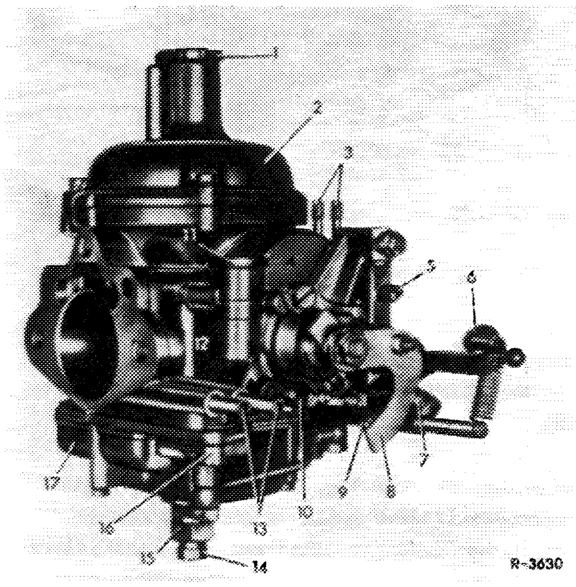
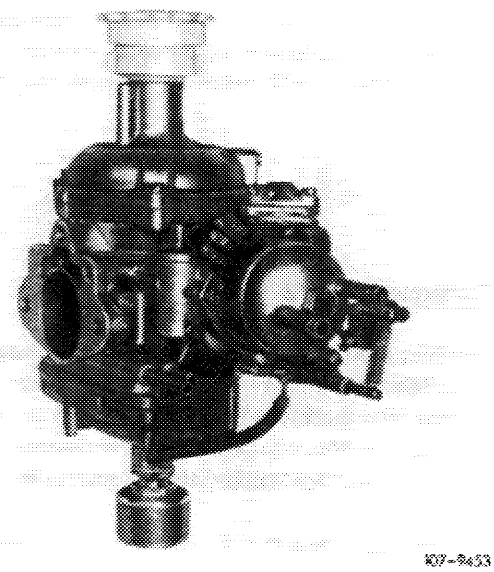
Revision: Revised; 175 CDT, USA-version model year 1973 added.

General Description

A. General





Stromberg-crossdraft-carburetor 175 CDS/CDT

175 = 1 3/4" (45 mm) intake manifold diameter, CD = constant depression, S = starter rotary slide valve, T = automatic starting device

Fig. 07-1/1
175 CDS

Fig. 07-1/2 107-9453
175 CDT

1 Closing plug
2 Carburetor cover
3 Vacuum connections
4 Starter housing
5 Full throttle stop
6 Throttle valve lever
7 Starter adjusting screw
8 Starter lever
9 Idle adjusting screw
10 Connecting rod
11 Float chamber vent valve
12 Carburetor housing
13 Fuel connections
14 Idle mixture adjustment screw
15 Lock screw
16 Fuel return valve
17 Float chamber cover

The Stromberg-CD-carburetor operates on the principle of a variable venturi (air horn) cross section. For fuel metering, only one needle nozzle (6) and one conical nozzle needle (9) (Fig. 07-1/3) are used.

The venturi cross section adapts itself to the respective air rate, which results in almost constant air velocity and constant vacuum at fuel outlet (CD= constant depression). Good fuel atomization is therefore assured in all speed ranges of engine.

The float chamber (36) is provided with a double float (13) and is located concentrically around the fuel inlet of the needle nozzle. This makes the carburetor to a great extent independent of positional changes of the vehicle (Fig. 07-1/4).

The richer fuel mixture required for a cold start is obtained by a mechanically actuated starter rotary slide valve (29) (Fig. 07-1/4).

On carburetors with automatic starting device, the bimetallic spring in starter cover is heated electrically and by means of hot water when the ignition is switched on.

Hot water heating is necessary to prevent reengagement of starter when engine is stopped for a short moment.

The Stromberg carburetor is provided with a float chamber vent valve which can be switched from inside to outside ventilation, and with a fuel return valve, which is controlled by the intake manifold vacuum.

During the winter with the car heater operating, the carburetor is heated with cooling water (37) (Fig. 07-1/4), in the area of the needle nozzle.

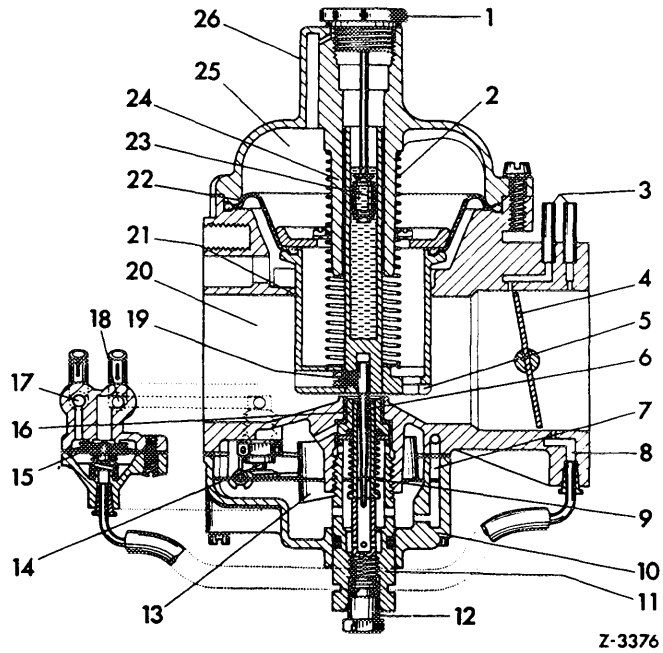


Fig. 07-1/3

Carburetor with Fuel Shutoff Valve

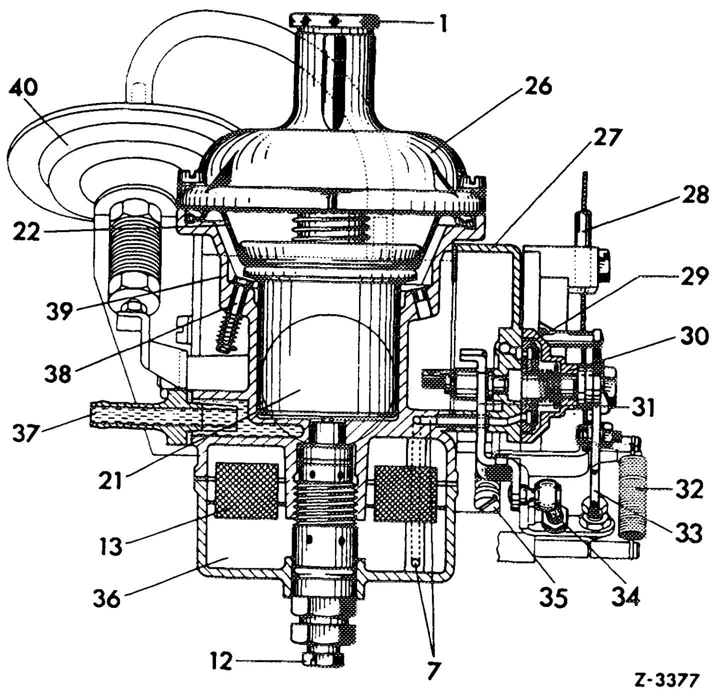
The fuel shutoff valve is simultaneously designed as an idle-fuel control screw (12). For safety reasons, the shutoff valve is controlled via a time-lag relay, so that the fuel flow is not stopped when the electrical supply line in interrupted.

With the ignition switched on, the shutoff valve is deengergized and therefore open. When the ignition is switched off, the shutoff valve is energized for 4-8 seconds by the time-lag relay and will therefore close valve (fuel flow interrupted).

Following this time-lag, the valve is once again deenergized (valve open). When the ignition is switched on during the time-lag, the shutoff valve is again deenergized and is therefore once again open.

Fig. 07-1/4

1 Closing plug
2 Compression spring
3 Vacuum connections
4 Throttle valve
5 Compensating bores
6 Needle nozzle
7 Duct
8 Vacuum bore
9 Nozzle needle
10 Float chamber cover
11 Lock screw
12 Idle mixture adjustment screw
13 Double float
14 Float needle valve
15 Vacuum diaphragm
16 Guide tube
17 Fuel return connection
18 Fuel intake connection
19 Shank screw
20 Mixing chamber
21 Air piston
22 Diaphragm
23 Damper (dashpot)
24 Guide bushing
25 Vacuum chamber
26 Carburetor cover
27 Starter housing
28 Starter cable
29 Starter rotary slide valve
30 Starter cover
31 Actuating lever vent valve
32 Return spring
33 Starter lever
34 Connecting rod
35 Idle adjustment screw
36 Float chamber
37 Heating connection
38 Tickler
39 Carburetor housing
40 Vacuum governor



B. Method of Operation

Normal Operation

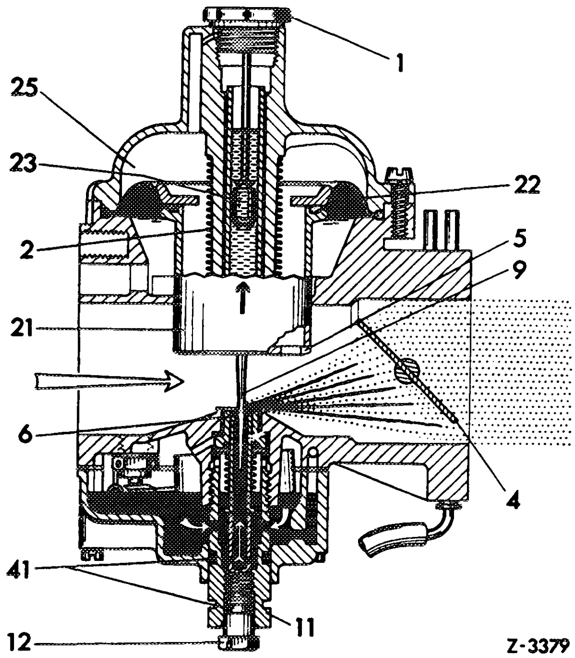


Fig. 07-1/5

Partial load mode of operation

1 Screw plug
2 Compression spring
4 Throttle valve
5 Compensating ports
6 Needle nozzle
9 Nozzle needle
11 Lock screw
12 Idle mixture adjustment screw
21 Air piston
22 Diaphragm
23 Damping element
25 Vacuum chamber
41 Ring seals

Upon opening of the throttle valve (4), the suction line vacuum is transferred to the vacuum chamber (25) via two compensating ports (5) in the air piston (21). A rubber diaphragm (22) seals the vacuum chamber off against the carburetor housing. The difference in pressure between the vacuum chamber and the pressure existing below the diaphragm causes an upward motion of the air piston.

Lifting of the air piston is contingent upon load and rpm, i. e., the air piston position and thus the air horn cross section vary with the amount of air taken in by the engine.

Both air velocity and vacuum at the needle nozzle fuel outlet (6) remain approximately constant.

A conical nozzle needle (9) connected to the air piston head is moved simultaneously. The greater the amount of air drawn through the carburetor, the further is the air piston moved upward and, consequently, the nozzle needle (9) lifted from the needle nozzle (6). This increases the flow area (annular clearance) for the fuel.

From the float chamber the fuel flows through bores in the lock screw (11) into the needle nozzle (6) where it is kept at the same level as in the float chamber when the engine is not running. With the engine running, the fuel is drawn off from the needle nozzle by the vacuum which exists in the emulsion camber.

Idle

With the engine idling, the air piston and thus the nozzle needle (9) are lifted slightly, depending upon the position of the throttle valve. The throttle valve position angle and thus the idling speed are adjusted in a conventional manner by the customary idle adjustment screw. The vacuum can therefore become effective at the fuel outlet opening of the needle nozzle (6).

Fuel throughput is dependent upon the annular clearance between nozzle needle and needle nozzle. Vertical adjustment of the needle nozzle by way of the idle mixture adjustment screw (12) will either increase or decrease the annular clearance.
Screwing-in results in a smaller annular clearance (lean mixture), screwing-out results in a larger annular clearance (richer mixture).

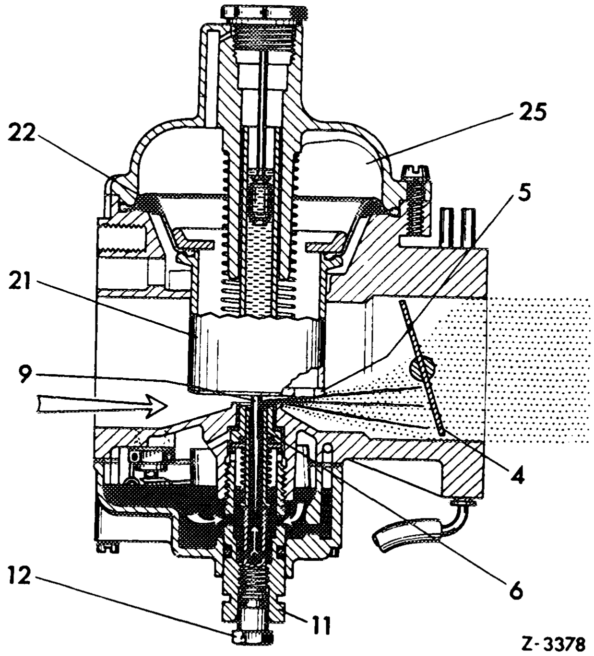


Fig. 07-1/6

Idle mode of operation

- 4 Throttle valve
- 5 Compensating ports
- 6 Needle nozzle
- 9 Nozzle needle
- 11 Lock screw
- 12 Idle mixture adjustment screw
- 21 Air piston
- 22 Diaphragm
- 25 Vacuum chamber

Acceleration

Upon sudden opening of the throttle valve, a damping element (23) installed in the air piston (21) serves to prevent an immediate upward movement of the air piston. This results in a short-term vacuum increase at the needle nozzle and enrichment of the fuel mixture.

In order to ensure trouble-free functioning of the damping element, only the prescribed oil makes and grades may be used (see Job No. 00-0).

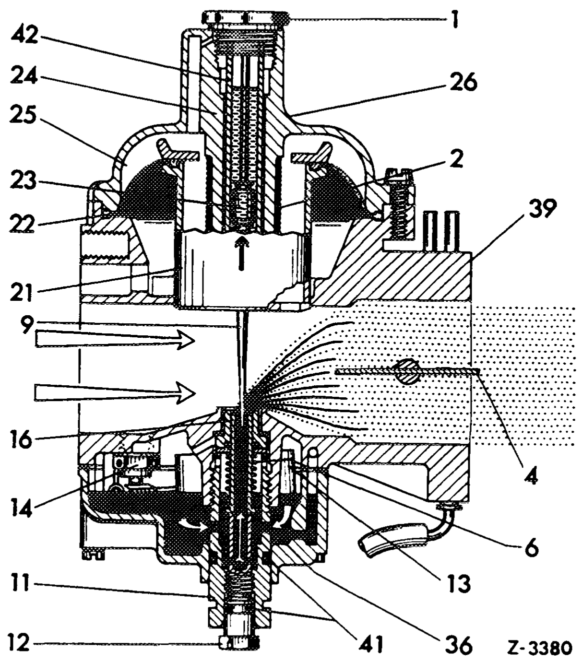


Fig. 07-1/7

Full-load mode of operation

- 1 Screw plug
- 2 Compression spring
- 4 Throttle valve
- 6 Needle nozzle
- 9 Nozzle needle
- 11 Lock screw
- 12 Idle mixture adjustment screw
- 13 Dual float
- 14 Float needle valve
- 16 Guide tube
- 21 Air piston
- 22 Diaphragm
- 23 Damping element
- 24 Guide bushing
- 25 Vacuum chamber
- 26 Carburetor cover
- 36 Float chamber
- 39 Carburetor housing
- 41 Ring seals
- 42 Air piston

Start Mechanism

a) Mechanical Starting Device

The carburetor is equipped with an additional start mechanism which is actuated by the starter cable.

Pulling the starter cable will turn the starter rotary slide valve (29), and at the same time, the throttle valve is opened to some extent. When the engine is started, fuel can therefore be drawn in from the float chamber via fuel ducts (43) and (45) and via the starter rotary slide valve (29) by the vacuum action of the intake manifold. Metering of the fuel intake is effected by bores in the starter rotary slide valve. Turning of the slide valve results in a corresponding opening of bores for fuel passage.

The air required for the cold start mixture flows into the intake manifold through the opened throttle valve.

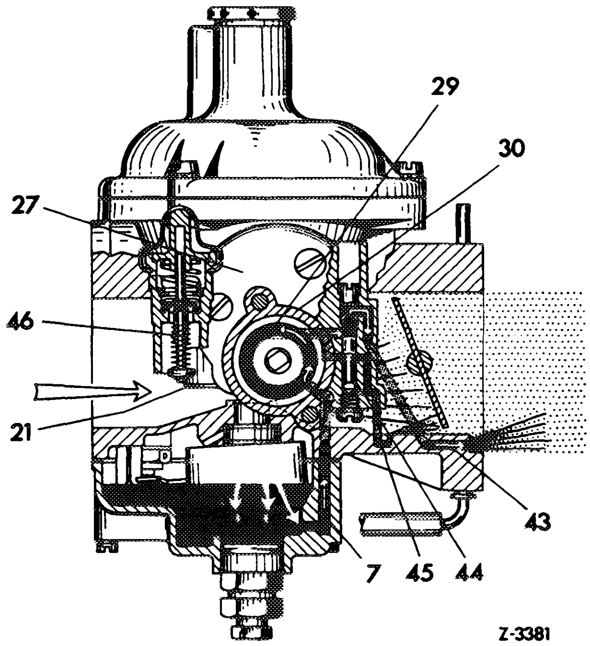


Fig. 07-1/8

Start mechanism mode of operation
Cold start - phase I

7 Fuel duct
21 Air piston
27 Starter housing
29 Starter rotary slide valve
30 Starter cover
43 Fuel duct
44 Vacuum piston
45 Fuel duct
46 Float chamber vent valve

After the engine has started, the vacuum piston (44) is attracted by the increased vacuum in the intake manifold, thereby closing duct (43) behind the throttle valve. The additional fuel required during the warm-up period is now exclusively drawn off from duct (45) in the mixing chamber.

The idea behind the start mechanism action is to provide the initially required rich fuel-air-mixture for starting the engine and to subsequently counteract over-enrichment.

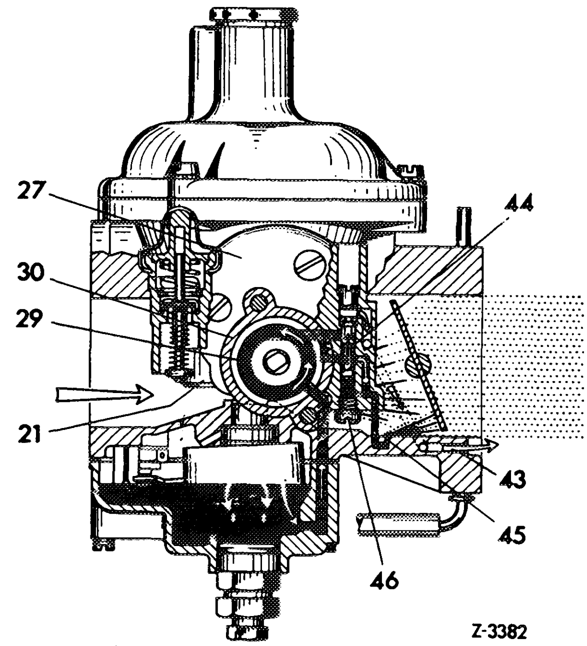


Fig. 07-1/9
Start mechanism mode of operation
Cold start - phase II

21 Air piston
27 Starter housing
29 Starter rotary slide valve
30 Starter cover
43 Fuel duct
44 Vacuum piston
45 Fuel duct
46 Screw plug

b) Automatic Starting

The automatic starting system is actuated by stepping down once on accelerator pedal.

The bimetallic spring (16) will return to its starting position in accordance with outside temperature. The stop lever (11) is carried along by the spring force of the bimetallic spring and will push the starting valve (5) down (Fig. 07-1/10 and 11).

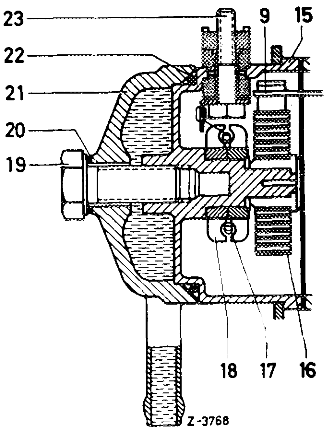


Fig. 07-1/10

15 Starter cover
16 Bimetallic spring
17 Heater coil
18 Ceramic element
19 Hex. screw
20 Seal
21 Water cover
22 Round cord ring
23 Electric connection

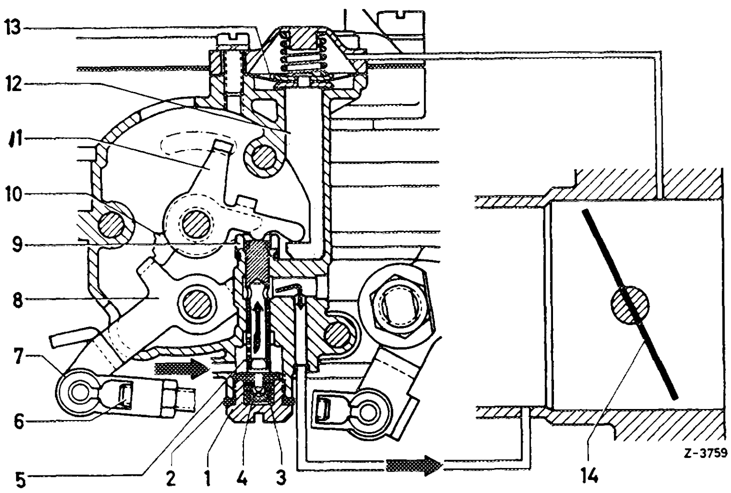


Fig. 07-1/11

1 Closing plug
2 Sealing rings
3 Compression spring
4 Spring plate
5 Starting valve
6 Connecting rod
7 Ball head
8 Starter lever
9 Cap
10 Stepped disc
11 Drive lever
12 Diaphragm rod
13 Vacuum diaphragm
14 Throttle valve

Depending on path of bimetallic spring, the starting valve completes one stroke and exposes the calibrated flow holes for enriching the fuel.

When the engine fires, the vacuum in the intake manifold acting on the diaphragm (13) will actuate the starting valve. The diaphragm rod (12) pulls the drive lever slightly upwards and makes starting fuel leaner. The first bore is covered.

With increasing temperature in starter box (15) the bimetallic spring is constantly less resistant and the drive lever returns to its zero position. During this procedure, the compression spring (3) will force the starting valve outwards until all the bores are covered and the valve plate (4) completely locks the fuel feed (Fig. 07-1/12).

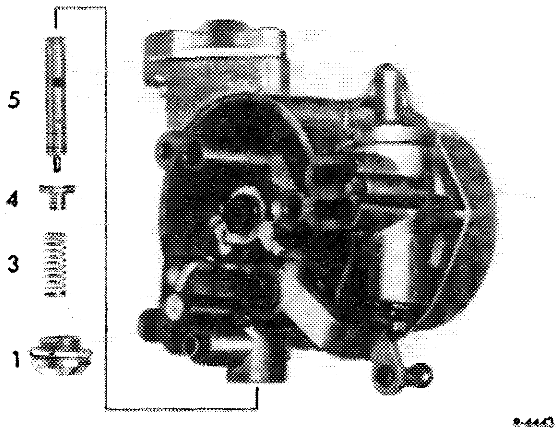


Fig. 07-1/12

1 Closing plug
3 Compression spring
4 Spring plate with valve plate
5 Starting valve

The stepped disc (10) is moved by the drive lever into the respective position in relation to starter lever (8), which effects a given rise of throttle valve (14) via connecting rod (6).

As a result of this adjustment, the starting valve (5) can move back when the engine heat increases until the throttle lever which is connected to the starting valve by means of the connecting rod, rests against the idling speed adjusting screw.

Float Chamber Vent Valve

The vent valve for the float chamber is regulated by the control linkage in such a way that the vent valve will ventilate the float chamber from the outside when the engine is idling, operating in the lower partial-load range, or when it is not running; when driving under normal operating conditions float chamber ventilation is effected from the inside.

Fuel Return Valve

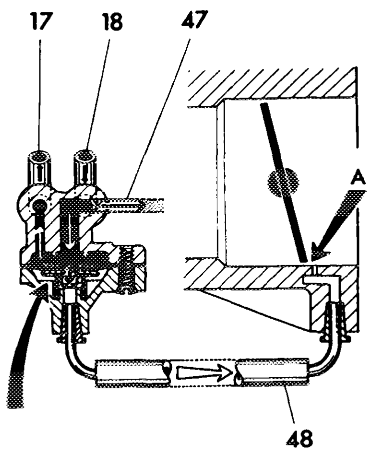


Fig. 07-1/13

Fuel return valve opened

A High vacuum
17 Fuel return
18 Fuel inlet
47 Fuel supply line to float chamber
48 Vacuum line

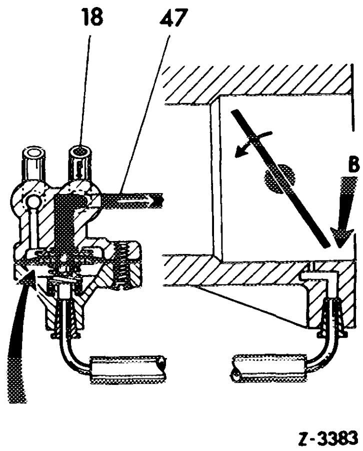


Fig. 07-1/14

Fuel return valve closed

B Vacuum decreasing
18 Fuel inlet
47 Fuel supply line to float chamber

The fuel return valve is controlled by the vacuum in the intake manifold.

When a high vacuum is present during idling, for example, the vacuum diaphragm is attracted against the spring pressure. This, in turn, opens the duct to the fuel return pipe (Fig. 07-1/13).

When the vacuum decreases, the diaphragm closes the duct (Fig. 07-1/14).

The vacuum take-off bore is so designed that the intake vacuum will lose its effect once a certain throttle valve opening angle is exceeded.

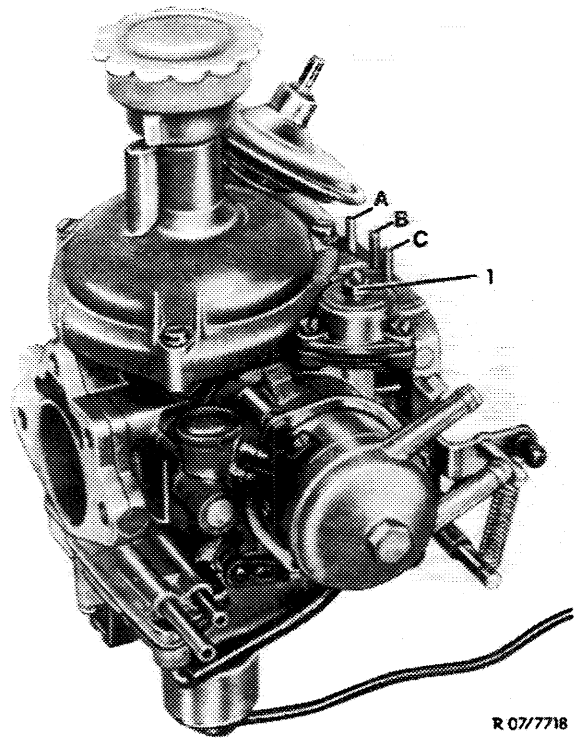


Fig. 07-1/15

A Vacuum connection exhaust gas return (brown)
B Vacuum connection ignition adjustment "retard" (white)
C Vacuum connection for changeover valves (blue)
1 Diaphragm rod (pull-down)

The carburetor is now vented inside only. The former venting valve is eliminated.

The diaphragm rod (1) of the vacuum box for the automatic starting device (pull-down) is permanently adjusted by manufacturer.

An additional vacuum tapping connection (A) has been attached for vacuum control of exhaust gas return valve.

Automatic Starting

To improve starting characteristics in the warming-up period, an additional start enriching valve has been installed in starter housing (4 in Fig. 07-1/16).

For better fuel metering in the warming-up period, the starting valve (8) is provided with an additional bore.

Operation of Start Enriching Valve

When the engine is stopped, diaphragm (3) is pushed downwards by spring (2) and will open the start enriching valve (4).

The fuel metered via feed duct (5) combines with the fuel fed through the starter valve bores prior to entering the mixing chamber (6).

The intake manifold vacuum established after starting will pull the diaphragm (3) against spring (2) up to stop of adjusting screw (1) in upward direction and the start enriching valve (4) will close.

With the automatic starting device switched off, enrichment is no longer effective, since the valve plate (7) will lock the fuel flow towards starting valve and start enriching valve.

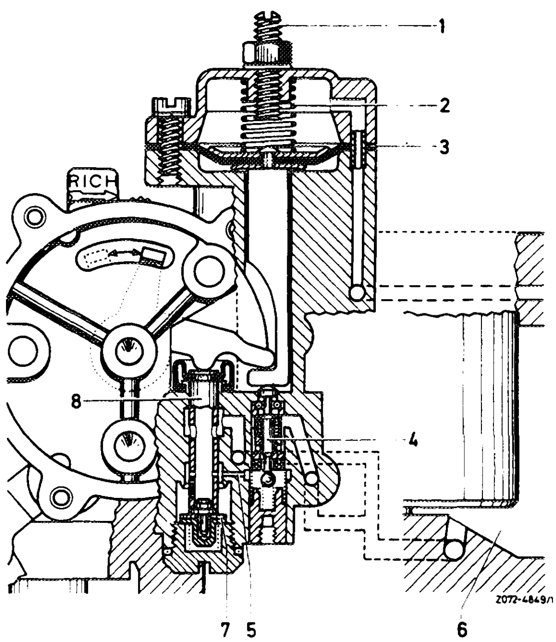


Fig. 07-1/16

1 Adjusting screw (pull-down)
2 Compression spring
3 Diaphragm
4 Start enriching valve
5 Fuel duct
6 Mixing chamber
7 Valve plate
8 Starting valve

Temperature-controlled Needle Nozzle

The needle nozzle is combined with a temperature-dependent compensating element into one unit (4 in Fig. 07-1/17 and 07-1/18).

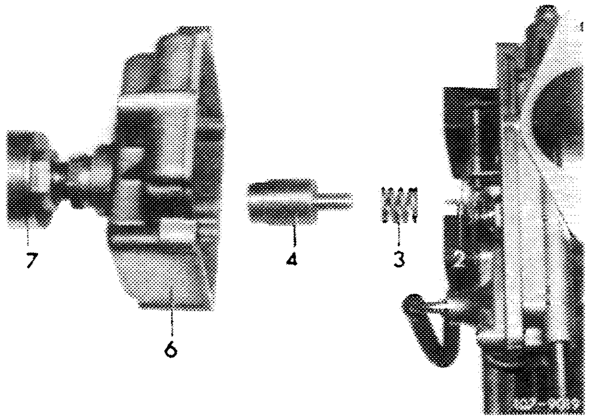


Fig. 07-1/17

2 Nozzle needle
3 Compression spring
4 Temperature-dependent compensating element with needle nozzle
6 Float chamber cover
7 Idle speed shutoff valve

The bimetallic shims (11) will slightly adjust needle nozzle (9) in accordance with fuel temperature (Fig. 07-1/18). This will provide an almost constant idle speed fuel quantity.

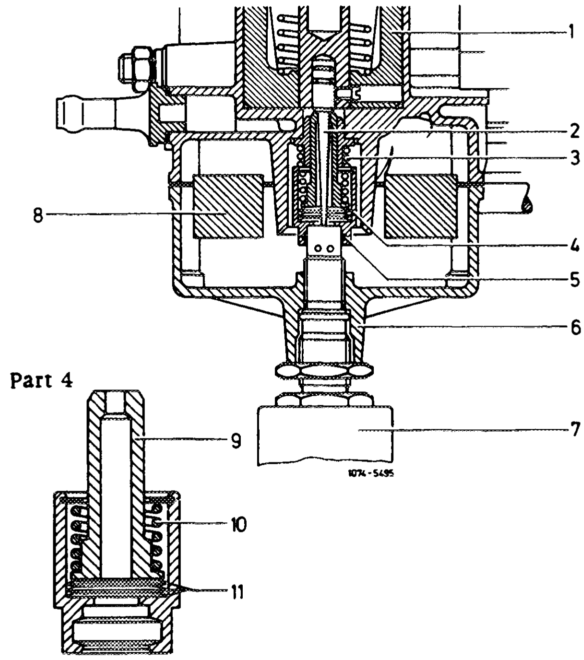


Fig. 07-1/18

1 Air piston
2 Nozzle needle
3 Compression spring
4 Temperature-dependent compensating element with needle nozzle
5 O-ring
6 Float chamber cover
7 Idle speed shutoff valve
8 Float
9 Needle nozzle
10 Compression spring
11 Bimetallic shims

Idle speed adjustment can also be made with engine at operating temperature (60-80 ^{o} C oil temperature) with or without carburetor heater added.

Float Chamber Cover

Float chamber cover is designed in such a manner that the idle speed shutoff valve is mounted directly in cover and not within a holding screw as before.