SERVICE MANUAL

Carburateur '69

Export Service Department

AKTIEBOLAGET
VOLVO
GÖTEBORG . SWEDEN

GROUP 23

FUEL SYSTEM

DESCRIPTION

The B 20 A engine is fitted with a horizontal carburettor of type Stromberg 175 CD-2 SE, see Fig. 2-60.
The B 20 B engine in the 120 and 140 models is fitted with two horizontal carburettors of type SU-HS 6, see Fig. 2-61.

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

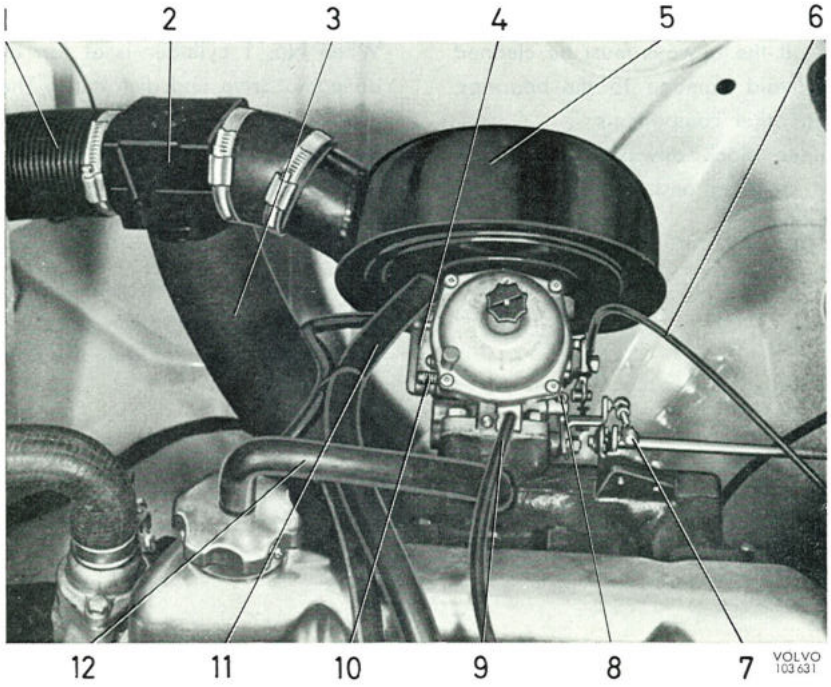
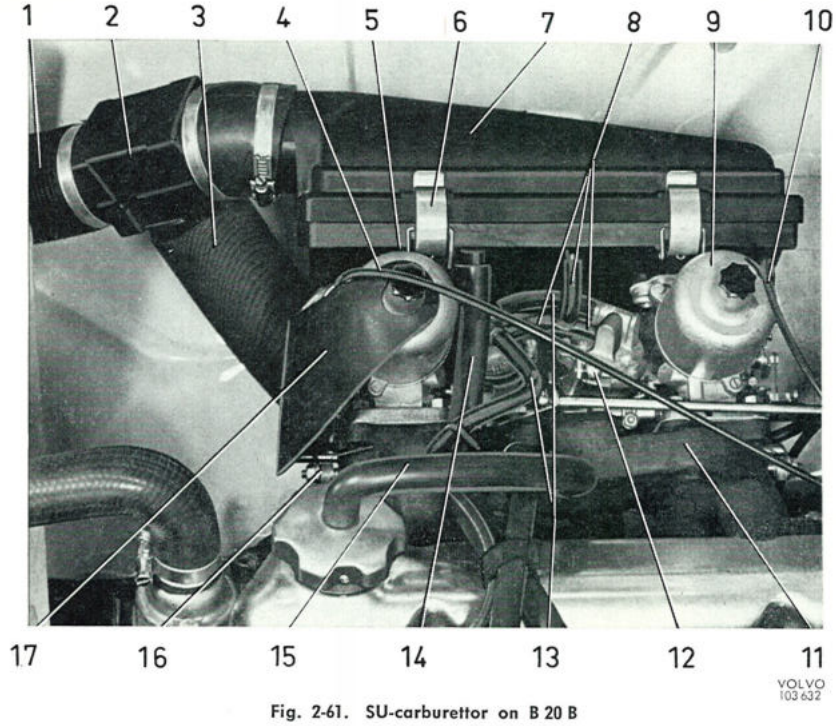


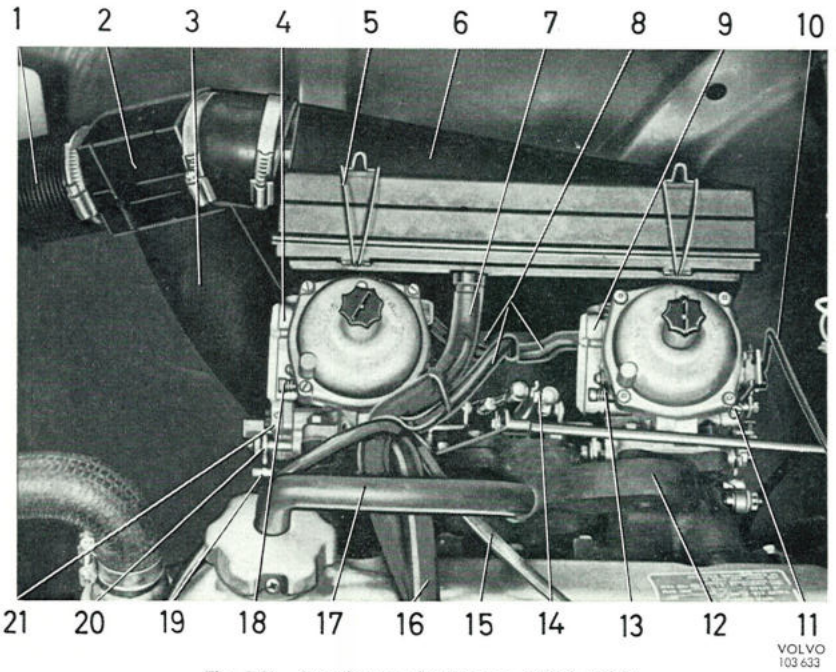
Fig. 2-60. Stromberg-carburettor on B 20 A

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



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 floatchamber ventilation through air cleaner
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. 2-61. SU-carburettor on B 20 B



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

Fig. 2-62. Stromberg-carburettor on B 20 B (USA)

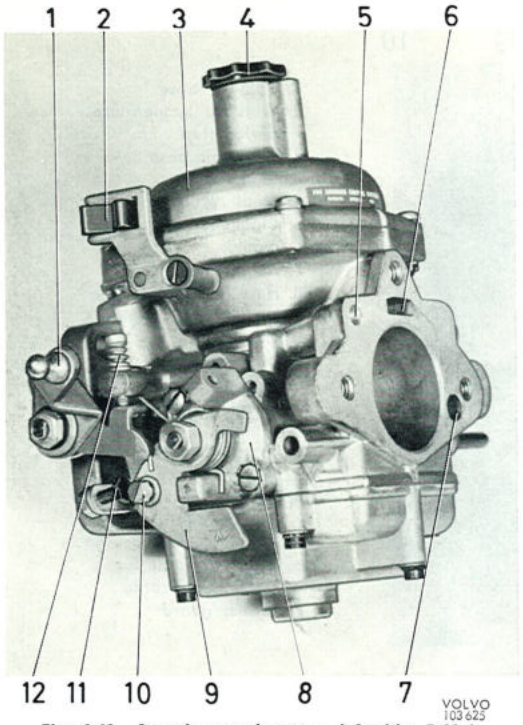


Fig. 2-63. Stromberg-carburettor, left side, B 20 A

1. Lever for throttle control
2. Clamp for choke wire
3. Suction chamber
4. Hydraulic damper
5. Vent drilling from floatchamber
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

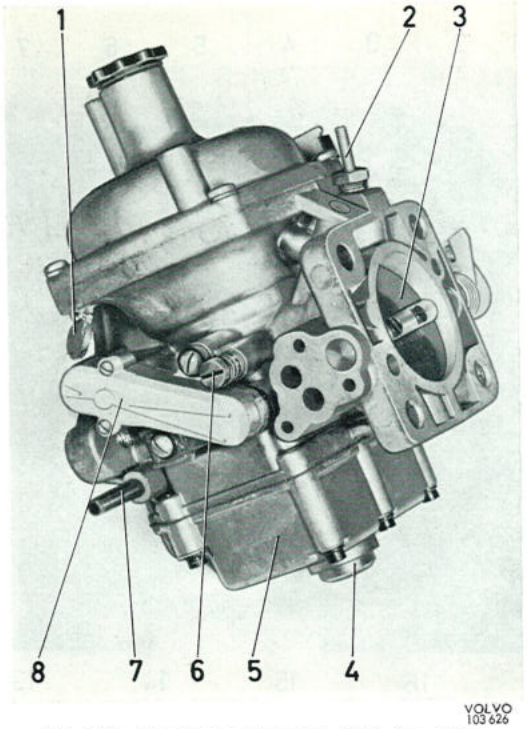


Fig. 2-64. Stromberg-carburettor, right side, B 20 A

1. Sealed plug
2. Connection for vacuum hose to distributor
3. Primary throttle
4. Floatchamber plug
5. Floatchamber
6. Idle trimming screw
7. Connection for fuel hose
8. Temperature compensator

ZENITH-STROMBERG CARBURETTOR

The carburettor for the B 20 A engine is shown in Figs. 2-63 and 2-64. 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. 2-64). This is constructed as an air valve regulated by the carburettor temperature and maintains the fuel-air mixture constant irrespective of the fuel temperature.

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

On B 20 B engines with twin Stromberg carburettors, these differ structurally from the carburettor for the B 20 A engine as follows: (see Figs. 2-65, 2-66, 2-67 and 2-68).

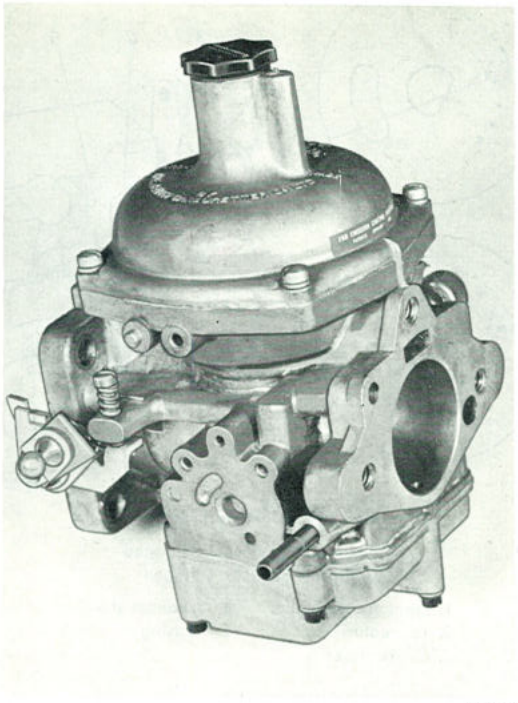


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Fig. 2-65. Stromberg-carburettor, front, left side, B 20 B

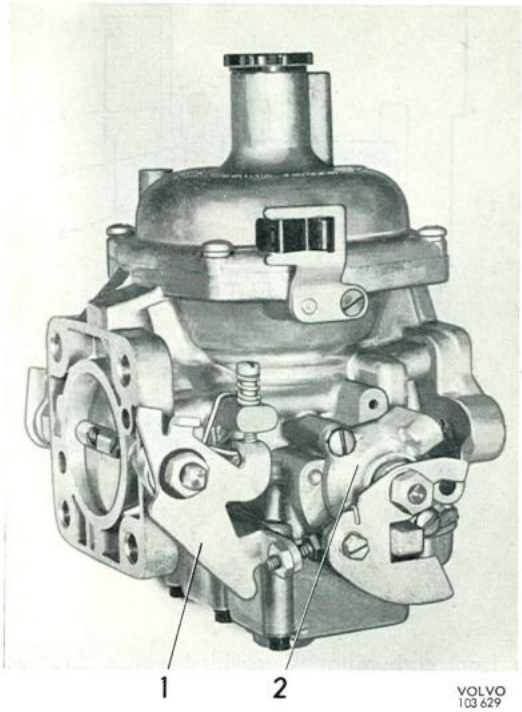

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Fig. 2-67. Stromberg-carburettor, rear, left side, B 20 B

1. Cam for regulating secondary throttle
2. Cold-starting device

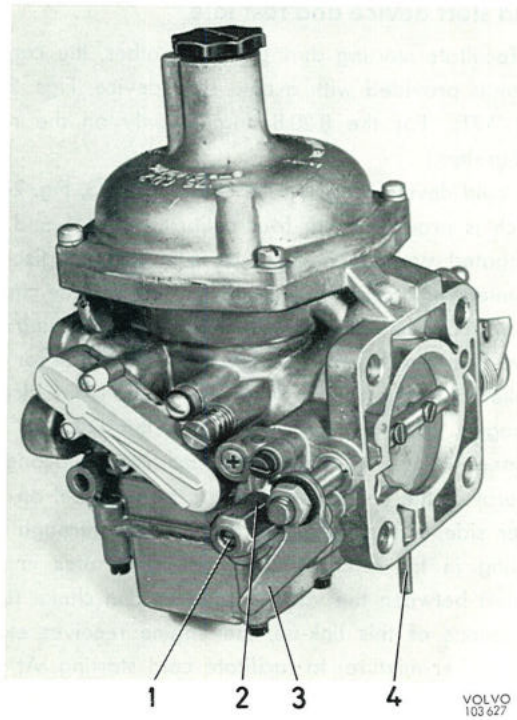

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Fig. 2-66. Stromberg-carburettor, front, right side, B 20 B

1. Adjusting screw
2. By-pass valve
3. Cam for regulating secondary throttle
4. Vacuum hose connection for distributor

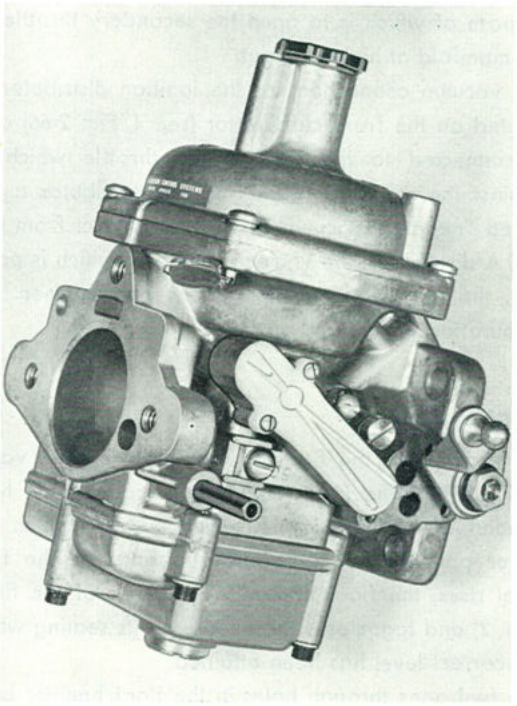

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Fig. 2-68. Stromberg-carburettor, rear, right side, B 20 B

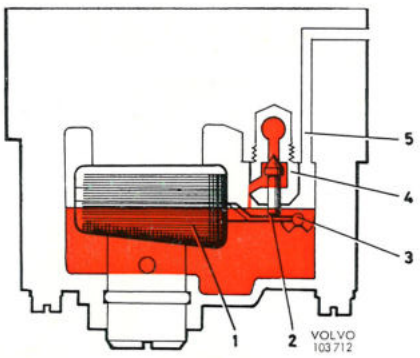

Fig. 2-69. Float system

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

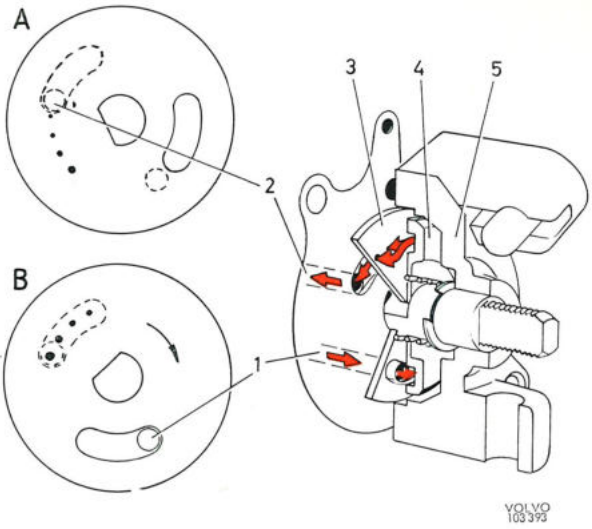

Fig. 2-70. Cold-start device

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

1. From floatchamber
2. To venturi
3. Choke lever
4. "Channel disc"
5. Housing

The front carburettor is provided with a throttle by-pass valve (2, Figs. 2-66 and 2-74), the purpose of which is to by-pass a regulated flow of fuel-air mixture past the carburettor throttle when this is closed at high speeds, that is, during engine braking. This reduces powerfully the volume of noxious exhaust gases produced.

The choke device is to be found only on the rear carburettor, see Fig. 2-67.

The throttle spindle in the respective carburettors is provided with a cam (see Figs. 2-66 and 2-67), 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 carburettor (see 4, Fig. 2-66) 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 carburettor throttle and air valve.

Float system

Fuel flows into the floatchamber via the float valve (4, Fig. 2-69). 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, by means of the float arm (2) and tag, closes the needle on its seating when the correct level has been attained.

The fuel goes through holes in the floatchamber plug and then to the inside of the jet, where the level is the same as in the floatchamber. Sealing between the floatchamber 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. 2-70 and 2-71). (For the B 20 B engine, only on the rear carburettor.)

The cold device consists of a choke lever (3, Fig. 2-70) which is provided with four calibrated holes and an elongated opening as well as a channeled 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. 2-63) 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. 2-70) from the floatchamber via one or several of the calibrated holes to the channel on the other side of the valve disc and further through the drilling in the channel (2), which terminates in the venturi between the vacuum plunger and choke flap. By means of this 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

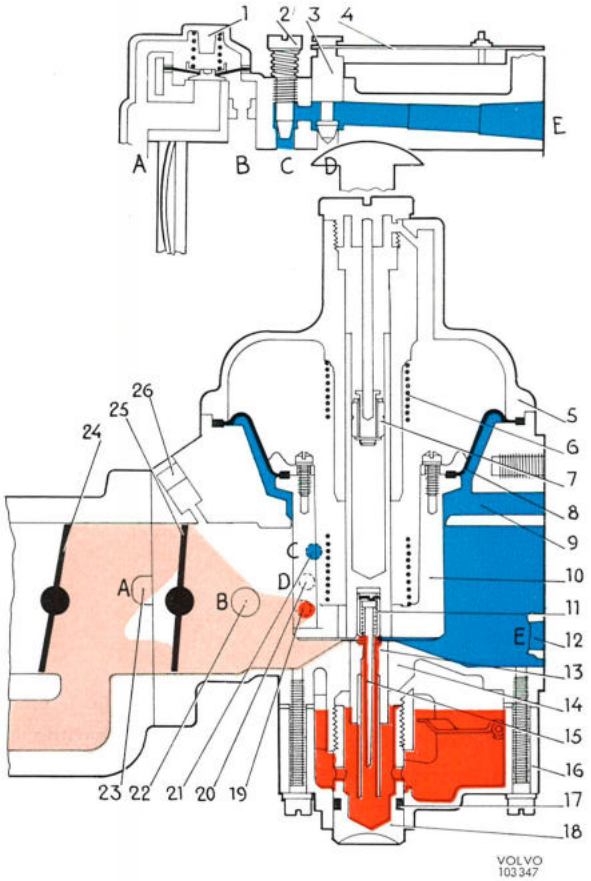

Fig. 2-71. Cold starting, principle

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. Inlet channel for fuel-air mixing through by-pass valve (B 20 B)
23. Outlet channel for fuel-air mixing through by-pass valve (B 20 B)
24. Secondary throttle (B 20 B)
25. Primary throttle
26. Vacuum outlet for distributor, B 20 A. (Has another location on B 20 B)

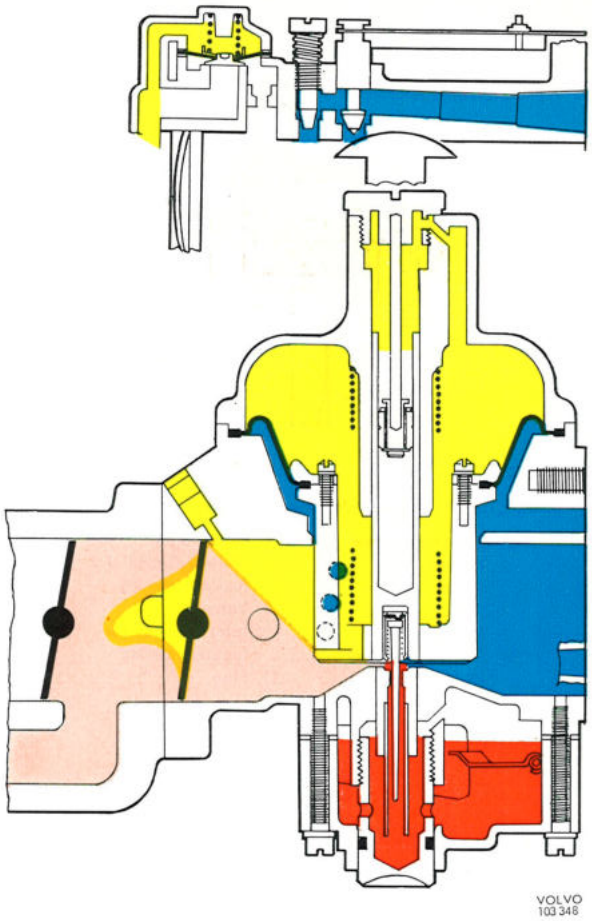

Fig. 2-72. Idling, warm engine

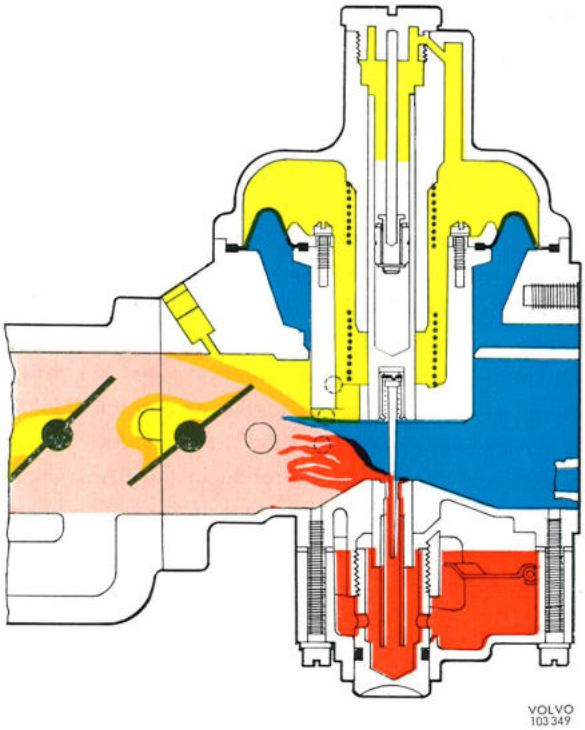

Fig. 2-73. Normal operation (with open secondary throttle)

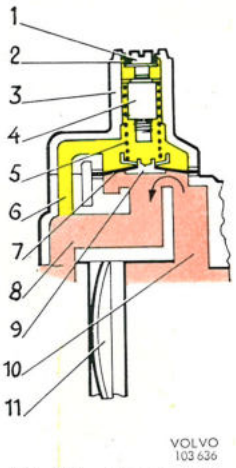

Fig. 2-74. By-pass valve

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

in such a way that turning the cam disc opens the throttle through the fast idle stop screw (11, Fig. 2-63) 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. 2-72). 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. 2-71) 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 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. 2-72. Fine adjustment of the engine idling speed can be carried out with the idle trimming screw (2, Fig. 2-71).

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. 2-71), which is attached to the valve, out of the jet. The effective choke area widens and increases the fuel flow. See Fig. 2-73.

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 temporary 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. 2-71) 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 downward stroke of the air valve is assisted by the spring (6). The rod in the valve 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".

SU-CARBURETTORS

Both the SU-type carburettors are shown in Figs. 2-75, 2-76, 2-77 and 2-78. 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. 2-79.) 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.

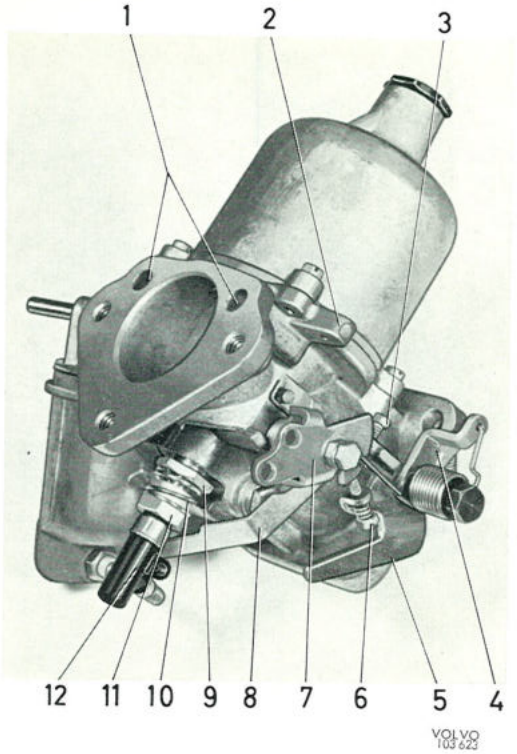

Fig. 2-75. SU-carburettor, front, right side

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

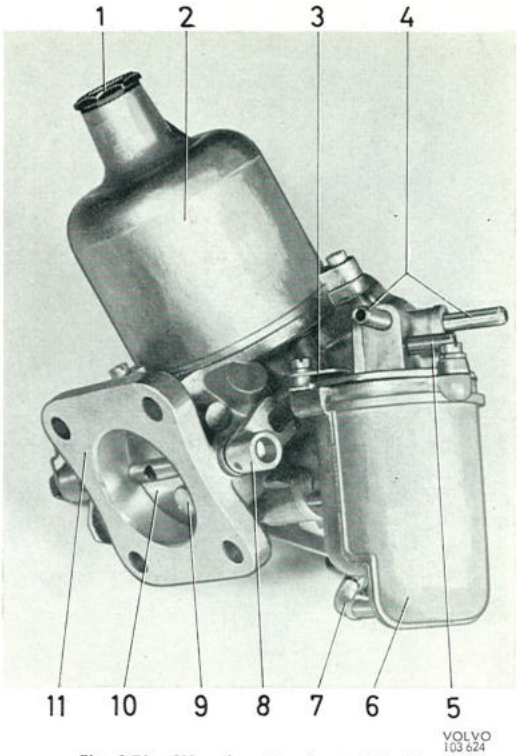

Fig. 2-76. SU-carburettor, front, left side

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

The primary throttle is fitted with a spring-loaded valve (9, Fig. 2-76), 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.

Float

The floatchamber is attached to the carburettor housing by means of screws. The valve (5, Fig. 2-80) 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 float chamber (9).

The floatchamber ventilation hose is connected to the air cleaner through the hose (8, Fig. 2-61).

Cold start

When the engine is started from cold, the fuel/air mixture can be enriched by lowering the jet (see Fig. 2-81), which is done through a linkage system from

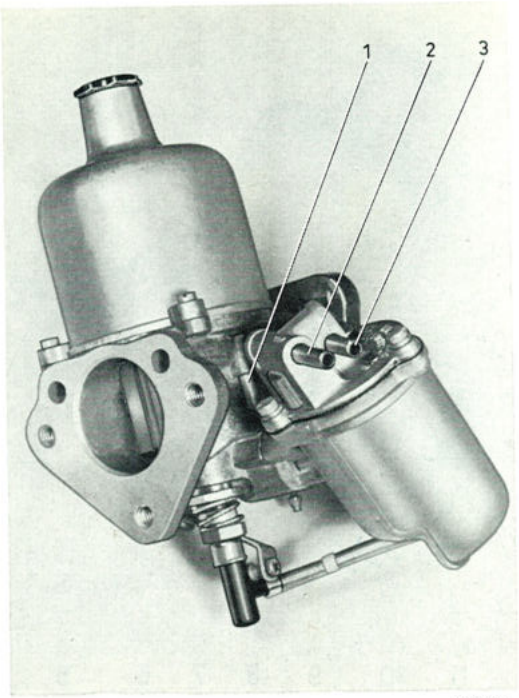

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Fig. 2-77. SU-carburettor, rear, right side

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

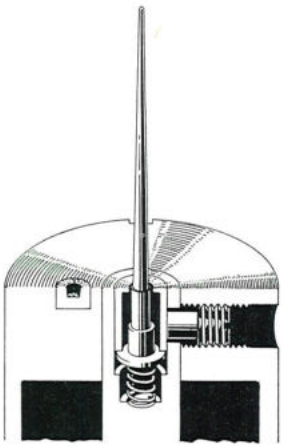

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Fig. 2-79. Spring-loaded needle suspension

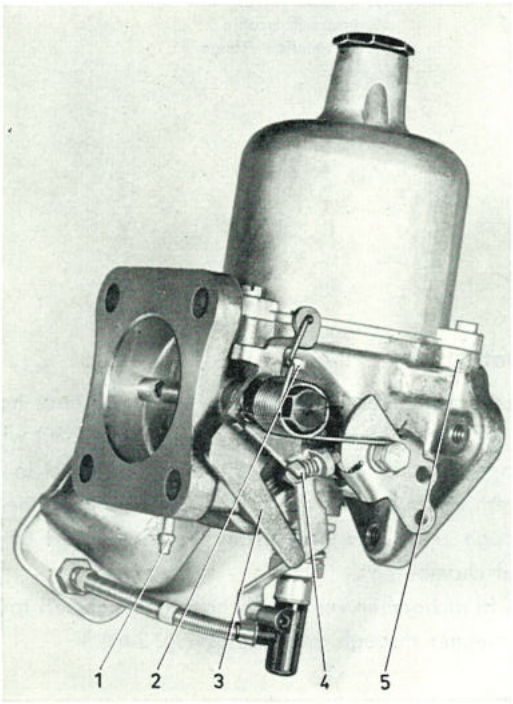

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Fig. 2-78. SU-carburettor, rear, left side

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

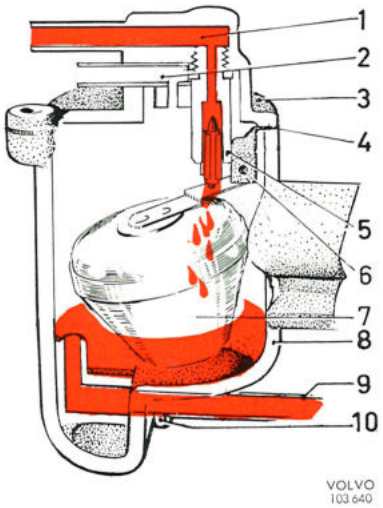

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Fig. 2-80. Float

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

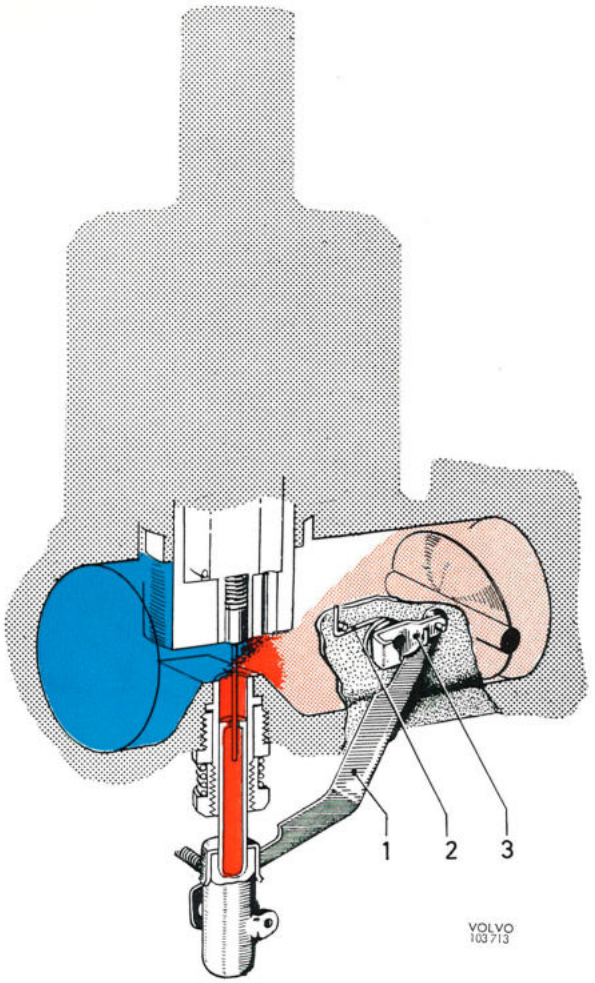


Fig. 2-81. Choke

1. Link 2. Return spring 3. Lever

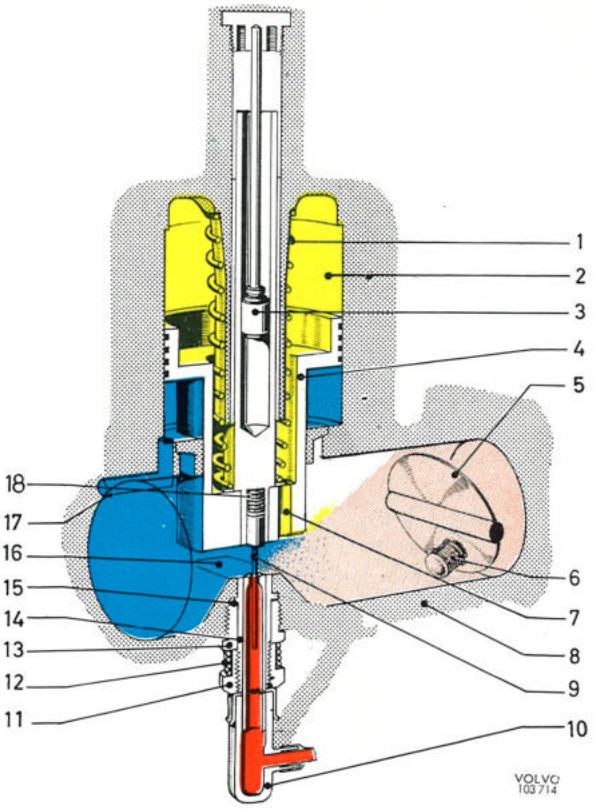


Fig. 2-82. Carburettor, function

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

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

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.

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. 2-84) and the throttle flap opens slightly.

Running

The air flow passing through the carburettors when the engine is running increases in speed when it passes through the constriction known as the bridge (16, Fig. 2-82).

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 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

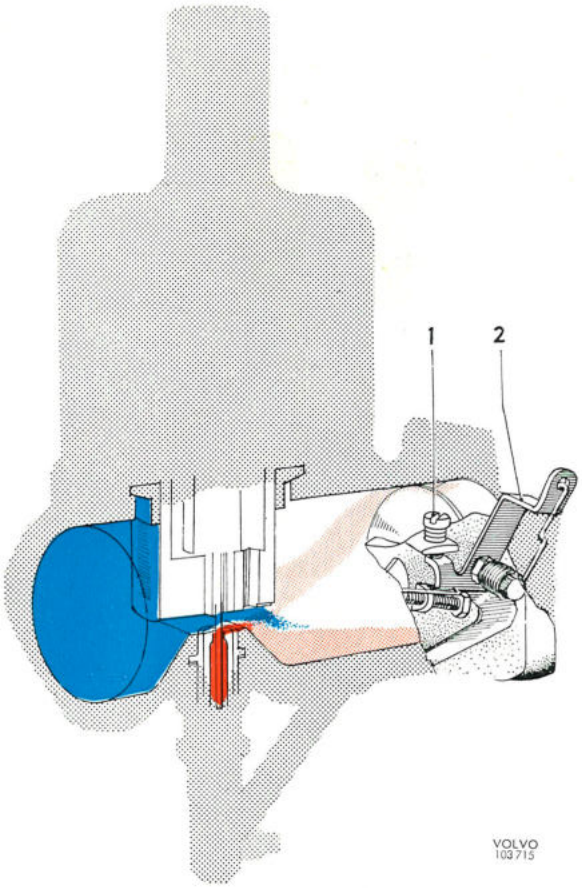


Fig. 2-83. Carburetter, idling

1. Idle trimming screw
2. Lever for return spring

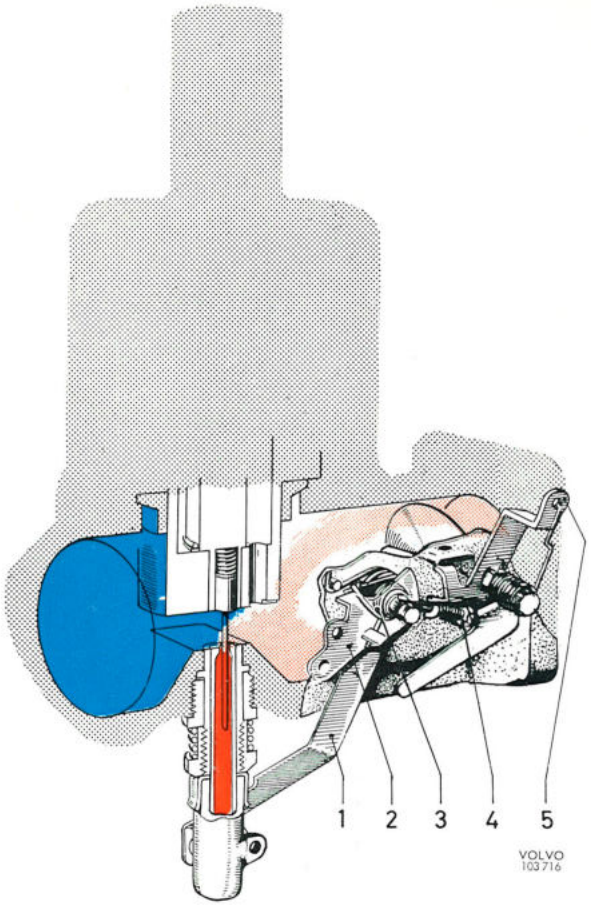


Fig. 2-84. Carburetter, fast idle

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

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 (4, Fig. 2-82) 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 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".

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 idle trimming screw (1, Fig. 2-83). 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. 2-82) 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. 2-84) is in the form of a cam which presses on the fast 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.

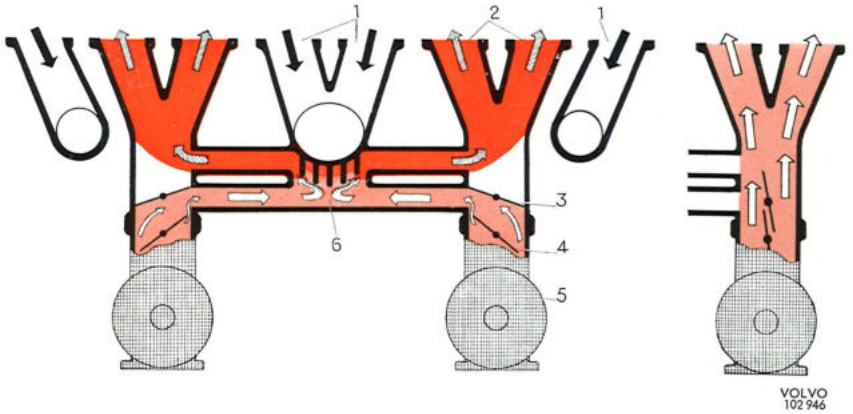


Fig. 2-85. Exhaust emission control system, B 20 B, principle of operation

1. Exhaust manifold
2. Intake manifold
3. Secondary throttle
4. Primary throttle
5. Carburettor
6. Preheating chamber

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 special carburettors fitted on the unit. Exhaust emission control for the B 20 B engine is provided by the special carburettors and a modified intake system which provides an exact and leaner fuel/air mixture.

Fig. 2-85 shows how the exhaust emission control system functions in principle for the B 20 B engine. The intake manifold is fitted with a secondary throttle (3) at each carburettor. For normal driving (with low power output) the throttles (3) are closed. This forces the mixture of fuel and air from the carburettors to a central preheating chamber (6) where the intake charge is heated and thoroughly mixed, whereby a completely evaporated and homogeneous mixture is obtained.

When higher output is required, that is, the primary throttles (4) are opened wider, the secondary throttles (3) also open up and the mixture of fuel and air passes from the carburettors directly to the cylinders without having to go through the preheating chamber.

No particularly accurate synchronizing of the carburettors is required since they are linked to each other through the intake manifold.

AIR CLEANER

The air cleaner functions both as a cleaner for the intake air and as an intake silencer. (However, the air cleaner shown in Fig. 2-88 has no silencing function.)

The air cleaner (Fig. 2-86) on the B 20 A unit is replaced complete. Change it every 40 000 km (25 000 miles) or earlier if driving conditions require it.

The air cleaner (Fig. 2-87) on the B 20 B engine has a replaceable paper insert, a so-called rod-type filter. Note that the insert for the SU-carburettors and the Stromberg carburettor differ from one another and must not be confused.

On certain markets where driving conditions are particularly dusty, an air cleaner with a foam plastic sleeve (see Fig. 2-88) is fitted.

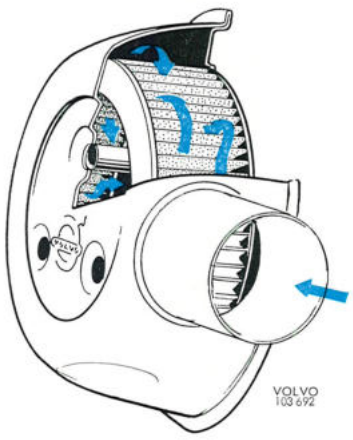


Fig. 2-86. Air cleaner B 20 A

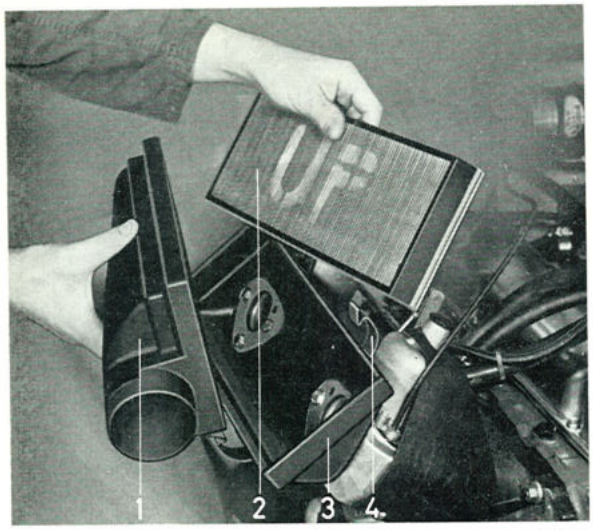


Fig. 2-87. Air cleaner B 20 B

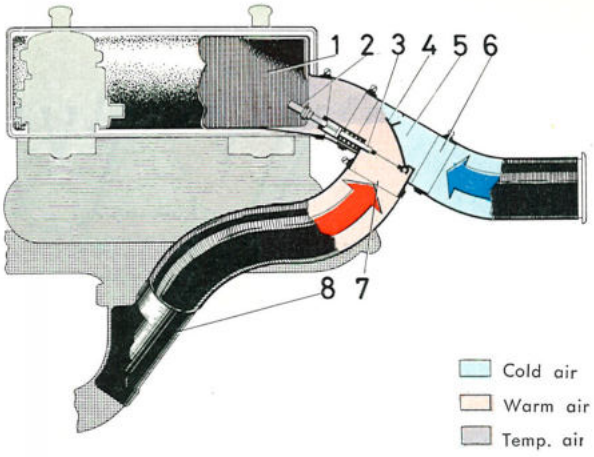


Fig. 2-89. Constant air temperature unit

1. Air cleaner
2. Thermostat
3. Flap control
4. Flap
5. Flap housing
6. Cold-air intake
7. Warm-air intake
8. Heater plate

The paper insert must neither be washed nor moistened. The only servicing to be done to it is replacement. Replace the insert every 40 000 km (25 000 miles) or earlier if the driving conditions are severe.

The engine is fitted with a constant air temperature unit for the air cleaner, see Fig. 2-89.

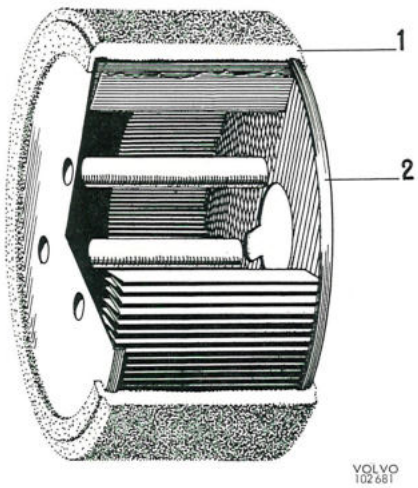


Fig. 2-88. Air cleaner with foam plastic sleeve

1. Foam plastic sleeve 2. Air cleaner

The constant air temperature unit consists of a flap housing (5), a hose (6) for cold air and heat-resistant hose (7) for warm air as well as a heater plate (8), which is secured to the exhaust pipe. The thermostat (2) fitted in the flap housing is inserted in the air cleaner housing and regulates the flap (4) by means of the flap control (3). The warm air taken at the exhaust pipe and the cold air taken at the front of the vehicle are regulated by the flap, mixed. The temperature of the mixture then influences the thermostat. In this way, the air supplied to the carburettors is maintained at a constant temperature of approximately 90° F.

This device eliminates the formation of ice in the carburettor. It also ensures that the driving properties of the vehicle are independent of the temperature of the outside air.

FUEL PUMP

The fuel pump is of the diaphragm type and is driven by a cam on the camshaft. When the rocker arm in the pump is pressed upwards by the cam, the diaphragm is pulled downwards and fuel is drawn up to the pump. When the rocker arm returns, the diaphragm is pressed upwards by a spring (15, Fig. 2-90) and fuel is fed to the floatchamber in the carburettor. When the level in the floatchamber is sufficiently

high, the float valve closes and the pressure in the delivery line rises until the pressure on the upper side of the diaphragm exceeds the spring pressure, and the pumping action ceases. The red arrows show the direction taken by the fuel.

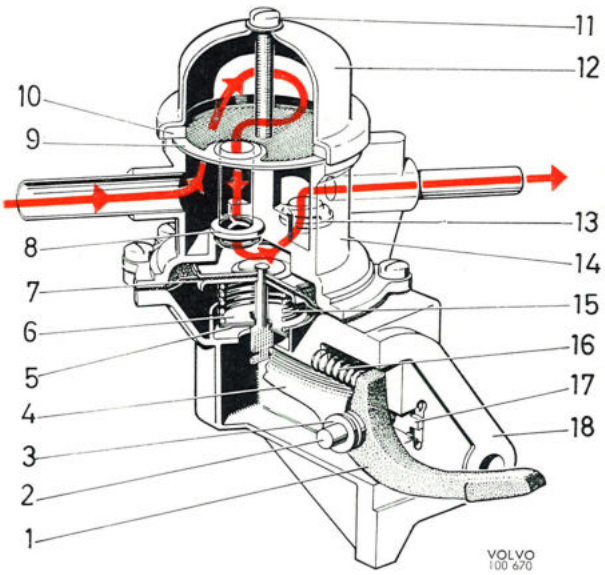


Fig. 2-90. Fuel pump

1. Rocker arm
2. Pin
3. Washer
4. Lever
5. Rubber seal
6. Washer
7. Diaphragm
8. Inlet valve
9. Strainer
10. Gasket
11. Screw with washer
12. Cover
13. Outlet valve
14. Upper pump housing
15. Diaphragm spring
16. Return spring
17. Rider
18. Lower pump housing

REPAIR INSTRUCTIONS

ZENITH-STROMBERG CARBURETTOR

The carburettor is specially set by the manufacturer and fine-adjusted with a CO-meter at the factory. **In order not to disturb the setting of the carburettor, it is absolutely essential that the following repair instructions are accurately followed when any work is to be done on the carburettor.**

PERIODICAL CHECK

Every 10 000 km (6 000 miles) check that there is oil in the damper cylinder(s). The spindle in the piston should be filled to about a 1/4" from the upper edge with oil approved as "Oil for Automatic Transmissions, type A". See Fig. 2-93.

Before any adjustment or repair to the carburettor is carried out, the following should be checked and, if necessary, remedied:

Valve clearance, spark plugs, compression, contact breaker (dwell angle) and ignition setting.

Also check that there is no air leakage on the intake side and that the air cleaner is not blocked. To be on the safe side, check also the flap function of the constant air temperature unit.

The function of the throttle control and throttle(s) should be checked as well. It should be noted here that the B 20 B engine drops its idling speed, after the engine speed has been raised, somewhat more slowly than the B 20 A unit because of the by-pass valve's function.

SETTING THE CARBURETTOR

The best setting of the carburettor is obtained by using a CO-meter.

However, the setting can be checked without the use of this meter, but if the method used for checking results in unsatisfactory running of the engine, the CO-meter must be used. Where there is uncertainty that the correct CO-value is obtained, **always** use a CO-meter.

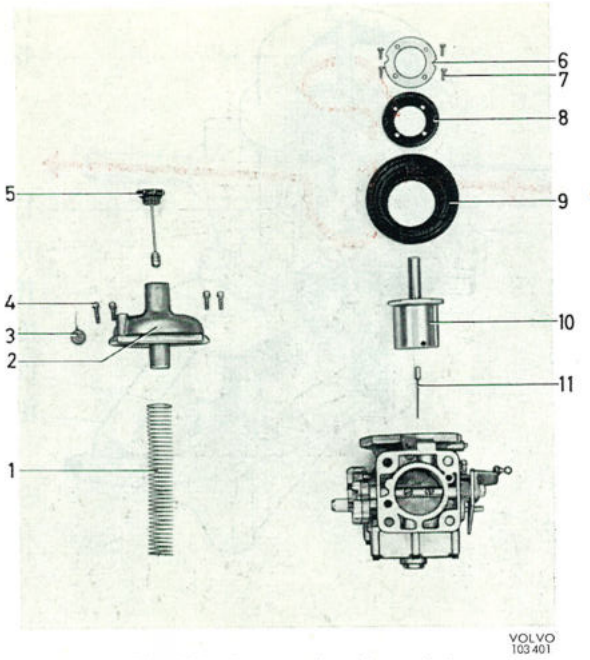


Fig. 2-91. Upper section dismantled

1. Spring
2. Suction chamber cover
3. Sealing plug
4. Screw
5. Hydraulic damper
6. Washer
7. Screw for diaphragm
8. Washer
9. Diaphragm
10. Air valve
11. Metering needle

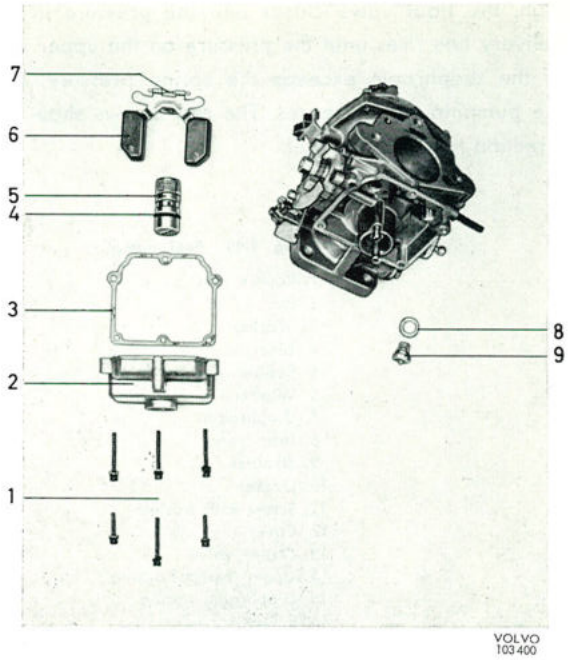


Fig. 2-92. Floatchamber dismantled

1. Screw for floatchamber
2. Floatchamber
3. Gasket
4. Rubber ring
5. Floatchamber plug
6. Float
7. Float pin
8. Washer
9. Float valve

SETTING WITHOUT CO-METER

B 20 A

1. Check that there is oil in the damper cylinder. See under "Periodical Check" (page 2 : 37).
2. Run the engine warm. The setting should be made within about 10 minutes after the coolant thermostat has opened. (One way of knowing this is to feel the radiator at the upper radiator hose, which suddenly becomes warm.)
3. Adjust the engine speed to 700 r.p.m. with the throttle stop screw (12, Fig. 2-63).
4. Adjust with the idle trimming screw (6, Fig. 2-64) from the basic setting, which is 2 screwed-out turns of the screw, so that the best idling speed is obtained.
5. Adjust the link rod. With the control against its stop on the manifold bracket, the link rod should be adjusted so that there is a clearance of about 0.1 mm (0.004") between the lever and the flange of the primary throttle spindle. See Fig. 2-95.
6. Setting the fast idle: Pull out the choke 23—25 mm (almost 1") so that the mark on the rapid idle cam comes opposite the centreline of the rapid idle screw. See Fig. 2-96.
   Then adjust the rapid idle screw to give an engine speed of 1100—1300 r.p.m.

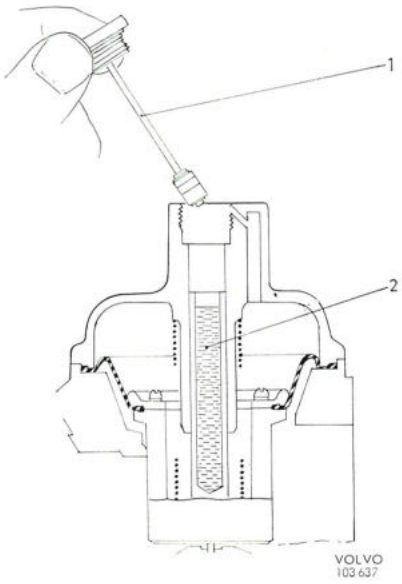


Fig. 2-93. Checking the damper oil

1. Damper piston
2. Oil approved as "Oil for Automatic Transmissions, type A"

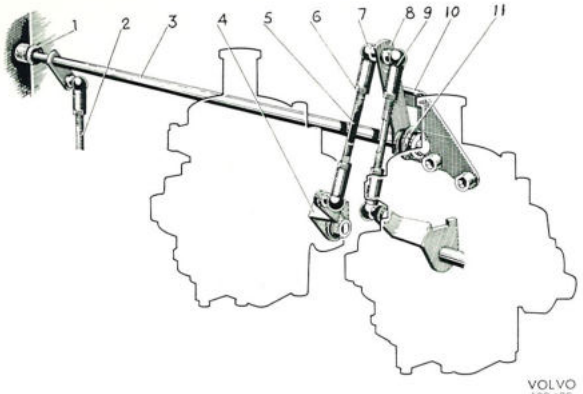


Fig. 2-94. Throttle control, B 20 B

1. Bush
2. Link rod for pedal
3. Control shaft
4. Lever
5. Link rod
6. Lock nut
7. Ball joint
8. Lever
9. Lock wire
10. Bracket
11. Rubber mounting

B 20 B

1. Check that there is oil in the damper cylinders. See under "Periodical Check" (page 2 : 37).
2. Run the engine warm. The adjustment should be carried out within about 10 minutes after the coolant thermostat has opened. (One way of finding this out is by feeling the upper radiator hose at the radiator, which suddenly has become warm.)
3. Adjust the engine speed to 800 r.p.m. with the throttle stop screws (12, Fig. 2-63). The speed should be adjusted to 700 r.p.m. for a vehicle with automatic transmission. (If the engine does not reduce its idling speed, see under the heading "By-pass valve".)

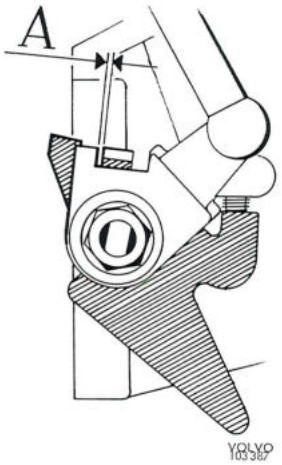


Fig. 2-95. Setting the control
A=0.1 mm (0.004")

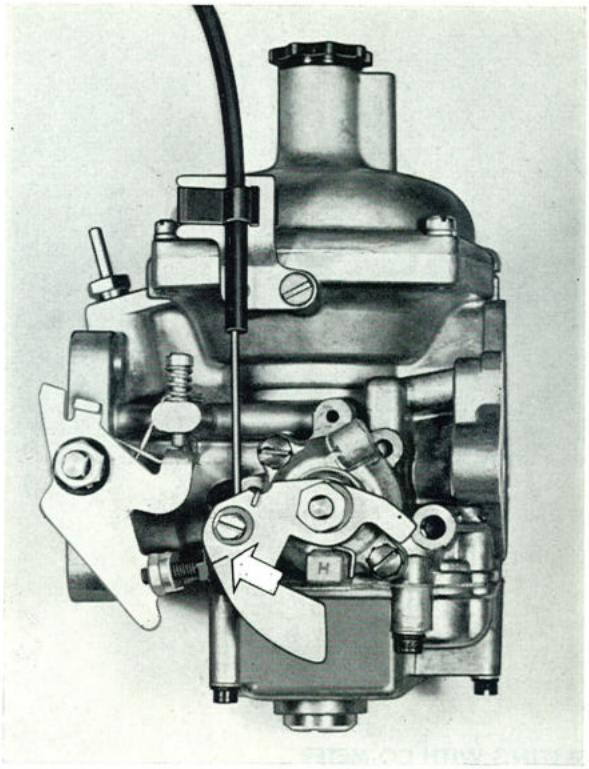
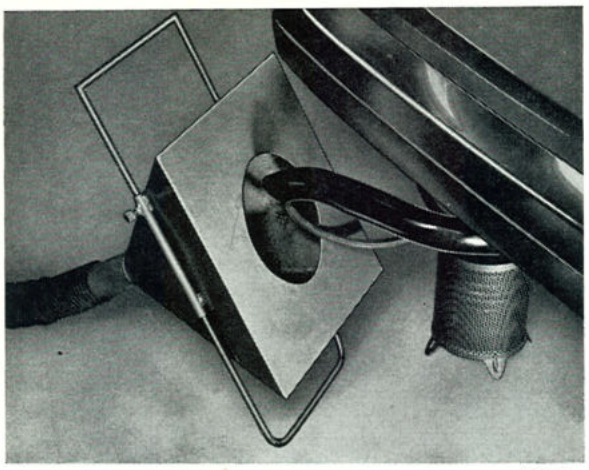


Fig. 2-96. Fast idle

N.B. Screw equally for both carburettors. Check to make sure that both carburettors have the same air valve lift. This is checked easily by simply making sure that the distance visually between the bridge of the carburettor housing and the air valve is the same for both carburettors. A more accurate synchronization is not required.

4. Adjust with the idle trimming screws (6, Fig. 2-64) from the basic setting, which is 2 screwed-out turns of the screw so that the best idling speed is obtained. Screw equally for both carburettors.
5. Adjust the link rods. With the control against its stop on the manifold bracket, the link rods should be adjusted so that there is a clearance of about 0.1 mm (0.004") between the lever and the primary throttle spindle flange. See Fig. 2-95.
6. Setting the fast idle: Pull out the choke control 23—25 mm (almost 1") so that the mark on the rapid idle cam comes opposite the centreline of the rapid idle screw. See Fig. 2-96.
   Then adjust the rapid idle screw to give an engine speed of 1100—1300 r.p.m.



VOLVO 103732

Fig. 2-97. Funnel for exhaust evacuation

SETTING WITH CO-METER

The setting should be made at a temperature of 60—80° F and must be made within 8 minutes after the coolant thermostat has opened. Warming-up should be done with a completely cold engine.

When measuring with a CO-meter, it is important that the **carburettor temperature** is the correct one. When the engine is idling, the floatchamber is exposed to heat radiation from the exhaust manifold while the flow of cold fuel through the floatchamber is small. The resultant rise in temperature causes an increase in the fuel flow through the jet due to the alteration in the viscosity and the increase in the CO-value. Racing the engine speed cools the carburettor to a certain extent due to the step up in the fuel flow. The temperature can be checked to make sure that it is not excessive by feeling the floatchamber with the hand. It should "feel cold", that is, it more or less should not exceed room temperature.

In order to be certain that the measured CO-value is correct, **measuring should be carried out within the time period mentioned above.**

There are a number of different types of CO-meters available which function with acceptable accuracy. The instructions on their use accompany each meter. Note that when connecting the hose for evacuating the exhaust gases, the hose must not be placed so that the exhaust gases are completely evacuated from the CO-meter connection to the exhaust manifold. A funnel, see Fig. 2-97, could suitably be used here. With the funnel installed, the suction at the connection would not be so great as to upset the measuring but sufficient to suck up the exhaust gases so that they do not fill the workshop. When doing any measuring with the CO-meter, it is important that the exhaust pipe and silencer are in good condition, that is, they do not leak.

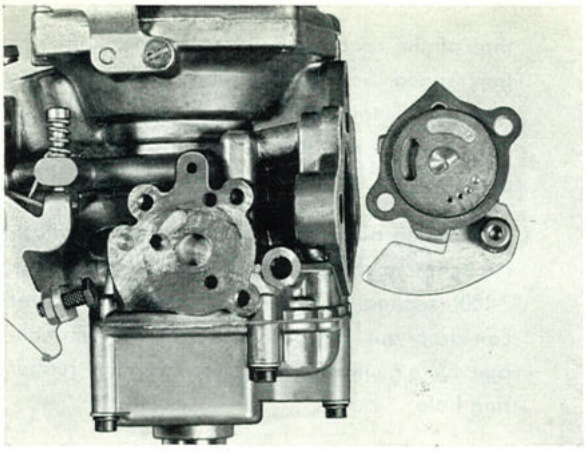
B 20 A

1. Check that there is oil in the damper cylinder. See under "Periodical Check" (page 2 : 37).
2. Connect a tachometer and run the engine warm at 1500 r.p.m. until the coolant thermostat opens. (One way of finding this out is to feel the radiator at the upper radiotor hose, which suddenly becomes warm.)
3. Adjust the engine speed to 700 r.p.m. with the throttle stop screw (12, Fig. 2-63).
4. Connect a CO-meter and check that the CO-content is within the limits 2.5—3.5 %. With the help of the idle trimming screw (6, Fig. 2-64), the CO-content can be adjusted within small deviations. (If the CO-content is too high, check first the temperature compensator, see under the heading "Temperature Compensator".)
5. Adjust the link rod. With the control against its stop on the manifold bracket, the link rod should be adjusted so that there is a clearance of about 0.1 mm (0.004") between the lever and the flange of the primary throttle spindle. See Fig. 2-95.
6. Setting the fast idle: Pull out the choke control 23—25 mm (almost 1") so that the mark on the fast idle cam comes opposite the centre line of the fast idle screw. See Fig. 2-96. Then adjust the fast idle screw to give an engine speed of 1100—1300 r.p.m.

B 20 B

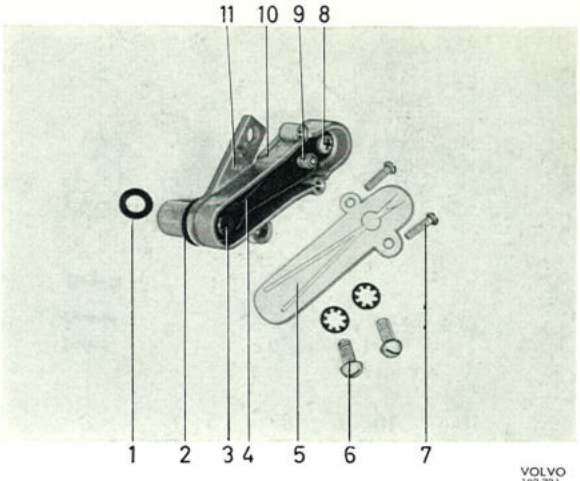
1. Check that there is oil in the damper cylinders. See under "Periodical Check" (page 2 : 40).
2. Connect a tachometer and run the engine warm at 1500 r.p.m. until the coolant thermostat opens. (One way of knowing this is to feel the radiator at the upper radiator hose, which suddenly becomes warm.)
3. Adjust the engine speed to 800 r.p.m. with the throttle stop screws (12, Fig. 2-63). The speed should be adjusted to 700 r.p.m. for a vehicle with automatic transmission. (If the engine does not reduce its idling speed, see under "By-pass valve".)

   N.B. Screw equally for both carburettors. Check that both carburettors have the same air valve lift. This is easily checked by measuring with the



VOLVO 103402

Fig. 2-98. Cold-start device



VOLVO 103731

Fig. 2-99. Temperature compensator

1. Rubber seal
2. Rubber seal
3. Valve
4. Bi-metal spring
5. Cover
6. Screw for temperature compensator
7. Screw for cover
8. Cross-slotted screw
9. Adjust nut
10. Housing
11. Marking

eye the distance between the carburettor house bridge and the air valve. The distance should be the same for both carburettors. More accurate synchronization is not required.

4. Connect a CO-meter and check that the CO-content is within the limits 2.5—3.5 %. With the help of the idle trimming screws (6, Fig. 2-64) the CO-content can be adjusted within small deviations. (If the CO-content is too high, check first the temperature compensator, see under "Temperature Compensator".)
5. Adjust the link rods. With the control against its stop on the manifold bracket, the link rods should be adjusted so that there is a clearance of about 0.1 mm (0.004") between the lever and the flange of the primary throttle spindle. See Fig. 2-95.
6. Setting the fast idle: Pull out the choke control 23—25 mm (almost 1") so that the mark on the fast idle cam comes opposite the centre line of the fast idle screw. See Fig. 2-96.
   Then adjust the fast idle screw to give an engine speed of 1100—1300 r.p.m.

FAULTY CARBURETTOR FUNCTION

1. Check to make sure that the reason for the fault in the function is not due to wrong damper oil or oil level, impurities in the floatchamber or a faulty float valve and float. See the respective headings.
2. Remove the air cleaner and check that the suction valve(s) operate easily and without jamming. (The damper piston[s] removed.) If this is not the case, remove the suction chamber cover and clean the pistons. At the same time, check to make sure the diaphragm is in good condition. Plug-seal after fitting.

N.B. If the metering needle must be released or moved, it should be adjusted, see under the heading "Replacing the metering needle". **A CO-meter is recommended for this purpose.**

Temperature compensator

3. Should there be a powerful drop in the idling speed during idling for a lengthy period, especially when the weather is warm, check the function of the temperature compensator by removing the plastic cover and pressing in the valve (3, Fig. 2-99). This should move under very light pressure and return to its position without jamming. This applies at a temperature above 70° F. The valve starts opening at 50° F.
   Pressing the valve inwards deteriorates the quality of the idle. If the valve has a tendency to be stiff in operation or if the compensator is incorrectly adjusted, the latter should be replaced complete. See under "Replacing the temperature compensator".
   For adjusting slacken one of the cross-slotted screws (8), for the bi-metal spring and center the valve so that its function will be as above. If necessary adjust as follows:
   At 70° F the valve should open 0.1—0.3 mm (0.004—0.012"). When checking the setting, remove the temperature compensator from the carburettor and store it at a temperature of 70° F until it has reached this temperature. Adjust with the nut (9) for the bi-metal spring.

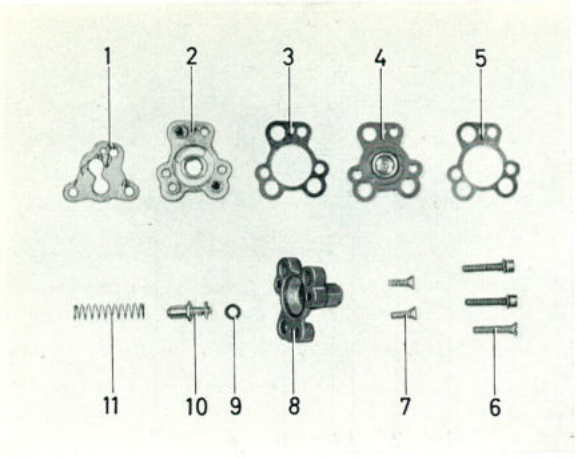


Fig. 2-100. By-pass valve

1. Gasket
2. Housing
3. Gasket
4. Diaphragm
5. Gasket
6. Screw for by-pass valve
7. Screw for cover
8. Cover
9. Rubber ring
10. Adjusting screw
11. Spring

Only for B 20 B

BY-PASS VALVE (FRONT CARBURETTOR)

4. With faulty function of the by-pass valve, or if the engine does not reduce speed at idle (first check that the throttle control is correctly adjusted) or if the valve does not open, then adjust as follows:

A **Engine does not reduce speed at idle:**

Turn the adjusting screw (1, Fig. 2-66) to the left until the engine reduces idling speed.

Check the function by running the engine briefly up to about 2 000 r.p.m. The engine should then return to idling speed. (Note that the engine will return to idle somewhat slower than is the case with a carburettor without a by-pass valve.) When correct function is obtained (that is, even the function according to B), turn the screw a further 1/2 turn to the left.

B **The valve does not open:**

Normally the air valve of the front carburettor should go down to the bridge a little after that of the rear carburettor on racing the engine speed. Set the adjusting screw at higher speed until normal function is obtained. If this not possible, replace the by-pass valve complete, see under "Replacing the by-pass valve".

N.B. When adjusting, do not press the adjusting screw inwards since the rubber ring (9, Fig. 2-100) sealing between the screw and cover can drop out of position. Check for air leakage by e.g. placing a finger over the rubber ring hole.

REMOVING THE CARBURETTORS

Remove the air-cleaner. Remove the link rod ball joints from the carburettors. Take off the fuel hoses, vacuum hose and choke wire.

Remove the nuts for the carburettors and take off the carburettors. Remove the protection plates and gaskets. Mask over the intake holes with tape.

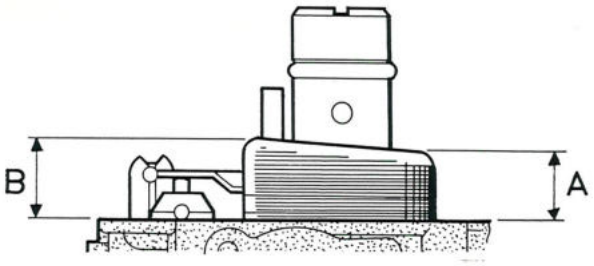
FITTING THE CARBURETTORS

Clean the gasket surface. Fit the protection plates, new gaskets and then the carburettors. Connect the ball joints, fuel hoses, vacuum hose and choke wire. Make sure that the choke control on the dashboard is pushed in. Then secure the pull wire in the clamping screw of the rapid idle cam. After this clip on the outer sleeve of the pull wire.

Fit the air cleaner and connect the hose for the crankcase ventilation. Adjust the carburettors, see under "Setting the carburettors".

CHECKING THE SECONDARY THROTTLES

Check to make sure that the secondary throttles are centered and can be turned without jamming. Check the location ("A", Fig. 2-115) of the levers. When the secondary throttle is closed, the distance "A" between the lever pin and the intake manifold flange should be 2.7—4.3 mm (0.11—0.17"). Check to make sure that the rubber seal (8, Fig. 2-116) is not damaged, and that its inner edge seals well against the intake manifold. When fitting a new seal, make sure that it is not damaged by the sharp edges of the spindle and that it is fitted so that the measurement "B" is 4.5—5.0 mm (0.18—0.20"), see Fig. 2-116.



VOLVO 103341

Fig. 2-101. Float level

A= 9—13 mm (5/8")
B= 15—17 mm (1/2")

CLEANING THE FLOATCHAMBER

The floatchamber is removed by uncrewing the floatchamber plug (5, Fig. 2-92) and the screws (1). Clean the gasket surface and fit a new rubber ring (4). Fit the floatchamber with a new gasket.

FLOAT LEVEL

Before checking the float level, remove the carburettor, invert it and take out the floatchamber.

The float is removed by carefully breaking the float spindle from the bridge The float is fitted with the sloping side facing away from the carburettor housing.

At the correct float level, the top point on the float should lie 15—17 mm (5/8") and the rear edge 9—13 mm (1/2") above the sealing surface (see Fig. 2-101). If the level is incorrect, adjust by bending the tag at the float valve.

N.B. Do not bend the arm between the float and the pin.

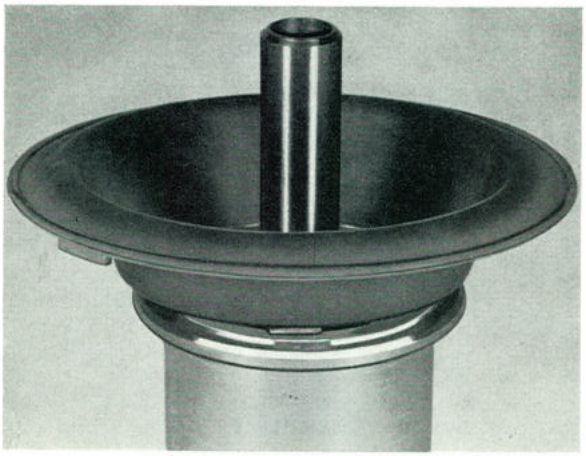
REPLACING THE DIAPHRAGM

1. Screw out the damper piston. Make line-up marks on the suction chamber cover and carburettor housing. Remove the seal plug, release the screws and take off the suction chamber cover. Remove the spring.
2. Pull up the air valve with diaphragm. Remove the diaphragm by unscrewing the four screws. Clean the air valve.
   N.B. Observe due care that the metering needle is not bent or moved from its position.
3. Fit the new diaphragm, see Fig. 2-102. The rubber register should fit into the valve groove.
4. Move the air valve down and fit in the rubber register as shown in Fig. 2-103. Fit the cover and fill with damper oil.
5. Plug-seal the suction chamber cover.

REPLACING THE BY-PASS VALVE

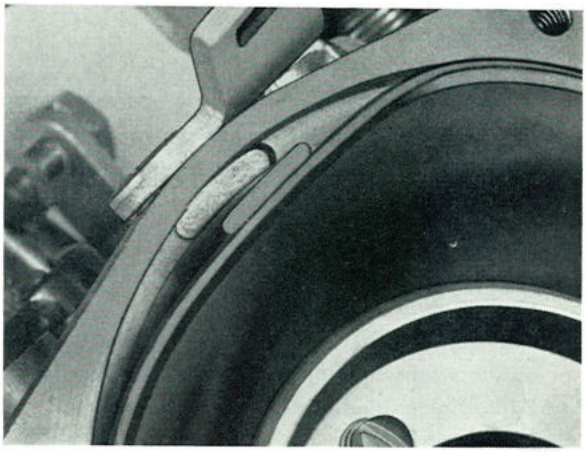
The by-pass valve is replaced complete. The valve is removed from the carburettor by screwing out the three screws (6, Fig. 2-100). Clean the gasket surface and fit the new valve with gasket (1). Carry out a function test. Note that the by-pass valve is marked × on the cover.

N.B. After the valve has been fitted on the carburettor, remove the screw (A, Fig. 2-104) on the by-pass valve. If the screw is not removed and it loosens, it will jam the cam so that the throttle cannot be closed. The only purpose the screw has is to keep the by-pass valve components together before being fitted on the carburettor.



VOLVO 101 963

Fig. 2-102. Diaphragm in air valve



VOLVO 101 964

Fig. 2-103. Diaphragm in carburettor housing

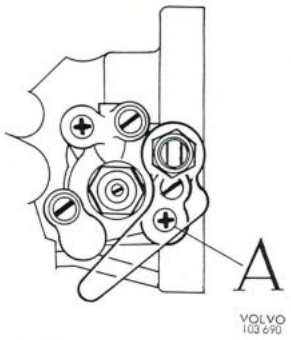


Fig. 2-104. Removing the screw

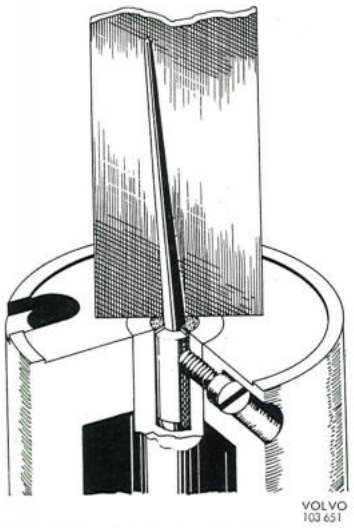


Fig. 2-105. Fitting the metering needle

REPLACING THE TEMPERATURE COMPENSATOR

The temperature compensator is replaced complete. It is removed from the carburettor by unscrewing the screws (6, Fig. 2-99). Take out the old seal (1) from the carburettor and fit a new one. Place a new seal (2) on the temperature compensator and fit the compensator.

N.B. The temperature compensator is marked "120°" for the B 20 A engine and "60°" for the B 20 B engine (see 11, Fig. 2-99).

REPLACING THE METERING NEEDLE

After replacing the metering needle, the following check with a CO-meter is recommended.

1. Remove the air valve from the carburettor and clean it.
2. Remove the needle by unscrewing the lock screw and pull the needle out with the spring suspension.
3. Before fitting the new needle, check the needle designation.
   For B 20 A: B2 AF
   For B 20 B: B1 S
   The designation is punched on the needle and can be read by pulling the needle out of the spring suspension far enough to reveal the designation.
4. Fit the needle with the spring suspension so that the flat surface faces the lock screw. The needle should incline to the holes in the air valve, i.e. in towards the carburettor throttle.
   The needle should be inserted so far that the plastic washer lies flush with the valve, see Fig. 2-105. Tighten the lock screw.
5. Fit the air valve in the carburettor. Plug-seal the suction chamber cover.

DAMPER DEVICE

If the engine does not react properly during acceleration, the reason may be a faulty clearance on the damper plunger, the axial clearance of which (see A, Fig. 2-106) should be 0.5—1.1 mm (0.02"—0.06").

The repair kit should be used to remedy any fault in the damper plunger.

If the damper device is to function correctly, then the level of the damper oil must be correct (see Fig. 2-93). The interval prescribed for the periodical check is 10 000 km (6 000 miles).

Fig. 2-106. Damper plunger clearance

SU-CARBURETTORS

The vehicles are delivered from the factory with the carburettors fine-adjusted with a CO-meter.

PERIODICAL CHECK

Check regularly every 10 000 km (6 000 miles) to make sure that there is oil in the damper cylinders. See Fig. 2-93.

The spindle in the piston should be filled to about 6 mm (1/4") from the upper edge with oil approved as "Oil for Automatic Transmissions, type A".

REMOVING THE CARBURETTORS

Both the carburettors must be drawn from the intake manifold simultaneously, since the intermediate shaft is carried in the levers on the throttle spindles.

1. Remove the air cleaner, fuel hoses, vacuum hose and controls from the carburettors.
2. Unscrew all the nuts securing the carburettors to the intake manifold.
3. Pull both the carburettors from the intake manifold simultaneously. Mask over the intake holes with tape.

DISMANTLING THE CARBURETTORS

1. Remove the damper plunger and suction chamber with valve.
2. Screw off the floatchamber cover and lift it up. Then remove the chamber.
3. Unscrew the screws holding the levers for the choke and fast idle control, pull them off and remove the jet.
4. Wash all parts in white spirit and blow them dry with compressed air.

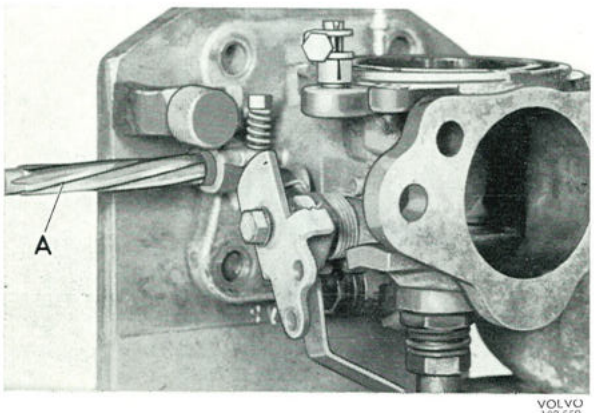


Fig. 2-107. Reaming the location for bush
A=SVO 2880 (2400 as alternative)

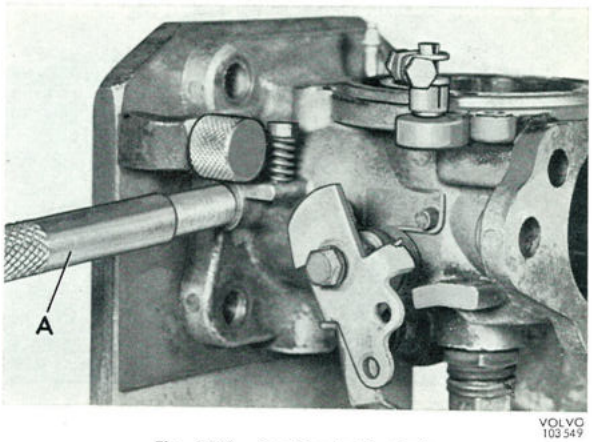


Fig. 2-108. Pressing in the bush
A=SVO 2402

RE-BUSHING THE CARBURETTORS

If there is throttle spindle play in the chamber, this can be re-bushed as follows:

1. First slacken the screws and remove the throttle spindle.
2. Secure stand SVO 2603 in a vise and mount the carburettor on the stand with the hooks as shown in Fig. 2-107 for work with SU-carburettors, use the thick pin of the stand. Make sure that the pin hole comes in line with the throttle spindle hole.
3. Ream the holes for the throttle spindle in the housing with reamer SVO 2880 (SVO 2400 as alternative). See Fig. 2-107. Do not pull the reamer back through the hole, but release the attachment and push the reamer in the direction of operation through the hole in the bottom plate. If the reaming is done in a vertical drilling machine, a minimum speed must be used and the reamer carefully secured so that it does not throw. It the reamer throws, the holes will be too large. The bushes will then become loose so that the housing must be scrapped.

   N.B. If may happen when re-bushing the carburettor housing for the SU-carburettors that the reamer jams with a screeching sound when reaming the location for the bush. The reason for this is that a part of the old bush in the housing has fastened on the reamer. Pull out the reamer, remove the bush and continue reaming.
4. After completing the reaming, turn the stand pin 90° so that it forms a stop inside the carburettor housing for the bushes. Then drive in the bushes with drift SVO 2402, see Fig. 2-108.
5. Turn the stand pin a further 90° and ream the driven-in bushes with reamer SVO 2401, see Fig. 2-109.

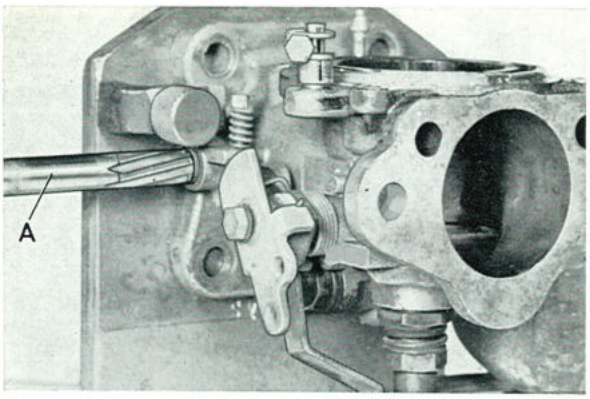


Fig. 2-109. Reaming the bush
A=SVO 2401

6. Fit the throttle with a new throttle spindle. Turn or rivet the throttle screws.
7. Fit the flange yoke as shown in Fig. 2-110 (with the throttle fully closed and the throttle stop screw out). Make sure that there is a clearance of 1.5 mm (0.06") between the flange yoke and the throttle housing. With the flange in position (see Fig. 2-110) and a 3.0 mm (approx. 1/8") drill, make a hole for the lock pin (the hole should be drilled at right angles to the longitudinal shaft of the carburettor when the throttle is closed) through the throttle spindle. Remove drillings, fit the flange yoke and the lock pin.
8. Fit the floatchamber.

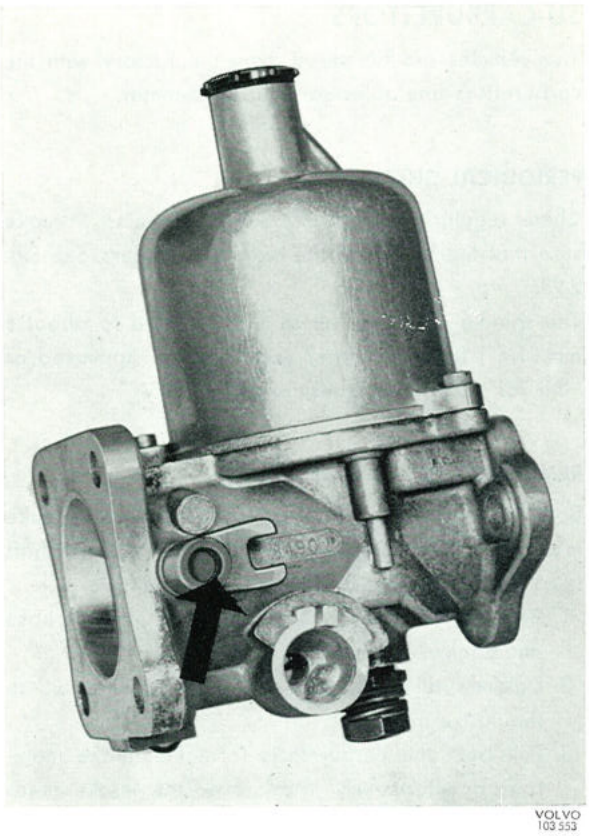


Fig. 2-110. Location of flange yoke

CHECKING AND ASSEMBLING THE CARBURETTORS

Before assembling the carburettor check to make sure that all the parts are free from damage. The air valve fit in the chamber has been accurately determined and its character must not be altered either by filing or shaving. Minor unevennesses can be carefully removed with a fine emery cloth.

1. **The spring-suspended metering needle should be installed so that it inclines towards the carburettor throttle.**
   This position is attained when the line (A, Fig. 2-111) points towards the holes in the air valve. This line marks where the pin, which presses on the needle, is located. The needle is fitted so that the spring sleeve lies flush with the valve, see Fig. 2-111.
2. Fit the jet sleeve and lock nut. Centering of the jet is required for certain carburettors, see under "Centering the jet".
   Tighten the lock nut.

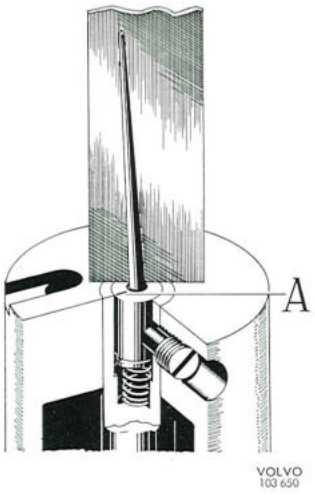


Fig. 2-111. Fitting the metering needle

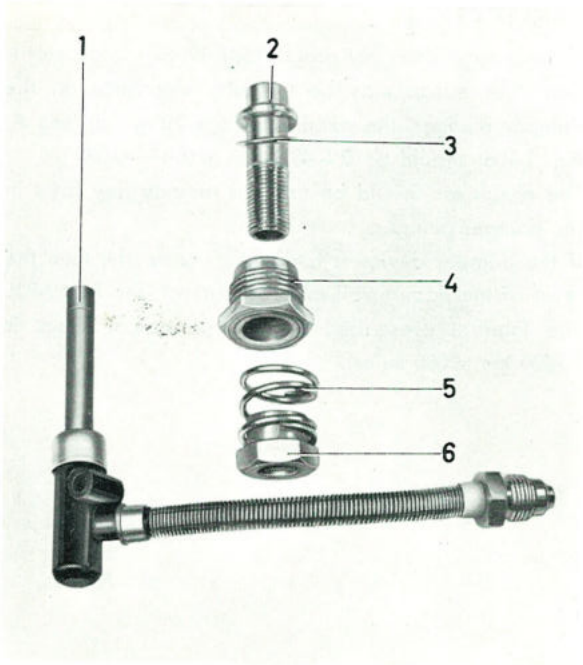


Fig. 2-112. Jet dismantled

1. Jet with fuel line, complete
2. Jet sleeve
3. Seal
4. Lock nut
5. Spring
6. Adjusting nut

3. Fit the spring and valve in the suction chamber and secure the chamber to the carburettor housing.
4. Fit the spring, adjusting nut and jet, see Fig. 2-112. Connect the link.
5. Check and secure the float valve, see Fig. 2-113. Fit the float and the cover. Secure the floatchamber and the line to the jet.
6. Screw the jet in to the stop position. Then unscrew it so far that it just touches the air valve when the latter rests on the bridge. From this position screw out the adjusting nut 15 hex flats.
7. Place the carburettor with the 4-holed flange facing downwards. Move the air valve to its topmost position. The valve should move easily without jamming. When it is released, it should return at even speed and strike against the bridge with a sharp metallic click.

CENTERING THE NOZZLE ON CARBURETTOR MARKED AUD 305

On the carburettor marked AUD 331 the jet **cannot be centered** on the plate which is secured to the floatchamber. However, a small number of carburettors have this centering arrangement still. These are marked AUD 305. The centering drift SVO 2369 (used for the B 16 B engine) should be used.

1. Remove the suction chamber and valve. Then refit only the suction chamber.
2. Disconnect the fuel hose from the floatchamber as well as the link from the jet. Remove the jet.
3. Release the lock nut for the jet sleeve. Push down the centering drift SVO 2369 through the hole for the hydraulic damper and into the jet sleeve.
4. Tighten the lock nut, with the drift pressed down fully, and turn the drift to make sure that it turns easily. It may be necessary to slacken the nut, turn the drift and tighten the nut several times after one another before a satisfactory result is obtained.
5. Assemble the carburettor. Fit the carburettor with the 4-holed flange facing downwards. Check the centering by lifting the valve 5—6 mm (1/4") from the bridge and then releasing it. The valve should then strike against the bridge (jet) with a **sharp metallic click.**

FIT OF AIR VALVE

The fit can be checked by plugging the air holes in the valve with, for example, small corks. The damper plunger is fitted but not filled with oil. The air valve spring is not fitted. Normally the valve should sink to the bottom, from the position shown in Fig. 2-114, in about 5—7 seconds.

REPLACING THE FLOAT VALVE

1. Remove the floatchamber cover and invert the chamber.
2. Remove the pin for the float lever. Remove the float.
3. Screw out the valve and fit a new one. Refit the float.
4. Check to make sure that the cover gasket is not damaged and place on the cover and secure it.

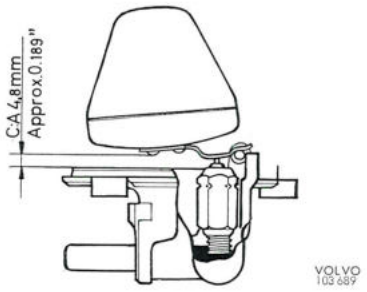


Fig. 2-113. Checking the float level

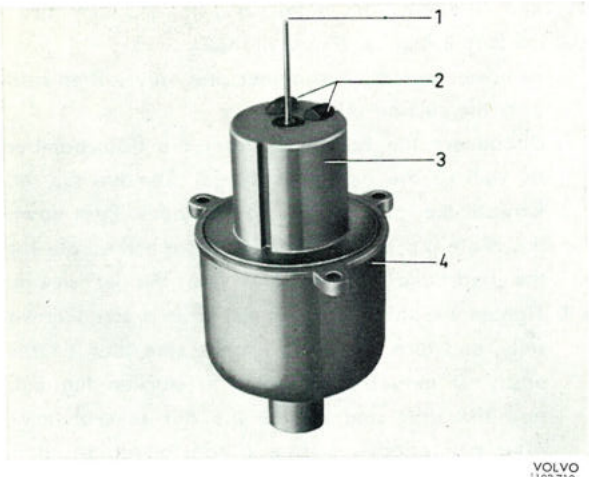


Fig. 2-114. Air valve fit

1. Metering needle
2. Plugs of, e.g. rubber or cork
3. Air valve
4. Suction chamber

DAMPER DEVICE

If the engine does not react properly during acceleration, the reason may be a faulty clearance on the damper plunger, the axial clearance of which (see A, Fig. 2-106) should be 0.4—0.8 mm (0.016"—0.032").

The repair kit should be used to remedy any fault in the damper plunger.

If the damper device is to function correctly, then the level of the damper oil must be correct (see Fig. 2-93). The interval prescribed for the periodical check is 10 000 km (6 000 miles).

CHECKING THE FLOAT LEVEL

This type of carburettor is relatively insensible to variations in the float level. To ascertain the correct level, check the position of the floats according to the measurement given in Fig. 2-113.

FITTING THE CARBURETTORS

1. Remove the masking tape from the intake ports. Fit on new gaskets.
2. Fit the intermediate shaft in position between the carburettors, see Fig. 2-117. Make sure that the protective plate is not damaged and that the sealing surfaces are clean.
3. Fit both the carburettors at the same time with the intermediate shaft in position. Tighten the nuts and connect up the control and lines.
4. Carry out any necessary carburettor setting adjustments, see under "Setting the carburettors".

CHECKING THE SECONDARY THROTTLES

Check to make sure that the secondary throttles are centered and that they can be turned without jamming. Check the location ("A", Fig. 2-115) of the levers. When the secondary throttle is closed, the distance "A" between the lever pin and the intake manifold flange should be 2.7—4.3 mm (0.11—0.17"). Check to make sure that the rubber seal (1, Fig. 2-116) is not damaged and that its inner edge seals properly against the intake manifold. When fitting the seal make sure that it is not damaged against the sharp edges of the spindle and that it is installed so that the measurement "B" is 4.5—5.0 mm (0.18—0.20").

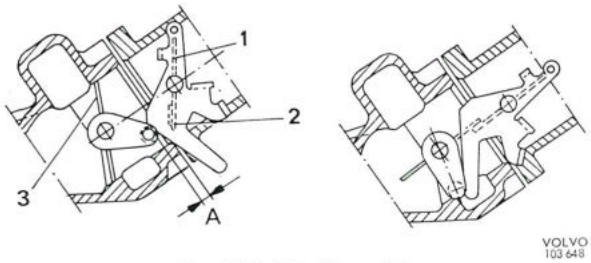


Fig. 2-115. Throttle position

Throttle position at low output — Fully open throttle

1. Primary throttle 2. Valve 3. Secondary throttle

"A"=2.7—4.3 mm (0.11—0.17")

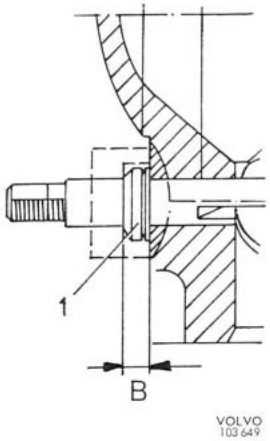


Fig. 2-116. Throttle spindle sealing

1. Rubber seal

"B"=4.5—5.0 mm (0.18—0.20")

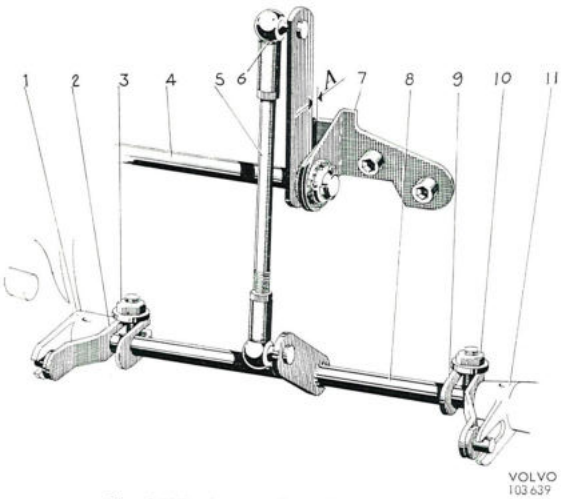


Fig. 2-117. Intermediate shaft and levers

A=Clearance between stop and lever

1. Lever on throttle spindle
2. Lever on intermediate spindle
3. Lock nut
4. Control shaft
5. Link rod
6. Lock wire
7. Bracket
8. Intermediate shaft
9. Lever on intermediate shaft
10. Lock nut
11. Lever on throttle spindle

SETTING THE CARBURETTORS

Before carrying out any adjustment or repair to a carburettor, the following should be checked and if necessary remeded:

Valve clearance, spark plugs, contact breakers (dwell angle) and ignition timing.

Also check that there is no air leakage on the intake side and that the air cleaner is not blocked. Check, too, the function of the flap for the constant temperature device.

The function of the throttle control and throttles should also be checked. Note here that the B 20 B engine reduces idle, after the engine speed has been raced, somewhat more slowly than for the B 20 A engine because of the function of the by-pass valves.

At certain intervals, for example, when changing the air cleaner, it is suitable to remove and thoroughly clean the suction chamber and air valve.

At the same time, the floatchambers should be cleaned. This is facilitated by removing the floatchamber covers.

Basic setting (zero-setting) of carburettors

The basic setting should always be the reference point for the final setting.

1. Place a feeler gauge 0.5 mm (0.02") at "A" Fig. 2-117, between the lever and its stop. Screw out the fast-idle stop and throttle stop screws so that the throttles are closed completely.
2. Release the nuts (3 and 10, Fig. 2-117) and carefully press the outer end of the levers (2, 9) on the intermediate shaft downwards so that the flange pins make smooth contact with the lower tooth on the levers (1, 11) of the throttle spindles. **N.B.** Do not press so hard that the primary throttle is influenced. Tighten the nuts (3, 10) in this position. Make sure that the intermediate shaft can be pushed forwards and backwards a little. It must not jam due to, for example, the levers (2, 9) being fitted too near the carburettors.
3. Remove the feeler gauge. Then check by lifting the lever at "A" that both the primary throttles are influenced simultaneously.
4. Turn the throttle stop screws so that they just touch the throttle levers when the throttles are closed. Then screw in them 1½ turns.
5. Unless rough adjustment of the jet is carried out according to point 6 under "Checking and assembling the carburettors", this should be done by screwing in the jet so far that it just touches the air valve when the latter rests on the bridge. From this position screw out the adjusting nut 15 hex flats.
6. Fill the carburettor damping cylinders with oil. The spindle in the valve should be filled to about 1/4" from the upper edge with oil which is approved as "Oil for Automatic Transmissions, type A". Compare with Fig. 2-93.

Setting the fuel/air mixture and idling speed

The best setting of the carburettors is obtained by using a CO-meter. However, the setting can be carried out without a CO-meter, but if there is uncertainty about the correct CO-value obtained, a CO-meter should be used.

SETTING WITHOUT CO-METER

The setting should be made at a temperature of 60°—80° F and must be made within 1—3 minutes after the coolant thermostat has opened. Warming-up should be done with a completely cold engine.

1. Connect a tachometer and run the engine warm to 1500 r.p.m. until the coolant thermostat opens. (Feel the radiator at the open radiator hose which suddenly becomes warm.)
2. Adjust the engine speed to 800 r.p.m. with the throttle stop screws.

N.B. Screw equally for both carburettors. Check tha the carburettors have the same air valve lift. This is easily checked by measuring with the eye the distance between the carburettor housing bridge and the air valve. This distance should be the same for both carburettors. More accurate synchronizing is not required.

3. From the basic setting (15 hex flats) on each carburettor, adjust the fuel/air mixture for the rear carburettor until max. idling speed is obtained. N.B. If more than four hex flats are required to reach the max. idling speed, adjust also the front carburettor in order to avoid getting too large an unbalanced setting. Then screw the nut on the rear carburettor inwards (leaner mixture) until the engine speed just begins to drop. This is the correct setting. As a checking measure, screw the nut inwards a further hex flat. The speed should then drop by 25—50 r.p.m. Screw back the nut a hex flat (to the position where the speed just starts to fall).
4. Subsequently adjust the idling speed to:
   800 r.p.m. for a mechanical gearbox
   700 r.p.m. for an automatic transmission.

SETTING WITH CO-METER

The setting should be made at a temperature of 60°—80° F and must be made within 1—3 minutes after the coolant thermostat has opened. Warming-up should be done with a completely cold engine.

When measuring with a CO-meter, it is important that the **carburettor temperature** is the correct one. When the engine is idling, the floatchamber is exposed to heat radiation from the exhaust manifold while the flow of cold fuel through the floatchamber is small. The resultant rise in temperature causes an increase in the flow through the jet due the alteration in the viscosity and the increase in the CO-value. Raising the engine speed cools the carburettor to a certain extent due to the step up in the fuel flow. The temperature can be checked to make sure that it is not excessive by feeling the floatchamber with the hand. It should "feel cold", that is, it more or less should not exceed room temperature.

In order to be certain that the measured CO-value is correct, **measuring should be carried out within the time period mentioned above.**

There are a number of different types of CO-meters available which function with acceptable accuracy. The instructions on their use accompany each meter. Note that when connecting the hose for evacuating the exhaust gases, the hose must not be placed so that the exhaust gases are completely evacuated from the CO-meter connection to the exhaust manifold. A funnel, see Fig. 2-97, could suitably be used here. With the funnel installed, the suction at the connection would not be so great as to upset the measuring but sufficient to suck up the exhaust gases so that they do not fill the workshop. When doing any measuring with the CO-meter, it is important that the exhaust pipe and silencer are in good condition, that is, they do not leak.

1. Connect a tachometer and a CO-meter. Run the engine warm to 1500 r.p.m. until the coolant thermostat opens. (Feel the radiator at the upper radiator hose, which should suddenly become warm.)
2. Adjust the engine speed to 800 r.p.m. with the throttle stop screws.
   N.B. Screw equally for both carburettors. Check that the carburettors have the same air valve lift. This is easily checked by measuring with the eye the distance between the carburettor house bridge and the air valve. The distance should be the same for both carburettors. More accurate synchronization is not required.
3. From the basic setting (15 hex flats on each carburettor), adjust the fuel/air mixture until a CO-value of 2.5—3.5 % is obtained. Adjust equally for both carburettors.
4. Subsequently adjust the idling speed to:
   800 r.p.m. for a mechanical gearbox
   700 r.p.m. for an automatic transmission

ADJUSTING THE CHOKE AND RAPID IDLING

1. Adjust the choke control so that the front carburettor jet starts to drop when the choke control on the dashboard is pulled out 20 mm (3/4") and the rear carburettor jet starts to drop when the choke control is pulled out 30 mm (1⅛").
2. The throttle stop screws are adjusted with the choke control fully pushed in. For the front carburettor, the distance between the throttle stop screw and the cam disc should be 0.1—0.3 mm (0.004—0.012") and for the rear carburettor 0.3—0.5 (0.012—0.020").

FLAP HOUSING FOR CONSTANT AIR TEMPERATURE DEVICE

If the flap (5, Fig. 2-118) does not open, there will be too high a temperature for the intake air and this will have a negative effect on the engine.

The thermostat can be checked in lukewarm water. The flap should be closed for cold air at a temperature of 70—77° F and for warm air at 95—105° F. If

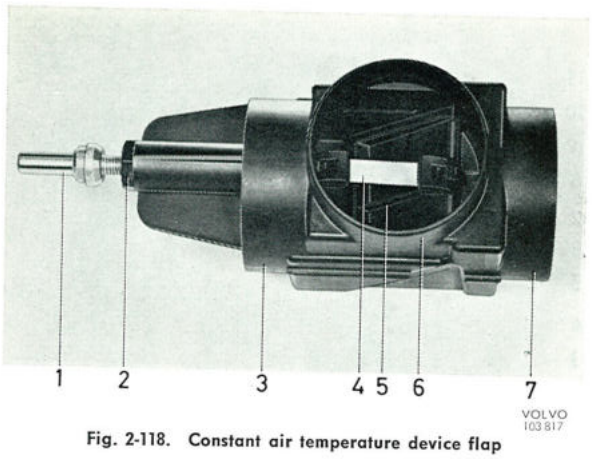


Fig. 2-118. Constant air temperature device flap

1. Thermostat
2. Lock
3. Air cleaner connection
4. Flap control
5. Flap
6. Warm-air intake
7. Cold-air intake

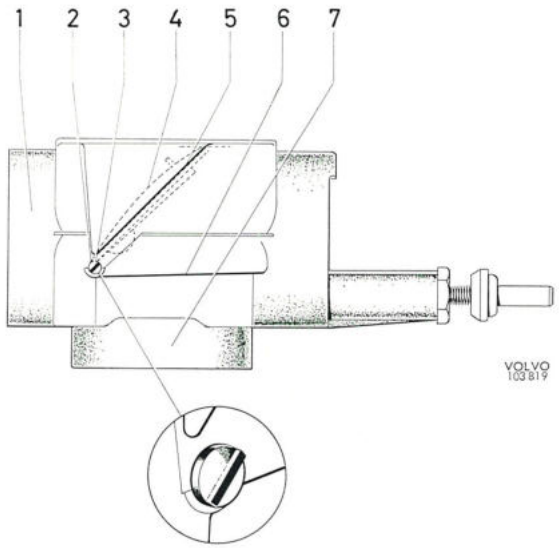


Fig. 2-119. Checking the flap function

1. Cold-air intake
2. Flap spindle
3. Tab
4. Flap
5. Stop for marking flap position at temp. below 58—77° F
6. Stop for marking flap position at temp. above 95—104° F
7. Warm-air intake

correct function is not obtained, replace the flap housing with the thermostat complete.

The flap location can be checked with the flap housing fitted in position. A small tab on the flap spindle projects from both sides of the housing (see 3, Fig. 2-119). The longitudinal pin for these tabs coincide with that of the spindle and turns parallel with the spindle. In other words, the location of the flap can be seen at different temperatures by comparing the angle of a tab in relation to the stops outside the housing. (On a number of early prod. flaps there are no tabs. These have instead a scribed mark.)

The thermostat can be checked in lukewarm water. The flap should be closed for cold air at 70—80° F and closed for warm air at 95—105° F. If correct function is not obtained, change the flap housing with thermostat complete.

ADJUSTING THE ACCELERATOR PEDAL

The length of the long, vertical link for the pedal is adapted so that there is a clearance of 1 mm (0.04") between the throttle lever lug and the full throttle stop on the carburettors, when the accelerator pedal is fully depressed. With a fully depressed pedal, the force of the driver's foot is taken up by the toe-plate without imposing unnecessary loading on the throttle control.

AIR CLEANER

The air cleaner on the B 20 A should be changed every 40 000 km (25 000 miles) unless the driving conditions are severe, in which case replacement should take place more frequently.

The insert in the air cleaner on the B 20 B should be changed every 40 000 km (25 000 miles). However, the same principle applies here as in the previous paragraph.

No cleaning of any kind should be done between the changes.

On no condition must the insert be moistened or oiled.

A sign of a blocked air cleaner is increased fuel consumption.

Air cleaner with foam plastic sleeve (see Fig. 2-88):

Normally the foam plastic sleeve should be washed or changed after every 20 000 km (12 500 miles). Abnormal fuel consumption or a weak engine may be signs of a blocked air cleaner, in which case the foam plastic sleeve should be replaced and even the paper filter, irrespective of the distance driven.

Normally a foam plastic sleeve can be washed or changed three times, when even the paper filter must be replaced. Under special circumstances, the paper filter can also be cleaned (but **not,** however, washed).

Cleaning the foam plastic sleeve:

The foam plastic sleeve is removed and loose particles shaken out. The sleeve is then placed in a bath containing one of the following solutions:

a) Warm soapy water
b) Warm water with a non-lathery or a low-lather washing agent (dish washing)
c) Paraffin
d) Fuel oil

The sleeve should be squeezed in the solution until it is clean, and then rinsed in clean water and dried, but not under direct heat.

Cleaning the paper filter:

The flap top and bottom sides of the filter are knocked against a flat base. When doing this, make sure that the paper folds are not damaged.

Oiling the foam plastic sleeve:

Before refitting the foam plastic sleeve, dip it in 15 cm^3 oil SAE 30. Squeeze the sleeve in the oil unit it is thoroughly permeated. Any surplus oil can be removed by rolling the sleeve in a clean cloth.

Fitting the foam plastic sleeve:

The foam plastic sleeve is fitted on the paper filter without touching the paper folds. The bevel edges of the sleeve should lie above the filter edges round the entire circumference.

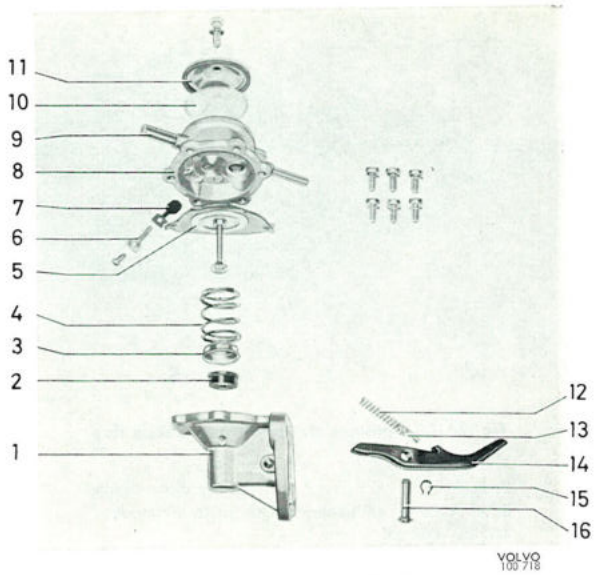


Fig. 2-120. Fuel pump, Pierburg

1. Lower pump housing
2. Rubber seal
3. Guide
4. Diaphragm spring
5. Diaphragm
6. Stop arm
7. Spring
8. Upper pump housing
9. Inlet pipe
10. Strainer
11. Cover with gasket
12. Return spring
13. Spring holder
14. Lever
15. Circlip
16. Lever shaft

FUEL PUMP

PIERBURG

DISMANTLING

1. Make line-up marks on the upper and lower sections. Remove both the upper and lower sections.
2. Remove a circlip (15, Fig. 2-120) from the lever shaft (16). Press out the shaft. Pull out the lever (14) and the spring (12).
3. Remove the diaphragm with spring (4), the guide (3) and the rubber seal (2). The spring can be removed after the rubber seal has been levered over the nylon washer.
4. Remove the screw on the underside of the lower section, take out the stop arm (6) and the spring valve (7). The inlet valve cannot be removed. Check the parts for wear.

ASSEMBLING

1. Fit the spring according to Fig. 2-121 and the stop arm. Tighten the screw sufficiently so that the spring fits well against the pump housing.
2. Fit the spring (4) and the guide (3). Fit on the rubber seal (2) with the flange facing in towards the guide.
3. Fit the diaphragm unit in the lower section of the pump. Press downwards so that the rubber seal comes into its correct position.
4. Press down the diaphragm, insert the lever (14) and make sure that the lever fits correctly in relation to the diaphragm rod. Fit the shaft (16), circlips (15), spring holder (13) and spring (12).
5. Fit the upper section according to the line-up marks and secure it.
6. Fit the strainer and cover.

Test the pump. When fitting make sure that the lever fits correctly above its cam.

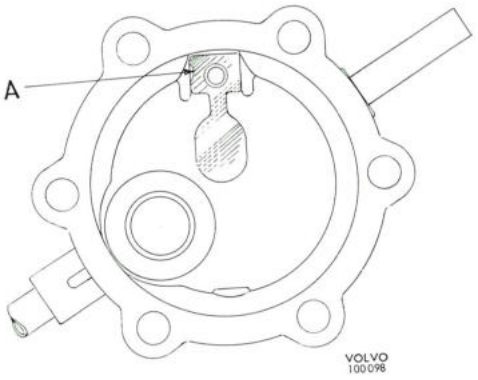


Fig. 2-121. Location of leaf spring

A. Recess

FUEL PUMP

AC

DISMANTLING

1. Remove the cover.
2. Make line-up marks on the upper and lower sections of the pump and dismantle them.
3. Remove the diaphragm by turning it a 1/4 of a turn.
4. Remove the spring (15, Fig. 2-122) by turning the washer (6) so that the hole in the washer coincides with the wide end of the diaphragm rod.
5. Remove the peening for the rocker arm rider (17) with, for example, a grinding rod, and remove the rocker arm (1) with pin (2) and lever (4).
6. Pull out the rocker arm pin.

Check the parts for wear.

ASSEMBLING

1. Assemble the link arm, rocker arm with washers (3) and rocker arm pin.
2. Insert the linkage system with return spring (16) into the housing.
3. Fit and lock the riders in the housing by peening with a suitable punch.
4. Assemble the diaphragm, spring and washers. Place the unit in position and put together the upper and lower sections and then fit on the cover.

Test the pump. When installing make sure that the lever takes up its correct position above the cam.

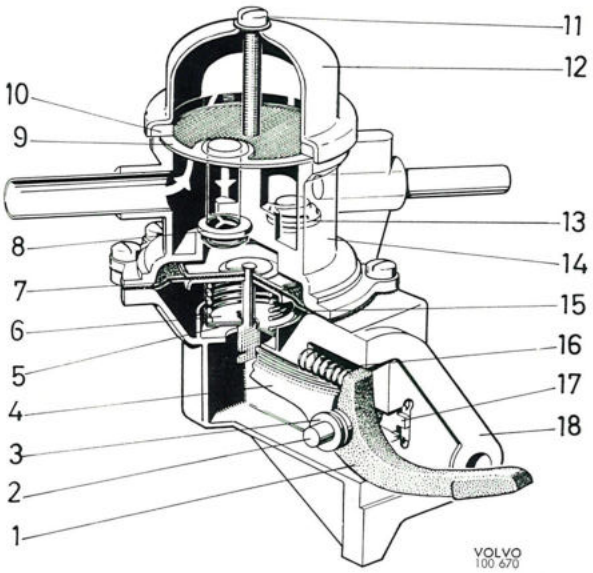


Fig. 2-122. Fuel pump, AC

1. Rocker arm
2. Shaft
3. Washer
4. Lever
5. Rubber seal
6. Washer
7. Diaphragm
8. Inlet valve
9. Strainer
10. Gasket
11. Screw with washer
12. Cover
13. Outlet valve
14. Upper pump housing
15. Diaphragm spring
16. Return spring
17. Rider
18. Lower pump housing