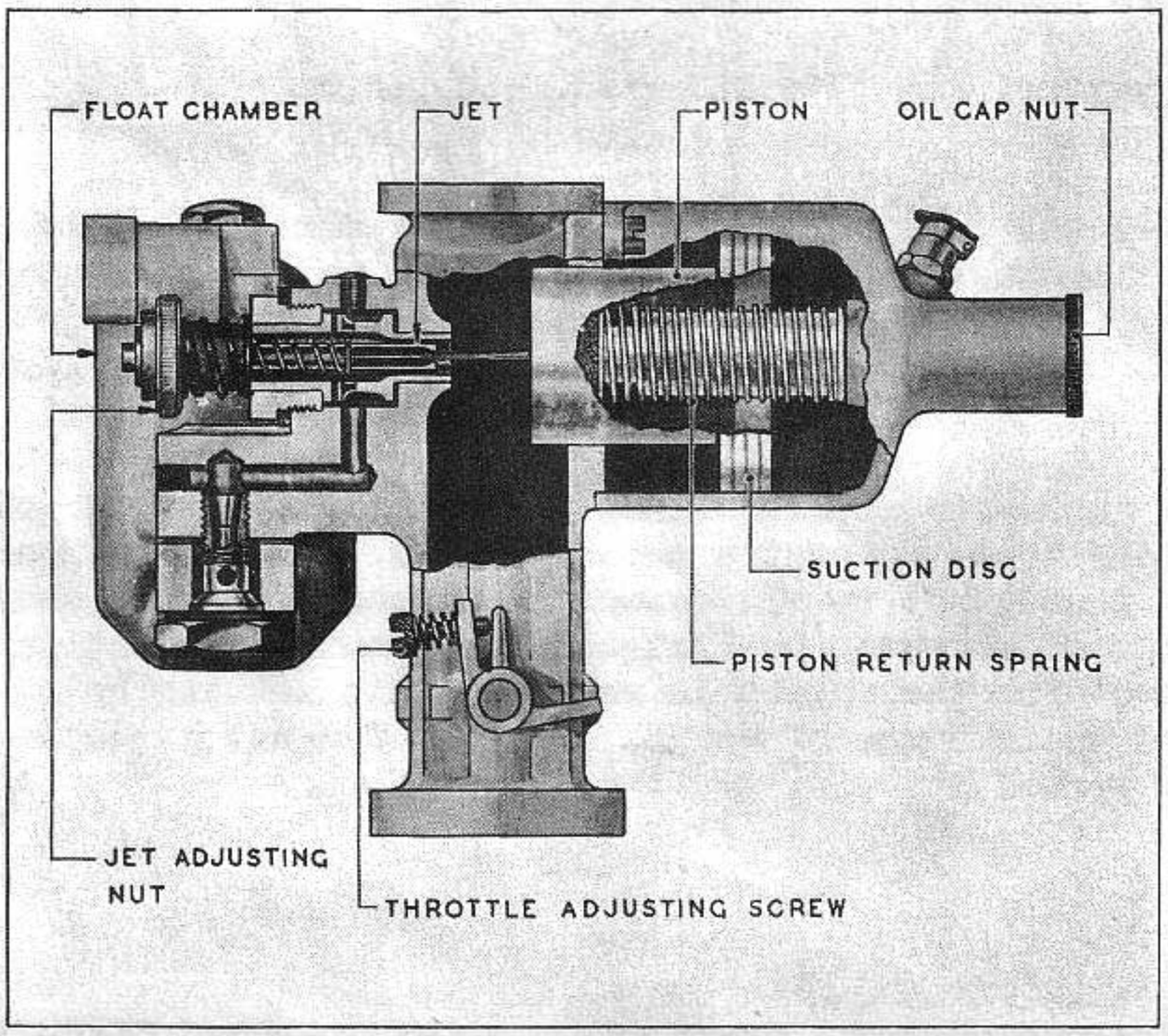
3. Set the throttle adjusting screws, see fig 4, so that the screws are just touching the stop lugs, and then screw them all in one complete turn.

4. Start the engine. When it is thoroughly warmed up, adjust the speed by turning the throttle adjusting screws in or out by equal amounts to raise or lower the speed, until an engine speed of between 600 and 700 r.p.m. is maintained. Take care that the jet head on the centre carburetter is pushed hard up against the jet adjusting nut.

5. A check should then be made to test the exact synchronisation of the throttle openings, by inserting one end of a piece of rubber tubing into each air intake in turn, as near the lower edge of the piston as possible and listening through it. If the hiss on one carburetter is louder than that on the others, unscrew the throttle adjusting screw until the hiss is equal on all three.

6. After this adjustment has been made the mixture may be corrected by screwing the jet adjusting nuts in or out by equal amounts: taking care to ensure that the controllable jet head of the centre carburetter is pushed right in.

7. This adjustment may cause the engine speed to rise, and it may be necessary to correct this by unscrewing the throttle adjusting screws by equal amounts and repeating the listening operation as described above.



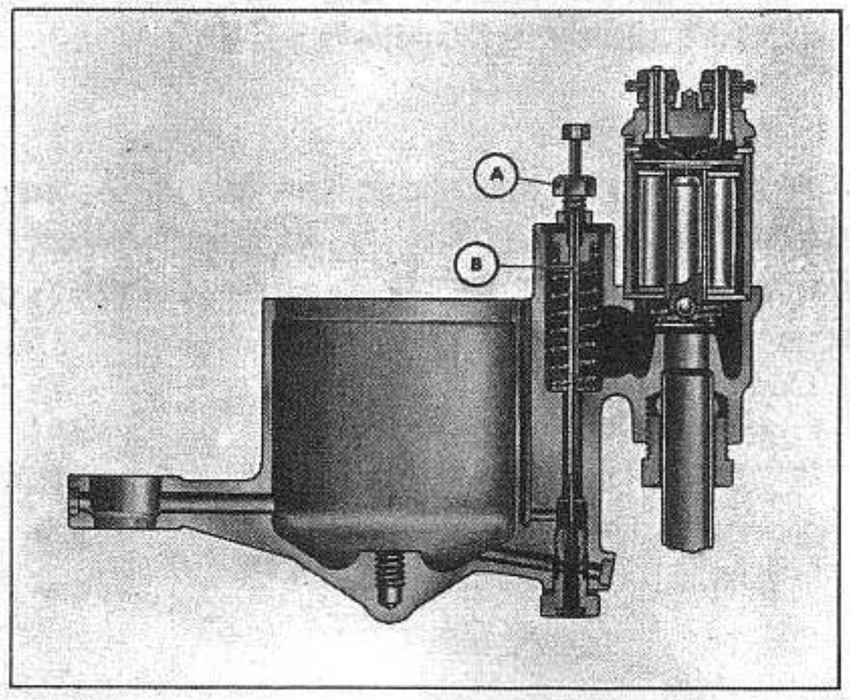


Fig. 5,

Auxiliary Starting Carburetter.

8. When the mixture on all carburetters is correct, lifting the piston of one approximately 1/32 in. with a pen knife blade should make the engine run unevenly from excessive weakness.

9. The exhaust beat of the engine should be regular and even when idling, and the revolution indicator needle should be steady if the mixture is properly set. If the exhaust beat is uneven with a colourless exhaust and an irregular misfire, the mixture is too weak. If, on the other hand, there is a rhythmical type of misfire with a blackish exhaust, the mixture is too rich.

10. Finally, after setting the carburetters satisfactorily, tighten the clamping bolts on the throttle spindle connecting rods, taking care not to alter the setting while doing so.

NOTE:- Hold the throttles firmly on the stops to avoid movement while tightening.

Auxiliary starting carburetter

The auxiliary starting carburetter is to assist starting with a cold engine during cold weather. It is fitted to the front carburetter only and is controlled by a switch on the instrument panel.

The only adjustment provided consists in setting the stop screw (A), which limits the movement of the needle (B). Screwing this down weakens, screwing it up strengthens the idling mixture. The engine having been allowed to attain its normal working temperature, the auxiliary carburetter should be switched on. The stop screw should now be adjusted upwards to an extent just short of that which will make the engine run unevenly, in other words, the engine should be given the strongest mixture possible upon which it will fire on all its cylinders.

If on the next occasion upon which the engine is started from cold difficulty is experienced, the stop screw should be unscrewed by approximately half a turn.

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NOTE:- Should difficulty at any time be experienced in starting the engine when hot, a start can generally be achieved by holding the accelerator down while the starter is operated.

(c) Type 85C - Engine with three Solex carburetters

The triple Solex carburetters fitted to Types 400/85B and 85C, incorporate the bi-starter principle, in which the hand operated mixture enrichment device for starting from cold has two positions, - a very rich one for cold starting purposes, and an intermediate one in which the petrol proportion is considerably reduced, and on which the car can immediately be driven away without any possibility of over-dosing.

The carburetters are carefully set before the car leaves the works and it should not be necessary for them to be disturbed. If, however, adjustment is required, it is most important to ensure the same amount of adjustment is carried out on each carburetter.

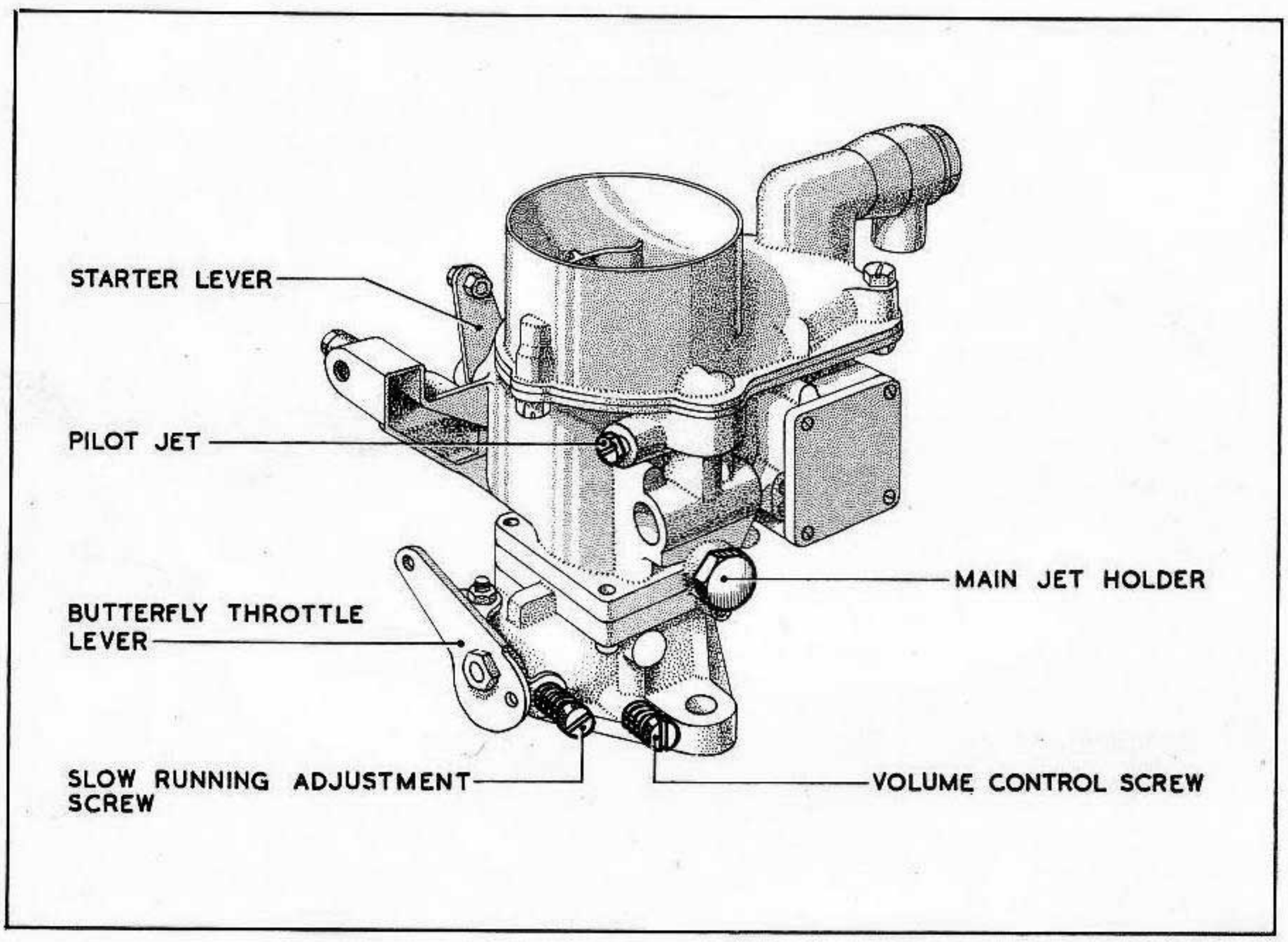

Fig. 6
Solex Carburetter Type 32BI

The starting device

The air and petrol jets are determined by experiment to suit the engine for which the carburetter is issued, and it is very seldom that an alteration is required.

Should adjustment be needed, however, due to change of climate or altitude, never alter the air jet without consulting the makers or one of the Solex Service Stations, for this is determined once and for all on a cylinder capacity basis.

Use a larger or smaller petrol jet as indicated by the symptoms.

(1) If starting from cold is not practically instantaneous, or the engine stalls immediately after starting, a size larger petrol jet is required.

(2) If black exhaust fumes occur, or there are other signs of over-richness, such as hunting immediately after the engine is started, particularly when the dashboard knob is pushed half-way in, a smaller petrol jet is required.

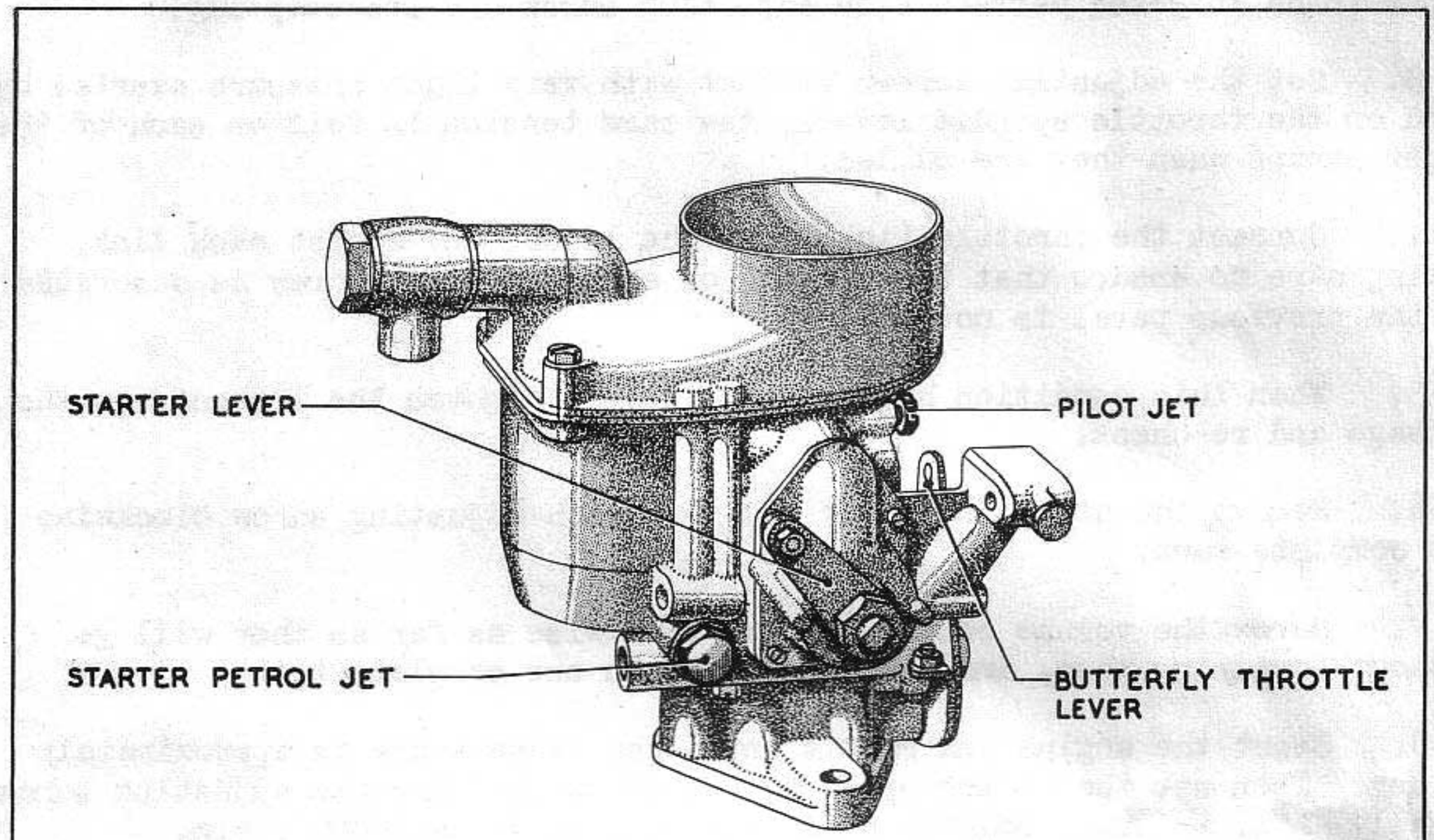

Fig. 7
Solex Carburetter Type 31BI

NOTE:- The fully open position of the starting carburetter control must be used only for starting the engine from cold. Immediately the engine is running the dashboard control should be moved to the intermediate position for a few minutes during the intitial warming up, and then moved again to the fully closed position.

Apart from ensuring that the linkage connecting the starting carburetter is operating correctly, no other attention is necessary.

Main carburetter - Slow running adjustment.

The idling or pilot jet provides the necessary output for idling.

The slow-running screw mounted on the abutment plate of the throttle lever limits the closing of the throttle, and thus fixes the idling speed of the engine. By screwing it in, the engine speed will be increased, and vice versa.

The mixture adjustment or volume control screw, permits the richness of the idling mixture to be varied. By turning it in an anticlockwise direction, enrichment takes place up to the limit of the petrol jet output,

P.T.O.

and conversely, by clockwise rotation, the mixture is weakened.

(1) Poverty of mixture is recognised by the irregular and splashy behaviour of the engine exhaust, and the tendency to stall.

(2) Over-richness will casue the engine to hunt and tend to stall when the hunt becomes excessive.

Therefore if either of the symptoms described in the previous para. develop due to the carburetters having been removed or the settings disturbed, the carburetters should be adjusted by adopting the following procedure:-

1. Disconnect the throttle linkage, so that the initial setting to each carburetter may be made individually.

2. Unscrew each adjusting screw sufficiently to enable a thin strip of paper to be inserted between each adjusting screw and its stop lug.

3. Set the adjusting screws so that with very light pressure exerted by hand on the throttle spindle levers, the same tension is felt on each of the paper strips when they are pulled.

4. Connect the throttle linkage to the levers and adjust each link, taking care to ensure that the setting on each adjusting screw as described in the previous para. is not altered.

5. When this condition has been fulfilled, tighten the locknuts on the linkage and re-check.

6. Remove the strips of paper and turn each adjusting screw clockwise one complete turn.

7. Screw the volume control screws clockwise as far as they will go without straining them, and then unscrew each one complete turn.

8. Start the engine and run it until the temperature is approximately 70 deg. Then set the idling speed by adjusting the throttle adjusting screws equally until the rev. counter registers between 700 and 800 r.p.m.

9. If the idling is unsteady, each volume control screw should be adjusted 1/8 of a turn clockwise to reduce the mixture delivered, or alternatively, 1/8 of a turn anti-clockwise to increase the mixture delivered.

NOTE:- The volume control screws should not be adjusted to less than a 3/4 turn from the closed position, otherwise a flat spot will occur further up the engine speed range.
If however, the engine is unsteady and the mixture appears to be rich with the volume control screws at 3/4 turn from the closed position, the engine may be steadied by changing the slow running jets for one size smaller i.e. - replacing the size 50 jets by size 45, and adjusting the volume control screws to one complete turn from the closed position.

10. With the settings as described above, there may be an occasional misfire on a free engine at the change over position, i.e. when the engine speed is increased, which can be heard faintly close to the exhaust tail pipe. Do not try to overcome this misfire by adjusting the volume control screws, as it disappears completely when the engine is operating under normal road conditions.

August/1949