ZENITH STROMBERG CARBURETTORS

Starting from Cold (Fig. 1)

The mixture is enriched from cold starting when the choke control is pulled. This operates a choke cam lever (71) which rotates the starter bar (26) to lift the air valve (9) and needle (11), thus increasing the area of the annulus between needle and jet orifice. Simultaneously, a cam on the cam lever (71) opens the throttle beyond its normal idle position to provide increased idling speed, according to the setting of the cam screw (66).

When the motor fires the increased depression will lift the air valve (9) to weaken the initial starting mixture and prevent the engine stalling through over richness.

Whilst the choke remains in action the car may be driven away but the control knob should be released or pushed in gradually as the engine attains normal working temperature. This will progressively decrease the extent of enrichment and the degree of throttle opening for fast-idle to the point where the cam screw (66) is out of contact with the cam on the choke lever and the throttle is permitted to return to the normal idle position as determined by the setting of the throttle stop screw (27).

NOTE: The accelerator pedal should not be depressed when starting from cold.

Normal Running (Fig. 1)

With the opening of the butterfly throttle manifold depression is transferred, via a drilling (9a) in the air valve, to the chamber (9b) which is sealed from the main body by the diaphragm (8).

The pressure difference between chamber (9b) and that existing in the bore (9c) causes the air valve to lift, thus any increase in engine speed or load will enlarge the effective choke area since the air valve lift is proportional to the weight of air passing the butterfly throttle (16). By this means air velocity and pressure drop across the jet orifice remain approximately constant at all speeds.

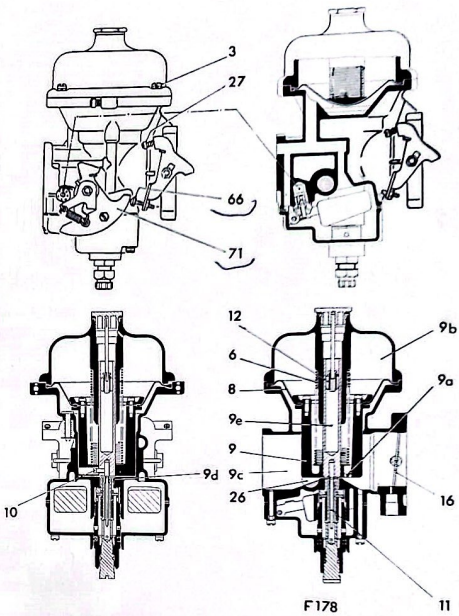
As the air valve (9) rises it withdraws a tapered metering needle (11) held in the base of the air valve by the locking screw (10), from the jet orifice (9d) so that fuel flow is increased relative to the greater air flow.

Acceleration

At any point in the throttle range a temporarily richer mixture is needed at the moment of further throttle opening. To provide this, a dash pot or hydraulic damper is arranged inside the hollow guide rod (9e) of the air valve.

The rod is filled with S.A.E. 20 oil to within a $\frac{1}{4}$" of the end of the rod in which the damper (12) operates, when the throttle is opened, the immediate upward motion of the air valve is resisted by this plunger during which time the suction or depression at the jet orifice is increased to enrich the mixture.

The downward movement of the air valve (9) is assisted by the coil spring (6).



3 Top cover screw
6 Coil spring
8 Diaphragm
9 Air valve
10 Locking screw
11 Metering needle
12 Damper
16 Butterfly throttle
26 Starter bar
27 Throttle stop screw
66 Cam screw
71 Choke cam lever
9a Air valve drilling
9b Chamber
9c Bore
9d Jet orifice
9e Guide rod

Fig. 1. Carburettor functional diagram

1 Attachment bolts
2 Cover plate
3 Cleaner elements
4 Gasket
5 Back plate
6 Flange gasket
7 Centre bolt
8 Flange gasket

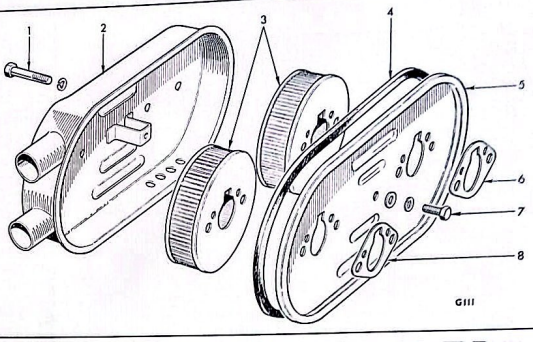


Fig. 15. Air cleaner details

Testing (Fig. 17)

To test the petrol pump pressure, disconnect the fuel delivery line at the rubber connector. Remove the connector and attach a plastic hose to the fuel delivery pipe as shown. Start the engine, and allow it to run on the fuel remaining in the carburettor until the gauge reading on the PRESSURE scale ceases to rise. Stop the engine and observe the gauge pressure which should remain at its highest reading for a short period. A rapid fall off indicates a leaking diaphragm or a sticking outlet valve. Failure to read within a tolerance of 1½—2½ per sq. in. (0·106 to 0·176 kg/sq. cm.) indicates a defective pump or pipe line blockage.

AIR CLEANER

The air cleaner comprises two paper elements housed in a container attached to the carburettor intake flanges. When operating under conditions similar to those prevailing in the United Kingdom both elements should be removed for cleaning every 6,000 miles. Depending upon the severity of conditions, this period should be reduced where excessive amounts of dust are encountered. A choked air cleaner will adversely affect combustion efficiency.

To remove the cleaning elements, unscrew four bolts (1) securing the container to the carburettor flanges. (See Fig. 15)

Withdraw the container from the carburettor flanges, remove the centre bolt (7), take off the cover plate (2), and lift out the elements (3).

Clean out the container and use a high pressure air line, or foot pump, to remove dust from between the folds of the paper elements. Renew the elements when they can no longer be cleaned effectively.

Renewing the gaskets (4), (6) and (8) as necessary, re-assemble the air cleaner by reversing the foregoing procedure, and note the position of the slots relative to the carburettor flanges as shown on Fig. 16.

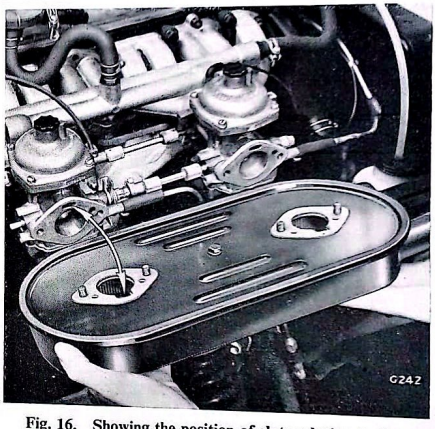


Fig. 16. Showing the position of slots relative to the carburettor flanges

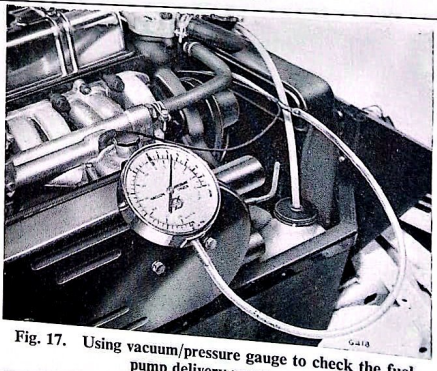


Fig. 17. Using vacuum/pressure gauge to check the fuel pump delivery pressure

Starter Bar Adjustment

27. Pull the choke control until the lifting edge of the starter bar on the rear carburettor just contacts the underside of the air valve when resting on the bridge. Turn the starter bar lever (23) on the front carburettor to obtain a similar condition and whilst both starter bars are thus held, tighten the clamping bolt (34). The engine should now be started and run until normal running temperature is reached before making final adjustments.

Idling and Synchronising Adjustments

Two adjustment screws are used to regulate the idle speed and mixture of each carburettor. The throttle stop screws (27) control the speed and the jet adjusting screws (41) alters the ratio of air-fuel mixture entering the cylinders. Viewed from underneath, turn each jet adjusting screw **clockwise** to weaken the mixture strength, and **anti-clockwise** to enrich it.

Whilst the engine is thoroughly warm, the air cleaners removed and the jet adjusting screws set as described in operation 26, adjust the stop screws (27) to give idling speed of 600/650 r.p.m.

The idling mixture is correct when the engine beat is smooth and regular and the air intake is equal on both cylinders. This may be assessed by the amount of "hiss" as the air enters each carburettor, or by using the equipment shown on Fig. 13 which gives a comparative measurement of air flow.

As a check, lift the air valve a very small amount ($\frac{1}{32}$") using the piston-lifting pin (37) and listen to the effect on the engine. If the engine speed rises appreciably, the mixture is too rich, and if the engine stops, the mixture is too weak. By properly adjusting the jet screws, the engine speed will either remain constant or fall slightly on lifting the air valve.

Finally re-adjust the fast idling screw (66) to provide a clearance of $\frac{1}{16}$" between the head of the screw and the adjacent face of the cam (71) as shown on Fig. 11.

NOTE: Satisfactory idling depends upon the general engine condition and tappet adjustment, spark plugs, and ignition timing, which should be inspected if idling is not stable.

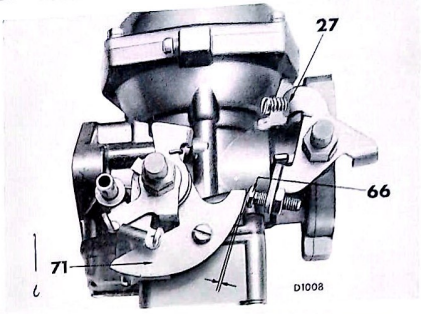


Fig. 11. Choke, cam and throttle adjusting screws

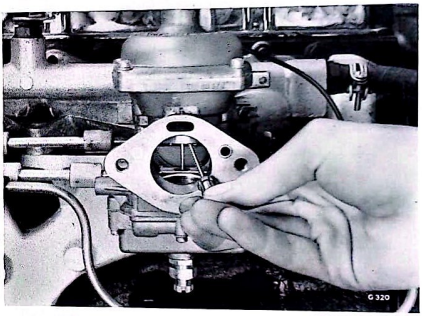


Fig. 12. Lifting the air valve for jet centering

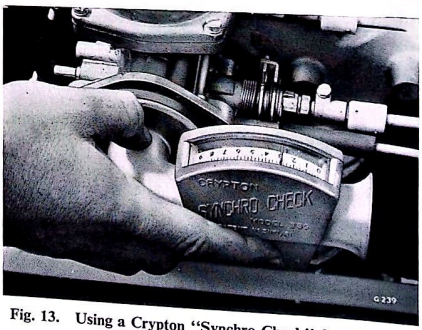


Fig. 13. Using a Crypton "Synchro Check" for balancing the air intake

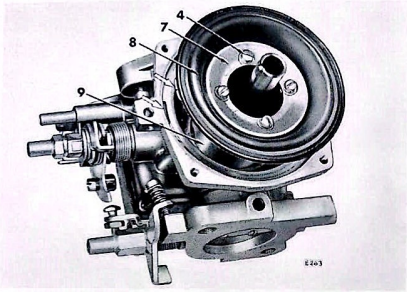


Fig. 9. Diaphragm assembly

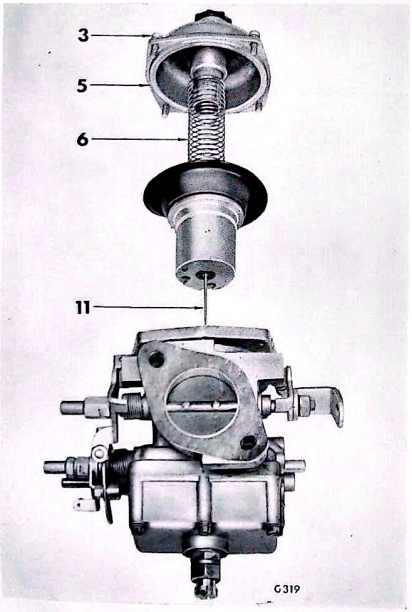


Fig. 10. Air valve details

corresponding recess adjacent to the choke outer cable fixing. Ensure that the outer edge of the diaphragm locates in the bore of the flange face.

19. Assemble the spring (6) over the air valve stem, locate the cover (5) on the stem and rotate the cover to bring the scribed marks into alignment. (See Dismantling, Operation 4.) Secure the cover by tightening four screws (3). Replenish the damper with oil (S.A.E. 20) and screw in the damper assembly (12).

Installation (Fig. 2)

20. Assemble the couplings (36), (33) to both carburettors, leaving the clamping bolts (34), (65) slack at this stage.
21. Using new gaskets (14) and insulators (15), assemble to each pair of studs on the manifold—a gasket, insulator, gasket, a carburettor and secure each assembly with two nuts and spring washers.
22. Reconnect the fuel pipes, vacuum pipe and before reconnecting the controls slacken back the throttle stop screw (27) of the rear carburettor and turn the cam screw (66) away from the cam to ensure that the throttle valve and choke cam lever are in the fully closed positions.
23. Slacken back the throttle stop screw (27) on the front carburettor and **only when both throttle valves are completely closed, tighten the coupling clamp bolt (65).**

Jet Centralisation

Efficient operation of the carburettor depends upon a freely moving air valve and a correctly centred needle in the jet orifice.

Check the air valve for free movement by lifting and releasing the valve, which should fall freely onto the bridge. Sluggish action indicates either (I) a sticking air valve which can be rectified by removing and cleaning the valve and bore with paraffin, or (II) by re-centralising the jet as follows:

24. Lift the air valve (9) and fully tighten the jet bushing screw (48). Screw up the orifice adjusting screw (41) until the orifice is just above the bridge.
25. Slacken off the jet bushing screw sufficiently to release the orifice bush (56), then allow the air valve to fall; this action will centralise the bush. Tighten the bushing screw to lock the bush and re-check by lifting and releasing the air valve. Repeat the procedure until a freely falling piston results.
26. Turn the adjusting screw (41) until it just contacts the underside of the air valve when it is resting on the bridge. From this position, unscrew the adjusting screw a further three turns to give an approximate jet position from which to work when synchronising the carburettors.

Float Chamber (Fig. 7)

10. Placing an aluminium washer (52) over the threads of the needle valve (51) screw the valve firmly into the carburettor body.
11. Place the float assembly (46) into position and secure it with the fulcrum pin (45) as shown on Fig. 7. Check that the highest point of the float when the needle is against its seating, is 18 mm. above the face of the main body. See "A". Reset the level by carefully bending the tag which contacts the end of the needle. The addition of a thin fibre washer under the needle valve seat will lower the fuel level.

Jet Assembly (Figs. 6 and 8)

12. Insert a new "O" ring (55) in the recess of the bushing (56). Slide the spring (50) over the jet (49) followed by the washer (54). Insert the jet assembly into the "O" ring already positioned in the bushing.
13. Locate an aluminium washer (57) over the upper stem of the bushing and insert the completed assembly into the carburettor body.
14. Exercising care to avoid damage, spring a new "O" ring (47) into the external groove of the bushing screw (48). Similarly, fit a new "O" ring (40) to the jet adjusting screw (41). Screw the adjusting screw into the bushing screw approximately three turns. Screw the assembled bushing screw into the carburettor body until finger tight, then unscrew it one complete turn and looking down on the bridge, move the jet to its approximate centre.
15. Locate a new gasket (53) on the float chamber flange of the carburettor body and mount the float chamber (44) over the bushing screw (48). Loosely insert the screws (42), (43), press the float chamber into contact with the gasket and finally tighten the six securing screws.

Air Valve Diaphragm Assembly (Figs. 9 and 10)

16. A locating tab is moulded on the inner and outer peripheries of the rubber diaphragm (8). These locate in a corresponding recess formed in the top face of the air valve (9) and in the top flange of the carburettor body. To assemble the diaphragm, locate the inner tab in the air valve recess and ensure that the inner bore of the diaphragm locates correctly around a shoulder formed on the top face of the valve. Place the retaining ring (7) over the diaphragm, insert the four screws (4) and tighten them securely.
17. Insert the needle (11) into its bore in the lower face of the valve and whilst the shoulder on the needle is held flush, relative to the lower face of the valve, tighten the screw (10). (Fig. 2)
18. Exercising care to avoid damaging the needle, insert the air valve into its bore in the carburettor, simultaneously entering the needle into the jet. Rotate the valve until the outer tab of the diaphragm can be inserted into a

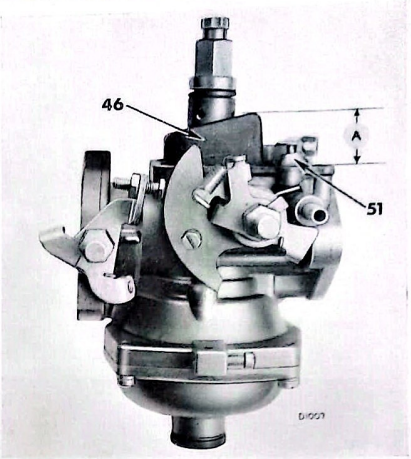


Fig. 7. Measuring float height

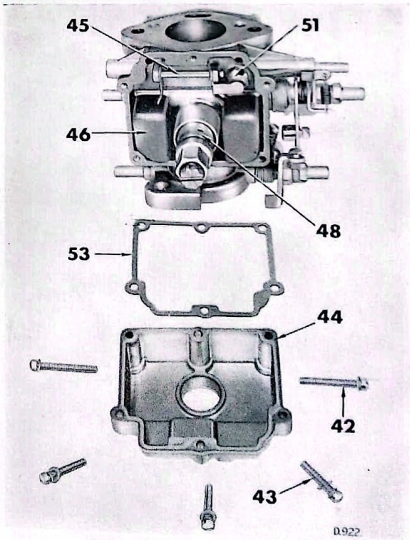


Fig. 8. Float chamber cover details

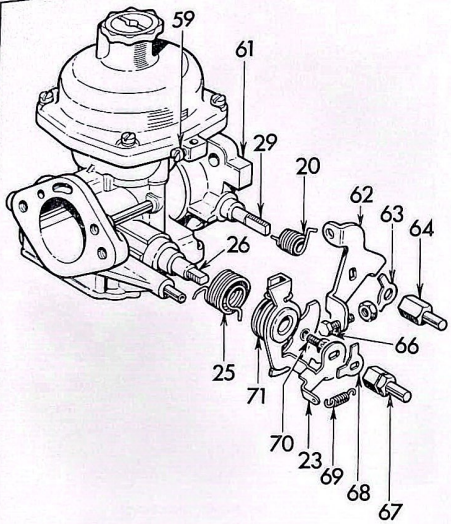
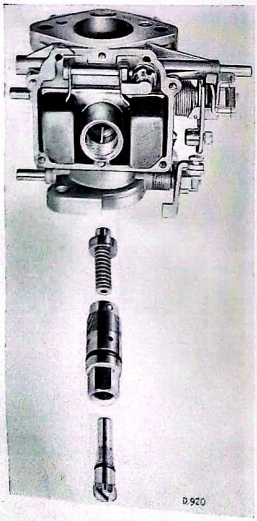


Fig. 5. Starter bar and throttle lever details



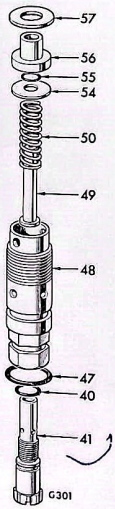


Fig. 6. Jet details

To re-assemble

Valve Lifting Pin

1. Insert the air valve lifting pin (37) into the body of the carburettor, assemble the spring (39) and secure it by springing the clip (38) over the pin.

Starter Bar and Lever Assembly

2. Spring the circlip (32) over a groove at the end of the starter bar spindle (26) and with the flat milled face uppermost, insert the spindle into the carburettor body.
3. With the larger coils leading, place the spring (25) over the large part of the spindle boss and locate the spring ends at each side of the fuel pipe.
4. Assemble the choke cam lever assembly (71) on the smaller diameter of the spindle boss, placing the cam adjacent to the spring (25) and towards the throttle spindle.
5. Locate the lever (23) on the flats of the spindle (26) and in correct relation to the cam lever assembly (71) as shown on (Fig. 5). Pull the outer end of the spring (25) into engagement with a cut-out on the lower extremity of the lever (23).
6. Fit the lockplate (68), tighten the coupling nut (67) and lock it by turning the ends of the lockplate. Insert the ends of the spring (69) through holes provided at the extremities of the levers (23) and (71).

Throttle Valve and Spindle Assembly

7. Insert the spindle (29) into the bore of the carburettor, centralise the spindle and rotate it to bring the two counter sunk holes upwards. Ensuring that the two raised "pips" on the face of the valve are upwards and outwards, slide the valve into the slotted spindle until the "pips" contact the spindle. Turn the spindle to close the throttle and secure the valve by securely tightening two screws (17).
8. With the larger coils leading, place the spring (20) over the throttle spindle boss, at the same side as the choke cam lever. With the butterfly in the closed position, engage the stop lever (62) over the flats on the spindle, simultaneously engaging the ends of the spring as shown on Fig. 7, to ensure that the valve is spring loaded in the closed position.
   Fit the lockplate (63), tighten the coupling nut (64) and secure by turning the lockplate.
9. Locate the throttle stop lever (21) on the flats of the throttle spindle, at the opposite end to the actuating lever, followed by the connecting link (58). Secure the lever and link with a lock washer and nut.

To Dismantle

1. Take off the air cleaners (page 1·309), disconnect the carburettors from the manifold by unscrewing four nuts.
2. Uncouple the clamping bolts (65) (34) and separate the carburettors from each other.
3. Unscrew the dampers (12) and drain the oil from the dash pots.
4. Take out four top cover screws (3) and, to facilitate assembly, scribe a line across the upper flanges. Lift off the top cover (5) and coil spring (6), taking care to separate the air valve diaphragm (8) which, in some instances, may tend to stick to the cover.
5. Exercising care to avoid damaging the needle (11), withdraw the air valve/diaphragm assembly from the carburettor body.
6. Turn the carburettor onto its flange face and unscrew the bushing screw assembly, which comprises items (40), (41), (47) and (48).
7. Release the cover (44) by removing three screws (42) and three screws (43).
8. Lift out the jet assembly which comprises items (49), (50), (54), (55), (56) and (57).
9. Slide out the fulcrum pin (45), lift out the float assembly (46) and unscrew the needle valve (51) with washer (52).

Butterfly Spindle Assembly

10. Unscrew the nut and withdraw the throttle lever and stop (21) from the spindle (29).
11. Turn back the lock plate (63), unscrew the coupling nut (64), unhook the spring (20) and withdraw the stop lever (62) and return spring from the spindle.
12. Take out two screws (17) and slide the butterfly throttle valve from the slotted spindle (29). Withdraw the spindle from the carburettor body.

Starter Bar

13. Turn back the lock plate (68), unscrew the coupling nut (67) and withdraw the lock plate, the choke cam lever assembly (71), with lever (23) and spring (69) attached, and the return spring (25).
14. Withdraw the starter bar spindle (26) from the carburettor body and extract the circlip (32).
15. Complete the dismantling operation by extracting the spring clip (38) and removing the air valve lifting pin (37) and spring (39).

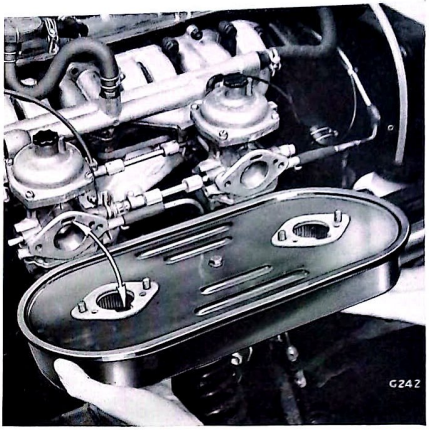


Fig. 3. Air cleaner attachment

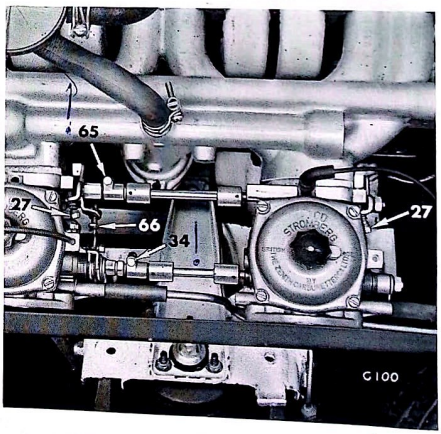


Fig. 4. Carburettor adjustment points

Key to Fig. 2

1 Sleeve
2 Nut
3 Top cover screw
4 Screw
5 Top cover
6 Coil spring
7 Retaining ring
8 Diaphragm
9 Air valve
10 Locking screw
11 Needle
12 Damper
13 Pipe
14 Gasket
15 Insulator
16 Butterfly throttle valve
17 Screws
18 Grommet
19 Bracket
20 Spring
21 Throttle stop lever
22 Nuts
23 Lever
24 Bush
25 Return spring
26 Starter bar spindle
27 Throttle stop screw
28 Spring
29 Throttle spindle
30 Fuel pipe connector
31 Pipe
32 Circlip
33 Coupling
34 Clamping bolt
35 Pin
36 Coupling
37 Air valve lifting pin
38 Spring clip
39 Spring
40 "O" ring
41 Orifice adjusting screw
42 Screw (long)
43 Screw (short)
44 Float chamber cover
45 Fulcrum pin
46 Float assembly
47 "O" ring
48 Bushing screw
49 Jet
50 Spring
51 Needle valve
52 Washer
53 Gasket
54 Washer
55 "O" ring
56 Bushing
57 Washer
58 Connecting link
59 Screw
60 Petrol inlet
61 Body
62 Stop lever
63 Lock plate
64 Coupling nut
65 Clamping bolt
66 Cam screw
67 Coupling nut
68 Lock plate
69 Spring
70 Cam screw
71 Choke cam lever
72 Nut

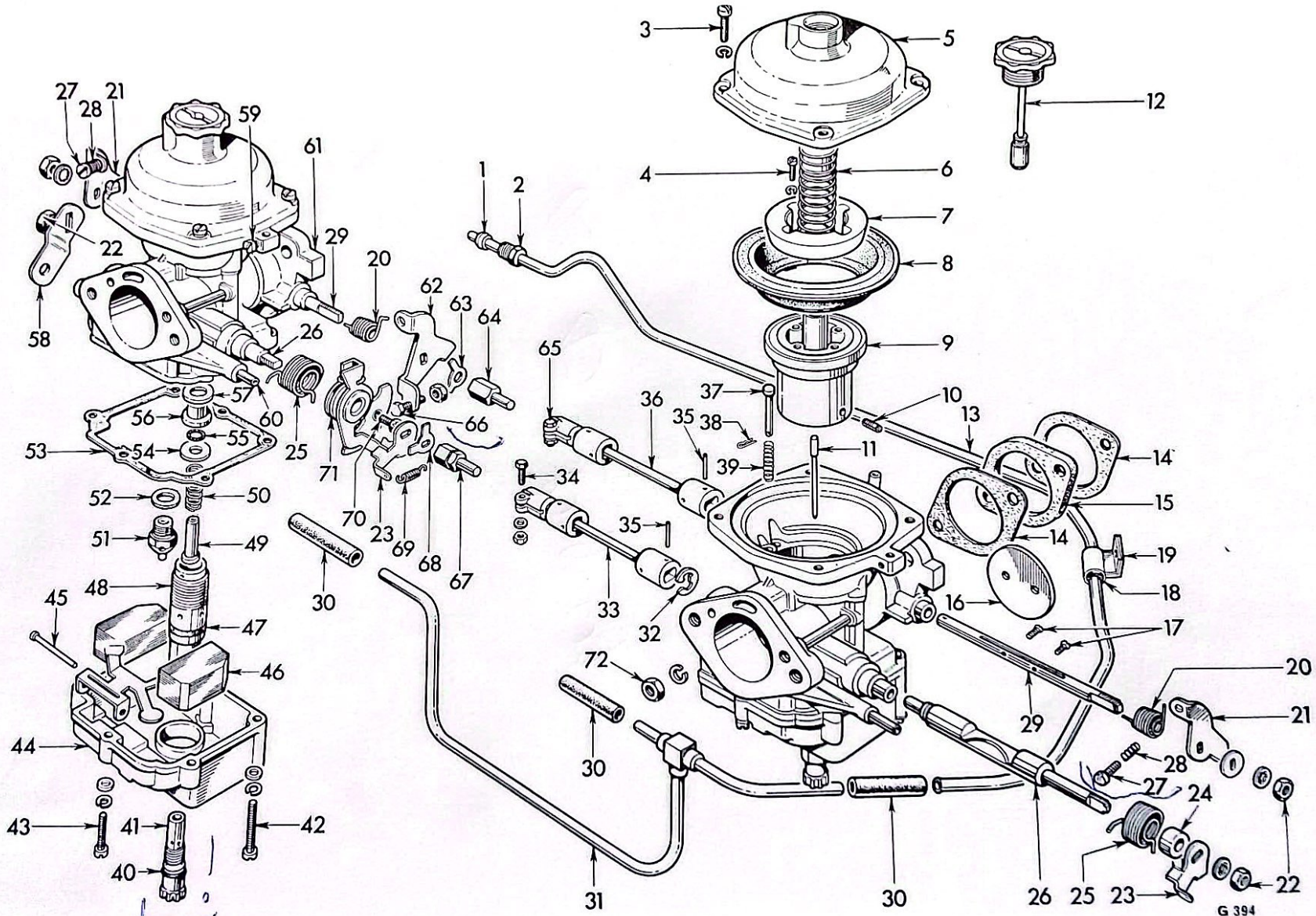


Fig. 2. Carburettor details