

Fuel System Description

**Stromberg 175 CD-2 SE
And
SU-HS 6
Carburetors**

FUEL SYSTEM DESCRIPTION

The B 20 A engine is fitted with a horizontal carburettor of type Stromberg 175 CD-2 SE, see Fig. 60.

The B 20 B engine In the 120 and 140 models is fitted with two horizontal carburettors of type SU-HS 6. see Fig. 61. (Right-hand steered 1800

cars are also fitted with this type of carburettor).

The B 20 B engine in the 1800 model and in cars intended for USA and Canada is fitted with two horizontal carburettors of type Stromberg 175 CD-2 SE, see Figs. 62 and 63

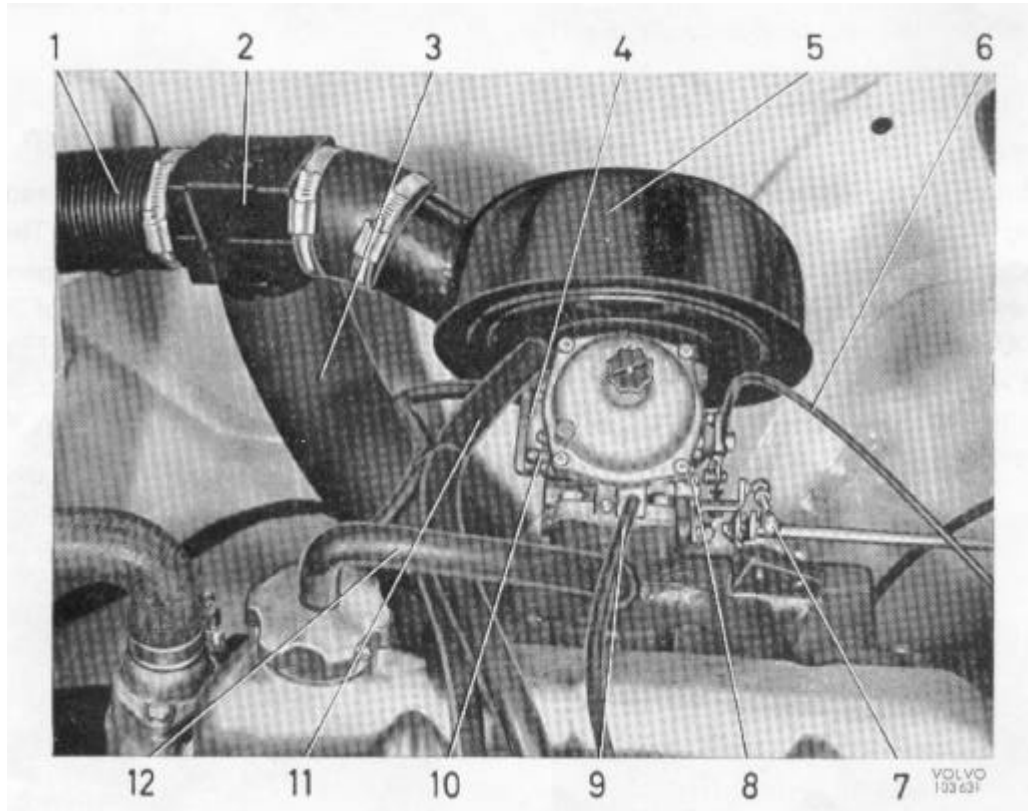
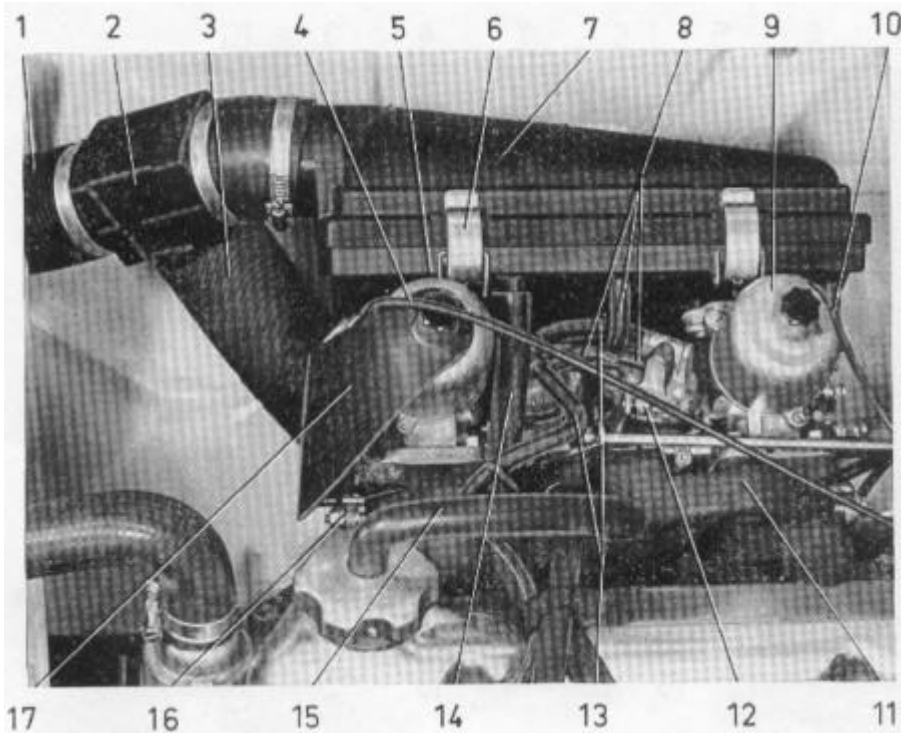


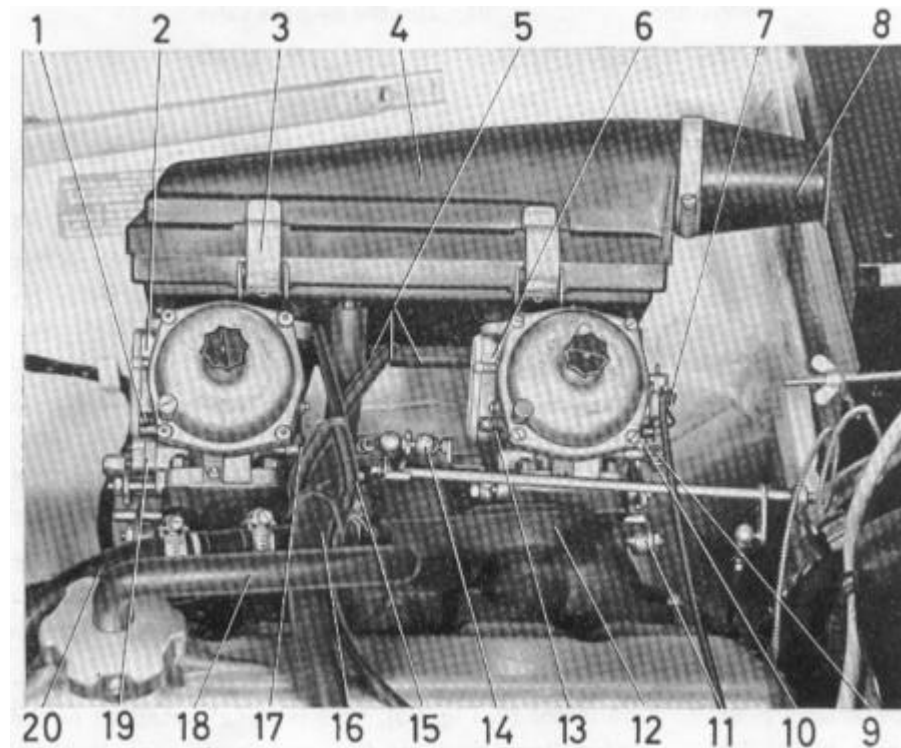
Fig. 60 Stromberg-carburettor on B2DA

- | | |
|---|--|
| 1. Cold-air hose | 8. throttle <i>stop screw</i> |
| 2. Constant temperature <i>device</i> . | 9. Vacuum hose for distributor |
| 3. Warm-air hose | 10. Idle trimming screw |
| 4. Temperature compensator | 11. Fresh-air hose for crankcase ventilation |
| 5. Air cleaner | 12. Hose for crankcase gases |
| 6. Choke wire | |
| 7. Throttle control | |



1. Cold air hose
2. Constant temperature device flap
3. Warm air hose
4. Choke wire
5. Front carburettor
6. Clamp for air cleaner cover
7. Air cleaner
8. Hose for float-chamber ventilation
9. Rear Carburettor
10. Choke wire
11. Manifold with preheating chamber
12. Throttle control
13. Fuel hoses
14. Fresh-air hose for crankcase ventilation
15. Hose for crankcase gases
16. Throttle spindle for secondary throttle
17. Rubber guard

Fig. 61 SU-carburettor on B 20 B



1. Idle trimming screw
2. Temperature compensator
3. Clamp for air cleaner
4. Air cleaner
5. Fuel hoses
6. Temperature compensator
7. Choke wire
8. Air intake
9. Fast idle stop screw
10. Throttle stop screw
11. Throttle spindle for secondary throttle
12. Manifold with preheating chamber
13. Idle trimming screw
14. Throttle control
15. Vacuum hose for distributor
16. Fresh-air hose for crankcase ventilation
17. Throttle stop screw
18. Hose for crank- case gases
19. Throttle by-pass valve
20. Vacuum hose for brake servo

Fig. 62 Stromberg-carburettor on B20 B in 1800

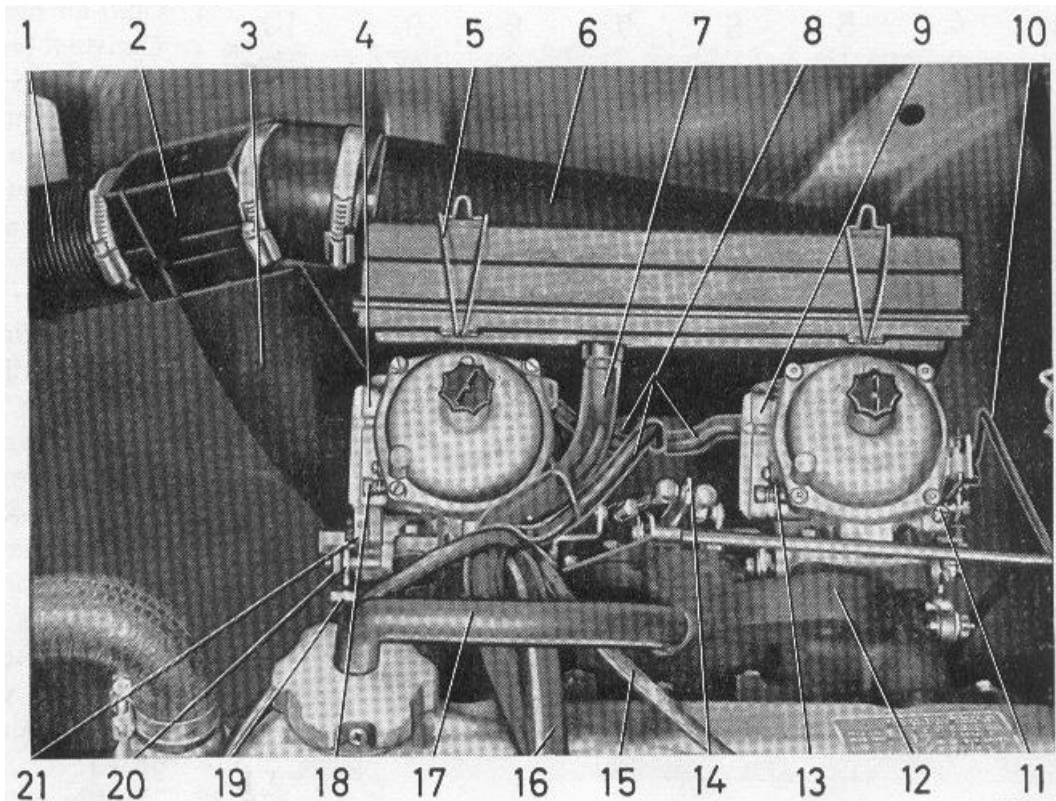


Fig. 63 Stromberg Carburettor on B 20 B (USA)

- | | | |
|---|---------------------------------------|---|
| 1. Cold-air hose | 9. Temperature compensator | 16. Vacuum hose for brake servo |
| 2. Air preheating flap | 10. Choke wire | 17. Hose for crankcase gases |
| 3. Warm-air hose | 11. Throttle stop screw | 18. Idle trimming screw |
| 4. Temperature compensator | 12. Manifold with pre-heating chamber | 19. Throttle spindle for secondary throttle |
| 5. Clamp for aircleaner | 13. Idle trimming screw | 20. Throttle spindle for primary throttle |
| 6. Aircleaner | 14. Throttle control | 21. Throttle by-pass valve |
| 7. Fresh-air hose for crankcase ventilation | 15. Vacuum hose for distributor | |
| 8. Fuel hoses | | |

ZENITH-STROMBERG CARBURETTOR

The carburettor for the B 20 A engine is shown in Figs. 64 and 65. It has been designed with a view to obtaining cleaner exhaust gases by means of an exhaust emission control system.

It is provided with a fixed jet, pressed into the carburettor housing, the fuel flow orifice area of which is varied by means of a movable tapered needle. The position of the needle is determined by the carburettor housing vacuum operating an air valve in which the needle is fitted in a spring-loaded suspension. The spring force always presses the needle against the same side of the jet, and this ensures an accurately controlled fuel flow through the jet.

The carburettor consists of three main parts of light-alloy, the middle part of which comprises the carburettor housing. The lower section is made up of a floatchamber, which encloses the jet and the float. The upper section consists of a suction chamber cover, which forms a suction chamber together with a diaphragm fixed in the air valve. The suction chamber regulates the air valve lift and thereby the location of the needle in the jet. By means of channels in the valve, the suction chamber is linked to the space between the carburettor throttle and valve.

The carburettor is fitted with a temperature compensator (8, Fig. 65). This is constructed as an air valve regulated by the carburettor temperature and maintains the fuel-air mixture constant irrespective of the fuel temperature.

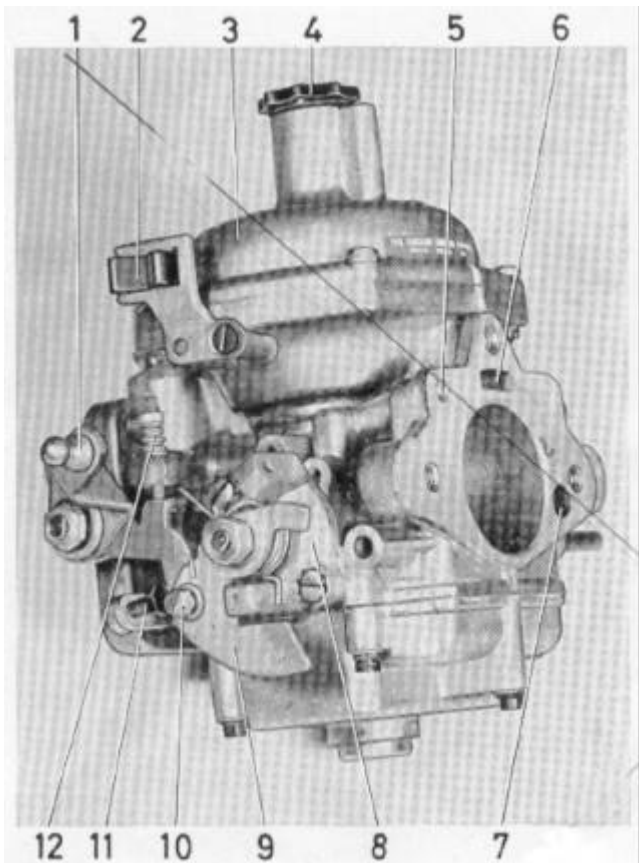


Fig. 64 Stromberg-carburettor, left side, B 20 A

1. Lever for throttle control
2. Clamp for choke wire
3. Suction chamber
4. Hydraulic damper
5. Vent drilling from float chamber
6. Drilling for air supply under diaphragm
7. Drilling for air supply to temp. compensator and idle trimming screw
8. Cold-start device
9. Cam disc for fast idle
10. Connection for choke control
11. Fast-idle stop screw
12. Throttle stop screw

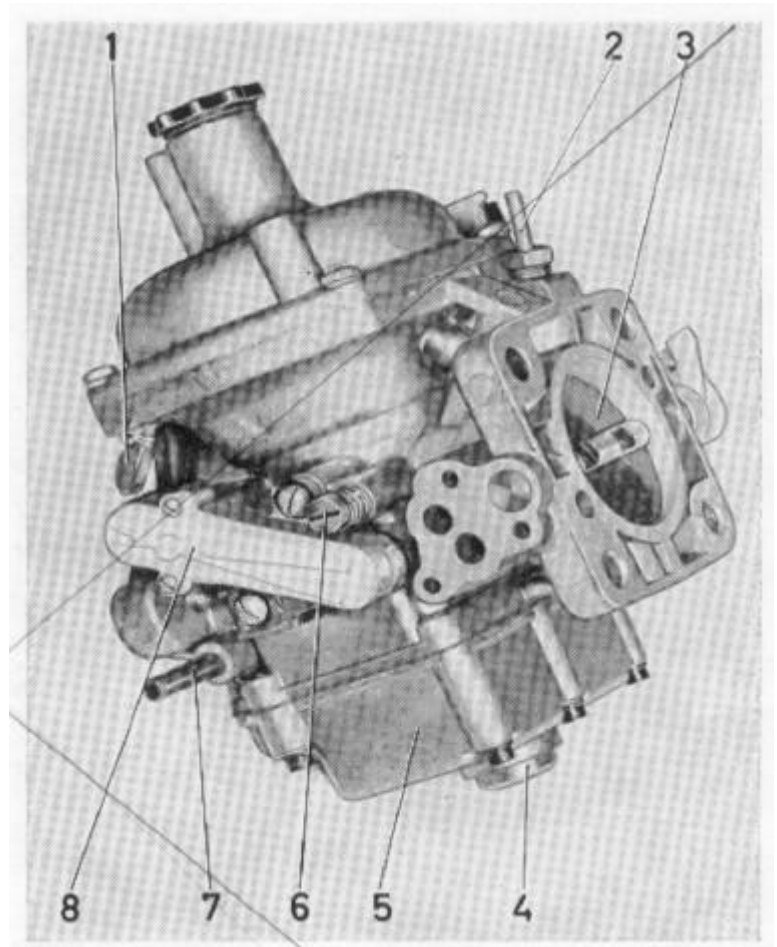


Fig. 65 Stromberg-carburetors, right side, B20A

1. Sealed plug
2. Connection for vacuum hose to distributor
3. Primary throttle Float chamber plug
5. Float chamber
6. idle trimming screw
7. Connection for fuel hose
8. Temperature compensator

The throttle spindle is provided with seals to reduce wear on the spindle and bushes and also eliminate air leakage,

On B 20 B engines with twin Stromberg carburetors, these differ structurally from the carburetor for the B 20 A engine as follows: (see Figs. 66, 67, 68 and 69).

The front carburetors is provided with a throttle by-pass valve (2, Figs. 67 and 75), the purpose of which is to by-pass a regulated flow of fuel-air mixture past the carburetor throttle when this is closed at high speeds, that is, during engine braking- ii-g. This reduces powerfully the volume of noxious exhaust gases produced.

The choke device is to be found only on the rear carburetor, see Fig. 68.

The throttle Spindle in the respective carburetors is provided with a cam ('see Figs. 67 and 68), the purpose of which is to open the secondary throttle in the manifold at higher output.

The vacuum connection for the ignition distributor is located on the front carburetor (see 4, Fig. 66') and is connected to the side of the throttle which is against the manifold. This gives the distributor a so-called 'negative vacuum setting' as distinct from the B 20 A distributor, the vacuum setting of which is positive, that is, the connection opens out between the carburetor throttle and air valve.

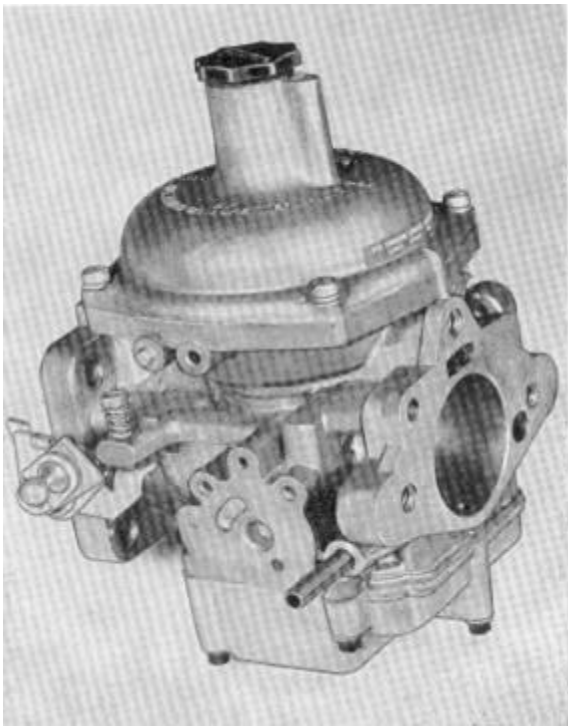


Fig 66 Stromberg-carburettor, front, left side

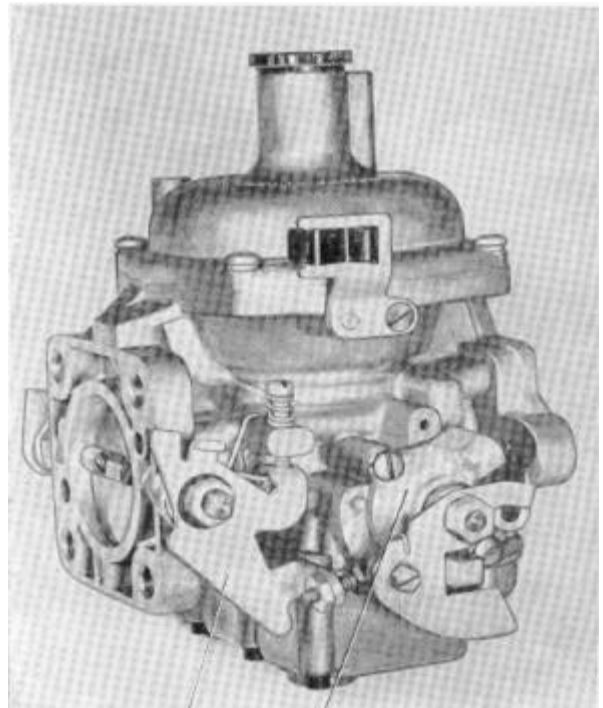


Fig 68 Stromberg-carburettor, rear, left side
 1. Cam for regulating secondary throttle
 2. Cold starting device

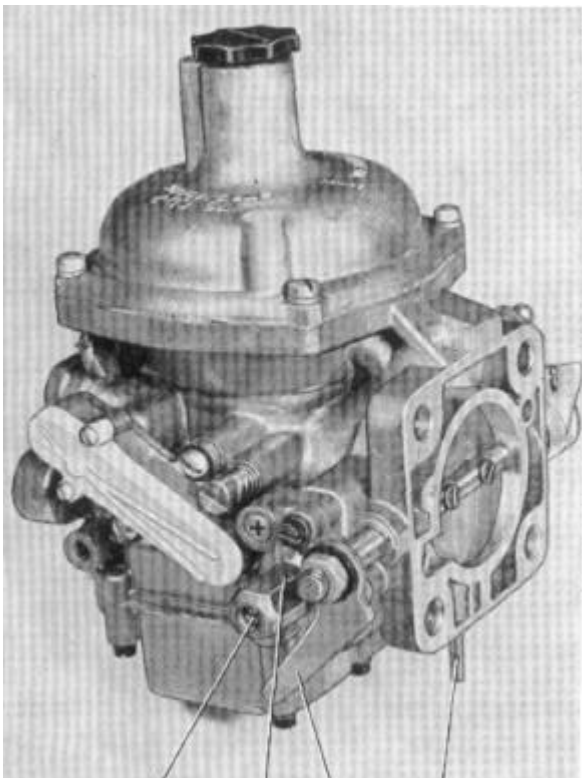


Fig 67 Stromberg-carburettor, front, right side

- 1. Adjusting screw
- 2. Throttle bypass valve
- 3. Cam for secondary throttle
- 4. Vacuum hose connection for distributor

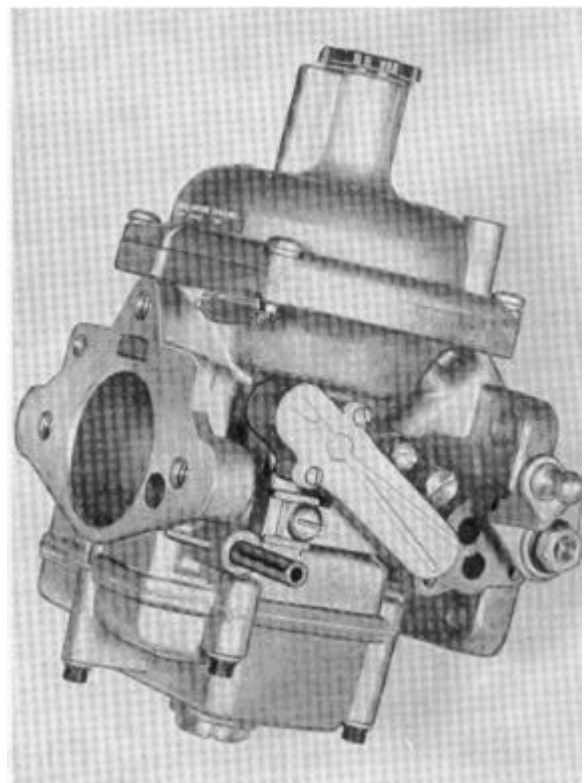


Fig 69 Stromberg-carburettor, rear, right side

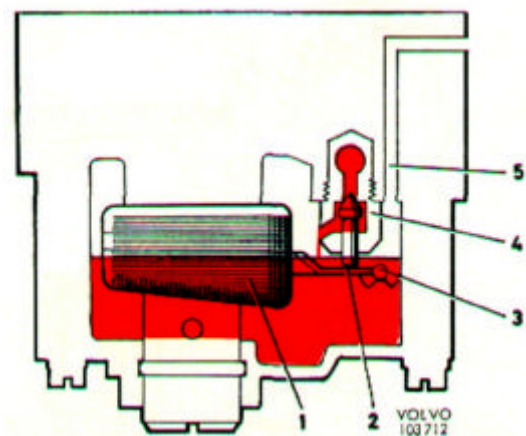


Fig 70 Float System

- | | |
|----------------|--|
| 1. Float | 5. Venting Channel from float chamber to air cleaner |
| 2. Float arm | |
| 3. Float shaft | |
| 4. Float valve | |

Float system

Fuel flows into the float chamber via the float valve (4, Fig. 70). The float (1), which is made up of twin expanded rubber floats, is carried on a bridge in the lower part of the carburettor housing. As the fuel level rises, the float lifts and closes the needle on its seating when the correct level has been attained.

The fuel flows through holes in the float chamber plug to the inside of the jet, where the level is the same as in the float chamber. Sealing between the float chamber plug and chamber is provided by an O-ring.

Cold-start device and fast idle

To facilitate starting during cold weather, the carburettor is provided with a cold-start device (Figs. 71 and 72). (For the B 20 B engine, only on the rear carburettor.)

The cold-start device consists of a choke lever (3, Fig. 71) which is provided with four calibrated holes and an elongated opening as well as a channelled disc (4) mounted on a spindle which is operated by the choke control. On the same spindle, outside the housing (5), there is a cam disc (9, Fig. 64) with connection for the choke control pull wire. When the cold-start device is engaged, the valve disc turns and this links up the channel (1, Fig. 71) from the float chamber via one or several of the calibrated holes to the channel on the other side of the valve disc and the drilling in the channel (2), which terminates in the venturi between the vacuum plunger and choke flap. By means of this

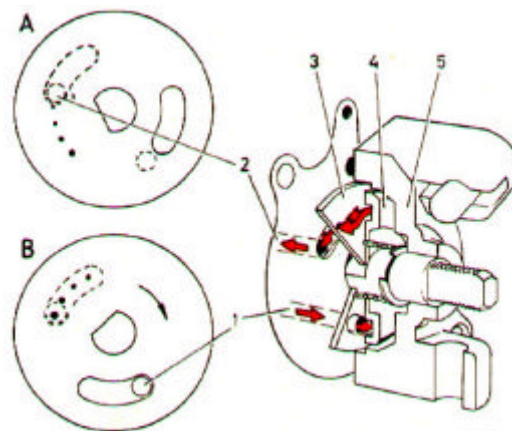


Fig. 71 Cold-start device

- A** Cold-start device, disengaged
B Cold-start device, engaged

- | | |
|-----------------------|-------------------|
| 1. From float chamber | 4. "Channel disc" |
| 2. To venturi | 5. Housing |
| 3. Choke lever | |

link-up, the engine receives extra fuel (richer mixture) to facilitate cold starting. At the same time, a little extra air is obtained by means of the choke device. When the choke control is pushed in, the valve disc turns and closes the inlet to the channel. At the same time as the cam disc is operated, the throttle flap opening is also influenced in such a way that turning the cam disc opens the throttle through the fast idle stop screw (11, Fig. 64) and the lever, before any of the calibrated holes open the connection to the fuel drilling. With this arrangement, the idling speed can, if necessary, be raised by the driver of the vehicle during the warming-up period of the engine.

Idling

When the engine is idling, the vacuum in the carburettor suction chamber is low and the column between the air valve and the bridge will be small (see Fig. 73). At this stage, the thicker section of the metering needle is in the jet and thus only a small quantity of fuel, corresponding to idling requirements, is sucked into the engine. The temperature compensator (Fig. 72) is regulated by a bi-metal spring (4) which influences a valve (3). When the engine is warm and the temperature in the carburettor rises, the valve opens and air is

A O V

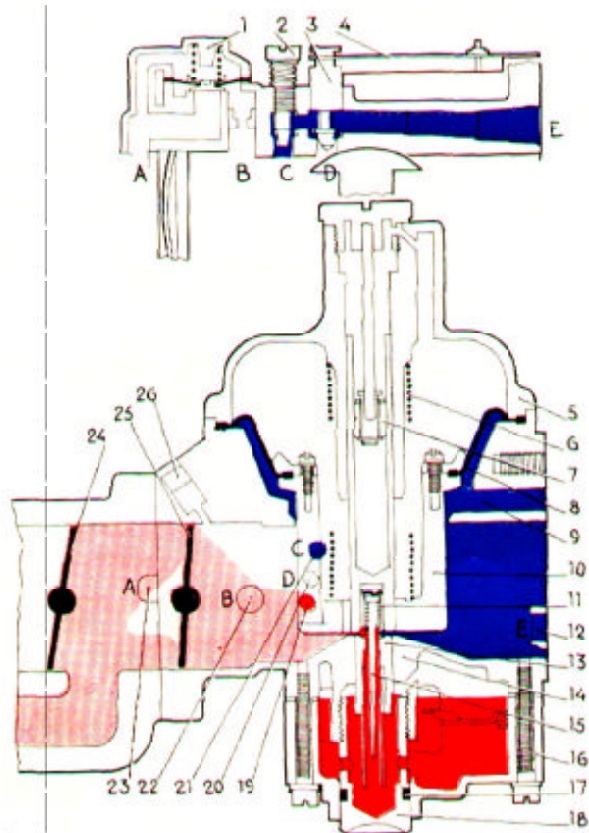


Fig. 72 Cold starting principle

(Carburettor on B 20 B engine. Vacuum outlet located as for B 20 A engine)

1. By-pass valve (B 20 B)
2. Idle trimming screw
3. Valve for temperature compensator
4. Bi-metal spring for temperature compensator
5. Suction chamber
6. Spring
7. Damper piston
8. Diaphragm
9. Drilling for air supply under diaphragm
10. Air valve
11. Metering needle suspension
12. Drilling for air supply to temp. compensator and idle trimming screw.
13. Fuel jet
14. Carburettor housing (middle section)
15. Metering needle
16. Floatchamber
17. Rubber ring
18. Floatchamber plug
19. Drilling for cold-start fuel (located in carb. Opposite wall)
20. Drilling for extra air through temperature compensator
21. Drilling for extra air through idle trimming screw
22. Outlet channel for fuel-air mixing through by-pass valve
23. Secondary throttle
24. Primary throttle
25. Vacuum outlet for distributor

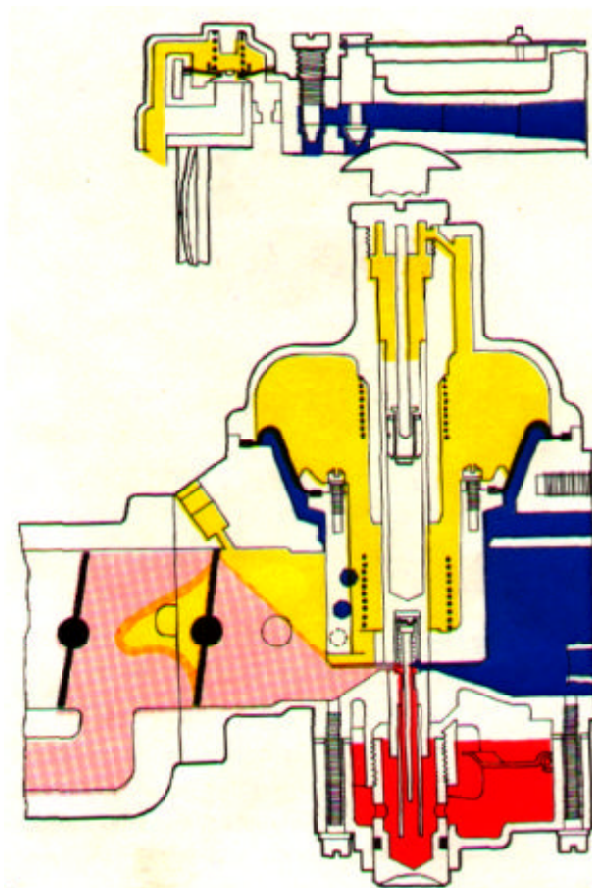


Fig. 73 Idling, warm engine

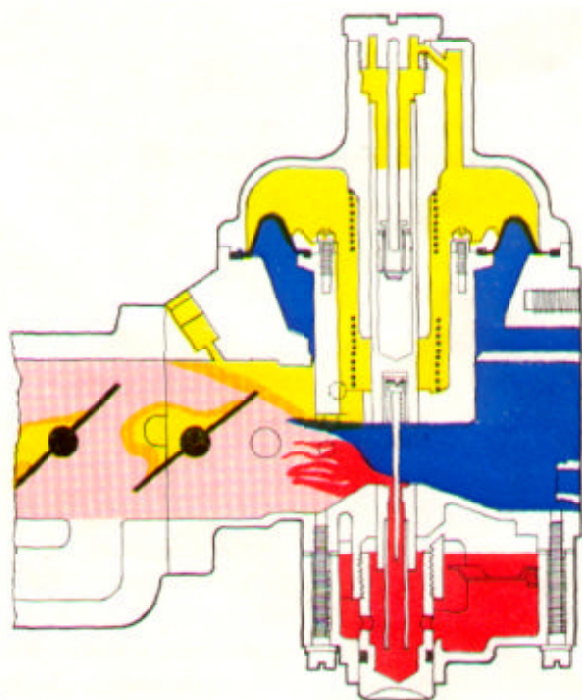


Fig. 74 Normal operation (with secondary throttle)

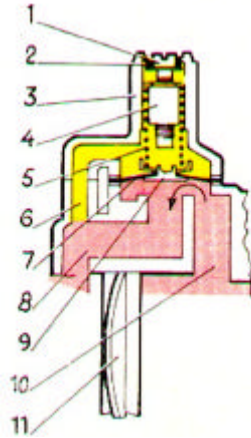


Fig. 75 Throttle by-pass valve

- | | |
|---------------------------------------|---------------------------------------|
| 1. Adjusting screw | 7. Diaphragm |
| 2. Rubber ring | 8. Outlet channel for fuel/air mixing |
| 3. Cover | 9. Valve |
| 4. Nut | 10. Inlet channel for fuel/air mixing |
| 5. Spring | 11. Flap |
| 6. Drilling to underside of diaphragm | |

supplied to the carburettor venturi to compensate for the increase in the fuel flow, which is obtained due to the alteration in the fuel's viscosity, see Fig. 73. Fine adjustment of the engine idling speed can be carried out with the idle trimming screw (2, Fig. 72).

Normal running

When the throttle flap opens, approximately the same vacuum is obtained in the suction chamber as in the engine intake manifold. Due to the pressure difference between the underside of the air valve, where there is pressure in the carburettor inlet port, and the upper side of the valve, where there is vacuum, the valve lifts from the bridge. This also lifts the tapered metering needle (15, Fig. 72), which is attached to the valve, out of the jet. The effective choke area widens and increases the fuel flow. See Fig. 74.

Since the vacuum in the engine induction manifold is dependent upon the engine speed and load, the correct fuel flow is obtained under all operating conditions.

Because of the variable choke area between the bridge and the valve, the air velocity and pressure drop across the jet orifice will always remain approximately constant, thus ensuring good fuel atomization at all speeds.

Acceleration

To provide at any point in the throttle range a temporarily richer mixture at the moment the throttle is suddenly opened (acceleration) a hydraulic damper is incorporated in the valve rod. The hydraulic damper consists of a plunger mounted on a rod. The plunger operates in oil. When the throttle is suddenly opened, the vacuum in the suction chamber increases rapidly.

When the air valve (10, Fig. 72) lifts, the damper plunger (7) is forced against its seat and oil is prevented from flowing past the lower side of the damper plunger from the upper side, and this retards the movement of the valve (10). A more powerful vacuum is temporarily obtained above the jet so that the fuel-air mixture becomes for the moment richer.

The down stroke of the air valve is assisted by the spring (6). The rod in the valve should be filled to approximately within 1/4" from the upper edge with oil approved as "Oil for Automatic Transmissions, Type.A".

SU-CARBURETTORS

Both the SU-type carburettors are shown in Figs. 76, 77, 78 and 79. The carburettor consists of a carburettor housing, a floatchamber and a suction chamber in which a movable spring-loaded air valve is located. The metering needle is mounted in a spring-loaded suspension secured in the air valve (see Fig. 80). The spring force always presses the needle against the same side of the adjustable jet, and this ensures an accurately regulated fuel flow through the jet.

The primary throttle is fitted with a spring-loaded valve (9, Fig. 77), which opens when the throttle closes at retardation (engine braking).

A regulated quantity of fuel/air mixture then passes through the valve with the result that there is a considerable reduction in the volume of noxious exhaust gases.

Accelerator pedal movement is transferred to the accelerator throttles by means of the shaft which links up the carburettors and which is flexibly journalled in the throttle spindle levers. On starting with a cold engine, the fuel/air mixture is enriched by the lowering of the jet. This also operates the fast idle. The following text describes the function of the various carburettor components.

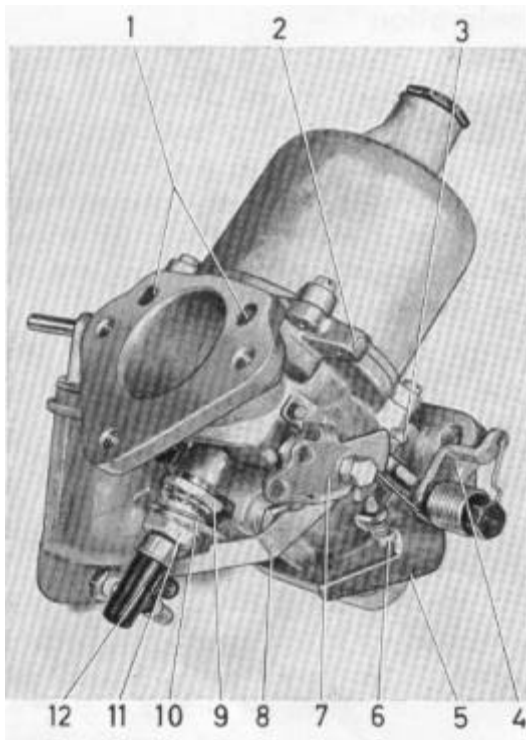


Fig. 76 SU-carburettor, front, right side

- | | |
|---------------------------------|---|
| 1. Ventilation hole | 7. Lever for choke control |
| 2. Attachment for choke control | 8. Link (for lowering jet when choking) |
| 3. Throttle stop screw | 9. Lock nut |
| 4. Throttle spindle flange | 10. Spring |
| 5. Cam for secondary throttle | 11. Adjusting nut |
| 6. Fast-idle stop screw | 12. Jet |

Float

The floatchamber is attached to the carburettor housing by means of screws. The valve (5, Fig. 81) which is opened and closed by the float, is fitted in the cover. The fuel is taken to the lower end of the jet through a flexible hose from the Lower part of the floatchamber (9).

The floatchamber ventilation hole is connected to the air cleaner through the hose (8, Fig. 61).

Cold start

When the engine is started from cold, the fuel/air mixture can be enriched by lowering the jet (see Fig. 82), which is done through a linkage system from the choke control of the instrument panel. Since the metering needle is tapered, the cross-sectional area for the fuel flow increases when the jet is lowered.

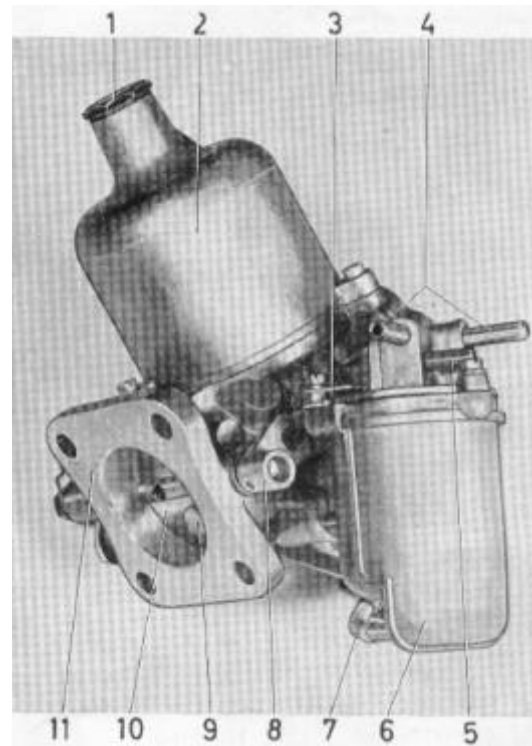


Fig. 77 SU-carburettor, front, left side

- | | |
|---|---|
| 1. Hydraulic damper | 6. Floatchamber |
| 2. Suction chamber | 7. Fuel line between jet and floatchamber |
| 3. Designation plate | 8. Lever |
| 4. Connection for fuel lines | 9. By-pass valve |
| 5. Connection for hose to air cleaner (float-chamber ventilation) | 10. Primary throttle |
| | 11. Connection flange |

When the choke control is pulled out, the outer end of the lever (3) is pressed downwards and operates the jet so that this is also pressed down. In addition, the fast idling screw is operated by the cam on the lever (2, Fig. 85) and the throttle flap opens slightly.

Running

The air flow passing through the carburettors when the engine is running increases in speed on passing through the constriction known as the bridge (16, Fig. 83).

Fuel is supplied to the flow of air through the jet which opens out at the bridge.

The vertical position of the air valve is determined by the difference between the vacuum in the carburettor and atmospheric pressure since the top of the piston has access to the space between the throttle flap and bridge, whereas the underside of

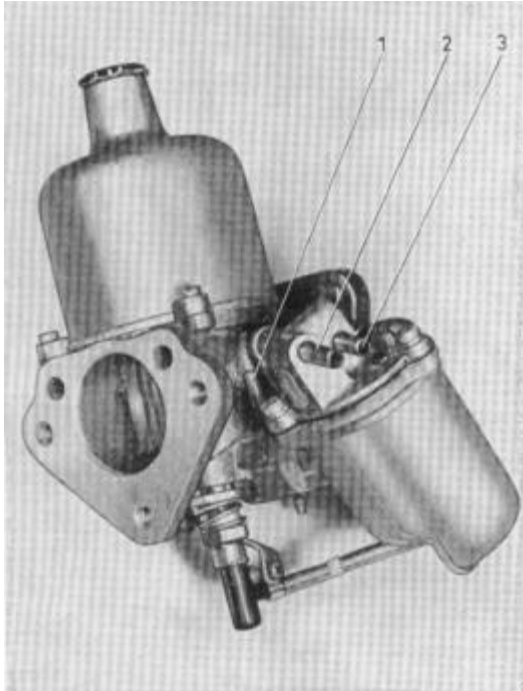


Fig. 78 SU-carburettor, rear, right side

- 1. Lift pin
- 2. Fuel inlet
- 3. Hose connection for air cleaner (floatchamber ventilation)

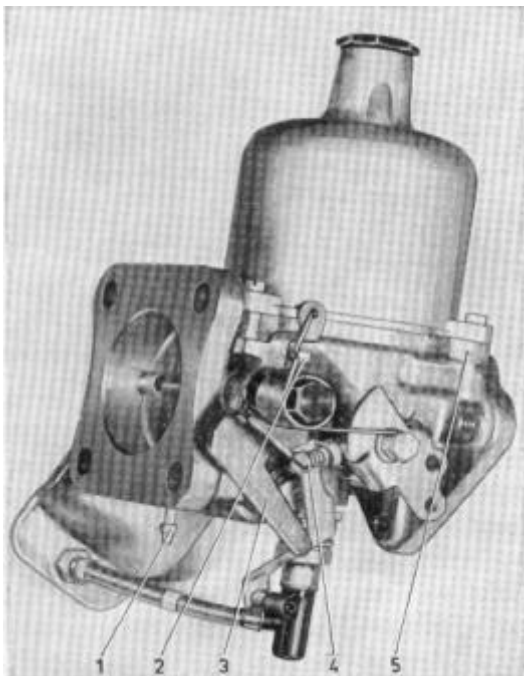


Fig. 79 SU-carburettor, rear, left side

- 1. Vacuum hose connection from distributor
- 2. Throttle stop screw
- 3. Cam for secondary throttle
- 4. Fast-idle stop screw
- 5. Attachment for choke control

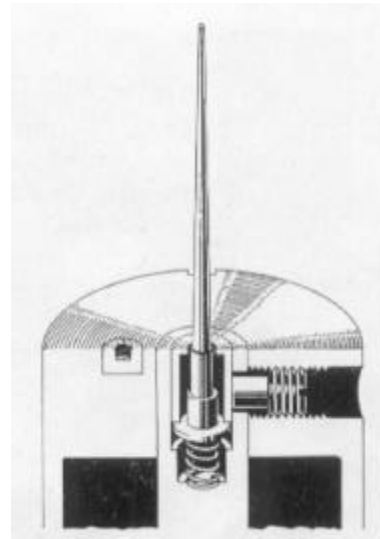


Fig. 80 Spring-loaded needle suspension

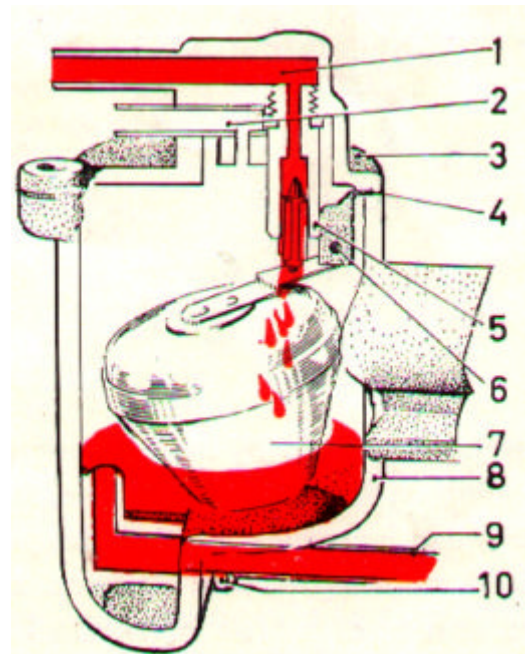


Fig. 81 Float

- 1. Fuel inlet
- 2. Hose connection to floatchamber ventilation
- 3. Floatchamber cover
- 4. Gasket
- 5. Valve
- 6. Pin
- 7. Float
- 8. Floatchamber
- 9. Fuel line
- 10. Screw union

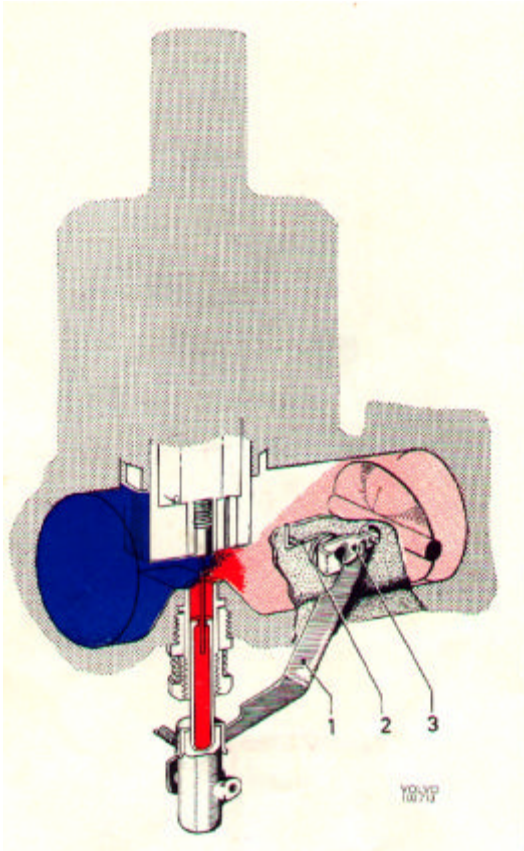


Fig. 82 Choke

1. Link 2. Return spring 3. Lever

the piston is influenced by atmospheric pressure. When loading on the engine increases, the degree of vacuum also increases, so that the piston and the tapered metering needle rise and permit an increased amount of fuel/air mixture to flow to the cylinders.

The supply of fuel and air is thus dependent upon the degree of vacuum in the carburettor venturi, so that the carburettors work in accordance with the continuously variable principle.

Acceleration

To provide at any point in the throttle range a temporary richer mixture at the moment the throttle is suddenly opened, a hydraulic damper is incorporated in the valve rod. The hydraulic damper consists of a plunger mounted on a rod. The plunger operates in oil. When the throttle is suddenly

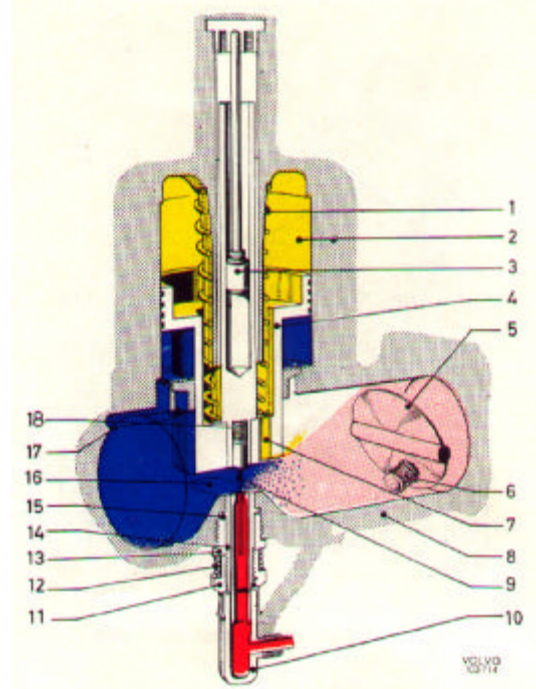


Fig 83 Carburettor function

Blue = Atmospheric
Yellow = Partial vacuum
Red = Fuel
Light-red = Fuel /air mixture

- | | |
|---------------------------|-------------------|
| 1. Spring | 10. Jet |
| 2. Suction chamber | 11. Adjusting nut |
| 3. Damper plunger | 12. Lock spring |
| 4. Air valve | 13. Lock nut |
| 5. Primary throttle | 14. Jet sleeve |
| 6. Throttle by-pass valve | 15. Washer |
| 7. Drilling | 16. Bridge |
| 8. Housing | 17. Drilling |
| 9. Metering needle | 18. Spring |

opened, the vacuum in the suction chamber increases rapidly.

When the air valve (4, Fig. 83) lifts, the damper plunger (3) is forced against its seat and oil is prevented from flowing past the lower side of the damper plunger from the upper side, and this retards the movement of the valve (4). A more powerful vacuum is temporarily obtained above the jet so that the fuel-air mixture becomes for the moment richer.

The downward stroke of the air valve is assisted by the spring (1). The rod in the valve (4) should be filled to approximately within a 1/4" from the upper edge with oil which is approved as "Oil for Automatic Transmissions, Type A".

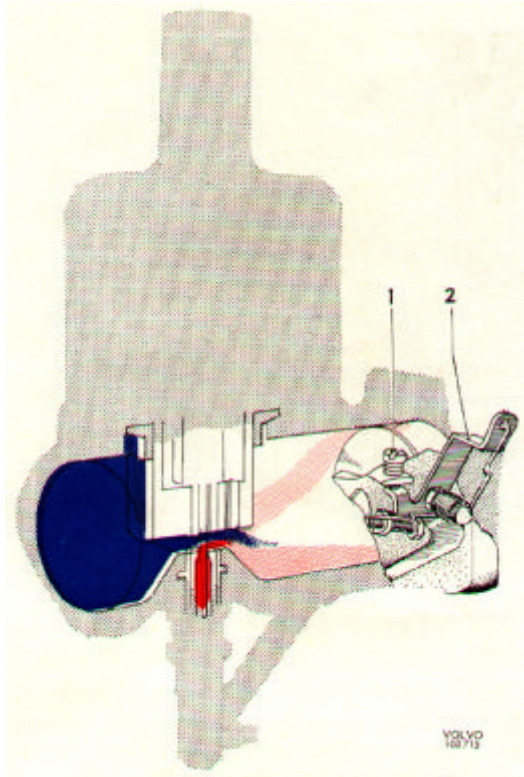


Fig. 84 Carburettor, idling

1. Throttle stop screw 2. Lever for return spring

Idling

When the engine is idling, only a small amount of fuel-air mixture passes through the carburettors. The throttle flaps are held slightly open by the throttle stop screw (1, Fig. 84). The idle adjustment on each carburettor is done independently. The shaft between the carburettors is not permanently fixed to the throttle flap spindle but is flexibly mounted in the ends of the levers.

The fuel/air mixture is adjusted with the adjusting nut (11, Fig. 83) at the jet and adjustment is carried out at idling speed to cover the entire speed range.

Fast idle

When the choke control is pulled out, the throttle flap is operated. One end of the lever (2, Fig. 85) is in the form of a cam which presses on the fast-

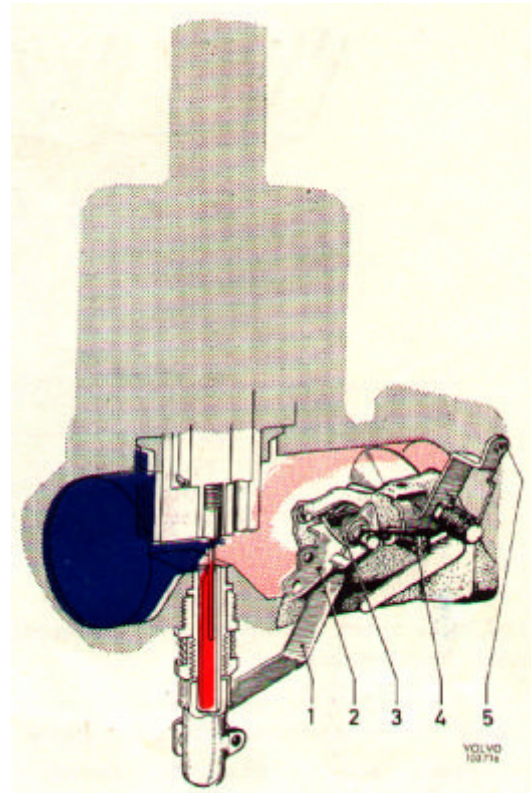


Fig. 85 Carburettor, fast idle

1. Link 4. Fast-idle stop screw
2. Lever 5. Lever for throttle spindle
3. Return spring

idle stop screw (4) whereby the throttle flap is opened.

This means that the engine runs at a faster idling speed during the time the choke control is pulled out.

EXHAUST EMISSION CONTROL SYSTEM

Exhaust emission is controlled by means of an exhaust emission control system which reduces the contents of carbon monoxide and hydrocarbons in the exhaust gases to an acceptable level. On the B 20 A engine, exhaust emission control is obtained by the special carburettor fitted on the unit.

Exhaust emission control for the 8 20 B engine is provided by the special carburettors and a modi-