THE S.U. CARBURETTER

A full description of the electrically controlled auxiliary enrichment device

ON certain installations an electrically operated auxiliary carburetter is used in conjunction with a single or a multiple installation of S.U. carburetters. This may be controlled either by a thermostatically or manually operated switch.

In all cases where this additional starting device is employed, the more usual means of manually withdrawing the jet for enrichment is, of course, omitted. The device is diagrammatically illustrated in Fig. 4.

Before considering the construction and operation of the additional apparatus involved, reference may first be made to Fig. 5, which shows the somewhat simplified construction of the main carburetter jet. It will, of course, be realised that it is still necessary, in the case of the main jet of the carburetter, to provide facilities for centring, as referred to in previous articles. Similarly, provision must also be made for some degree of vertical adjustment of the jet in order to achieve the correct idling mixture strength.

Reference to Fig. 5 will show that the general construction of this jet, which is mounted within a pair of jet bearings, follows closely the design of those described previously. It will be seen, however, that the jet does not emerge from the lower jet bearing but terminates in a flange (50) which forms the lower abutment for the loading spring.

Thus, the jet is urged downwards by the load of the gland spring, the lower face of the flanged end (50) coming into contact with the adjusting screw (51). A cap nut (52) encloses the adjusting screw (51) which, when tightened in position, seals the bottom of the lower jet bush against leakage of fuel which would otherwise occur down the thread of the adjusting screw. The operation of centring the jet is identical with that already described.

Idling Adjustment

The process of adjustment for idling differs, however, from that formerly described in that the operation is performed by rotation of the slotted head of the screw (51). The general procedure for this adjustment is, of course, similar to that given for the normal sliding type of jet, with the exception that the dome nut (52) must first be removed, and the vertical movement of the jet for this purpose performed by the application of a screwdriver to the head of the adjusting screw (51). During this process of adjustment some slight leakage of fuel may occur but it will, of course, discontinue as soon as the cap nut (52) is replaced.

The enrichment apparatus for starting is, in effect, an auxiliary carburetting system and is shown in Fig. 4. The main body casting (34), containing a solenoid-operated valve and fuel metering system, is illustrated as a separate unit attached by means of a ducted mounting arm to the base of the main carburetter fuel inlet.

The auxiliary carburetter forms, therefore, a separate unit additional to the normal float-chamber, retained by the hollow cross-drilled bolt (43). In certain cases, however, the casting (34) is formed integrally with the main float-chamber body (33), drawing its fuel supply directly therefrom.

Fuel is supplied, in either case, to the base of the jet (42) which is obstructed to a greater or lesser degree by the tapered slidable needle (45).

When the device is in action air is drawn from atmosphere through the air intake (40) and thence through the passage (41), being carburetted with fuel as it passes the jet (42). The mixture is thence carried upwards past the shank of the needle (45) through the passage (49) and so past the aperture provided between the valve (36) and its seating (35). From here it passes directly to the induction manifold through the external feed pipe shown.

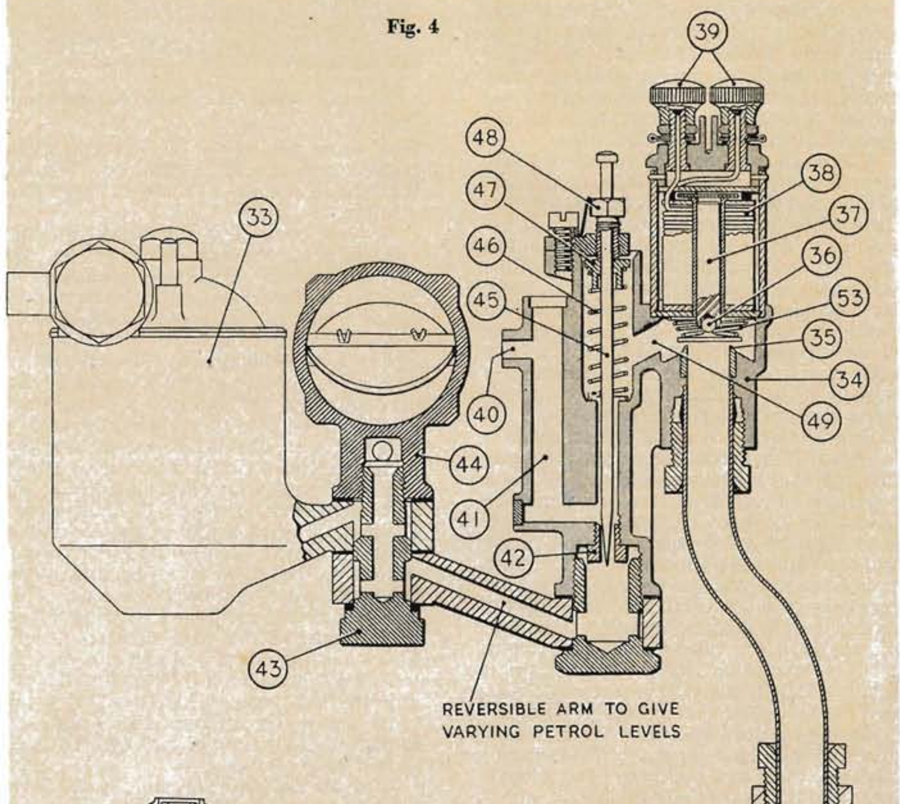
The device is brought into action by energising the winding of the solenoid (38) from the terminal screws (39). The centrally located iron core (37) is thus raised magnetically, carrying with it the ball-jointed disc valve (36) against the load of the small conical spring (53) and thus uncovering the aperture provided by the seating (35).

Considering the function of the slidable needle (45), it will be seen that this is loaded upwards in its open position by means of the light compression spring (46) which abuts against a collar (47) attached to the shank of the needle. The needle continues upwards through the vertically adjustable stop (48) in which it is slidably mounted and it finally terminates in an enlarged head.

Depression within the space surrounding the spring (46) is directly derived from that prevailing in the induction tract and this exerts a downwards force upon the disc (47) which is provided with an adequate clearance with its surrounding bore. This tends to overcome the load of the spring (46) and to move the needle downwards, thus increasing the obstruction afforded by the tapered section which enters the jet (42).

The purpose of this device is to provide two widely different degrees of enrichment, the one corresponding to idling or light cruising conditions, and the other to conditions of open throttle or full-power

Fig. 4



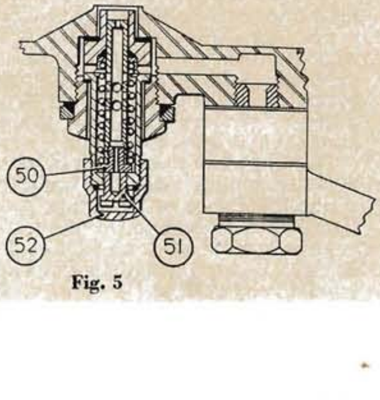


Fig. 5

operation. In effect, under the former conditions, the high induction depression prevailing will cause the disc (47) to be drawn downwards,. drawing the tapered needle into the jet (42), while, under the latter, the lower depression existing in the induction tract will permit the disc to maintain its upward position with the needle withdrawn from the jet.

The tuning elements concerned in this device are the size and degree of taper of the lower end of the needle (45), the diameter of the disc (47), the load provided by the spring (46) and the degree of movement permitted to the needle assembly, as determined by the adjustment of the stop (48).

In most installations the solenoid (38) is energised by means of a thermostatically operated switch housed within the cylinder head water jacket. This is generally arranged to bring the apparatus into action at temperatures below about 30–35° C. In some instances, however, a manual switch is provided, and in such cases a warning light is generally provided to indicate to the driver that the apparatus is in operation.

It will, of course, be understood that the normal adjustment to the main carburetter or carburetters, as dealt with in a previous article, must be performed with the engine at its normal running temperature before any attempt is made to tune the auxiliary enrichment device.

As it can generally be assumed that the tapered form of the needle (45), the strength of the spring (46), and the diameter of the disc (47) have already been appropriately chosen, tuning is generally confined to the adjustment of the stop-screw (48). It will be appreciated that the main purpose of this adjustment is to limit the downward movement of the needle, the head of which abuts against the upper surface of the stop-screw at the lower extremity of its travel. The final downward movement of this needle determines, as has been described, the degree of enrichment provided, with the auxiliary enrichment carburetter in operation, under idling conditions.

An approximate guide to its correct adjustment in this respect is provided by energising the solenoid when the engine has already attained its normal running temperature. The stop-screw (48) should then be so adjusted that the mixture is distinctly although not excessively rich, that is to say, until the exhaust gases are seen to be discernibly black in colour, but just short of the point where the engine commences to run with noticeable irregularity.

Anti-clockwise rotation of the stop-screw will, of course, raise the needle under these conditions, and increase the mixture strength, while rotation in the contrary direction will have the opposite effect. In order to energise the solenoid under conditions when the thermostatic switch will normally have broken the circuit, it is merely necessary to short-circuit the terminal of the thermostatic switch directly to earth or, if this is not readily accessible, to make a connection between the appropriate terminal of the pair (39) to earth by means of a separate wire. In cases where a manual switch is provided, no difficulty, of course, arises in bringing the auxiliary enrichment carburetter into action under any condition of engine temperature.

(To be concluded next month)

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