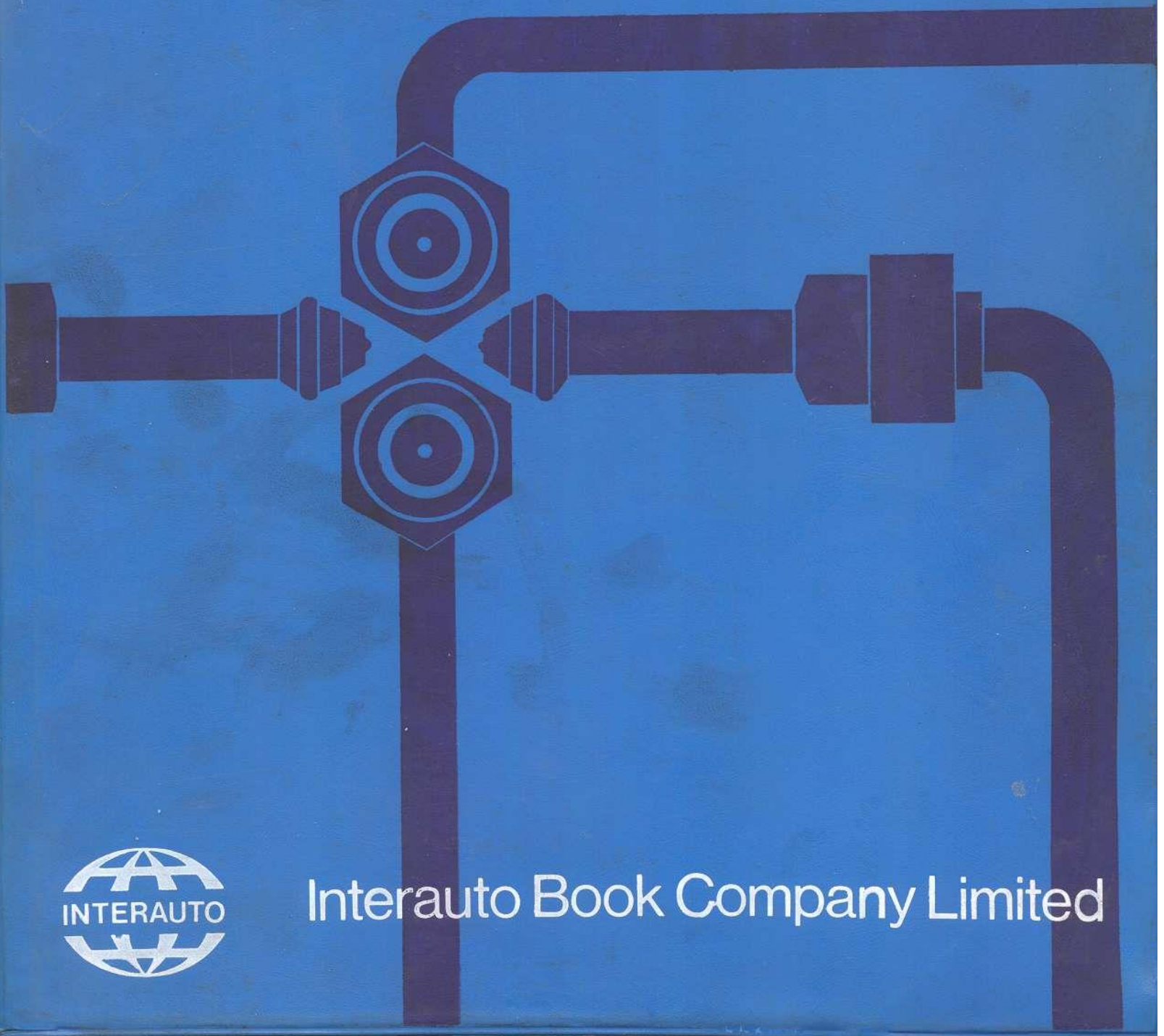
The Petrol Fuel Injection Book for Automobiles



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PEUGEOT

504

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FUEL INJECTION SYSTEM

Principle of operation of the fuel injection pump

The camshaft (7) (Fig. 1.01) rotates at half the speed of the engine and has the same number of cams as the engine has cylinders. The cam (6) acts on the tappet (4), which in maintained in contact with the cam by the action of the spring (5).
The tappet lifts the semi-spherical end of the piston (1) which rests on the rocker lever (3) due to the action of the spring (2).
The bottom dead centre of the piston varies as it is determined by the position of the rocker lever, the two ends of which are moveable. The rocker lever is supported at its rear end on an eccentric shaft which is operated by an enrichment lever (14). This lever rests during normal operation on stop (13).
The front end of the rocker lever moves by the action of a push rod (12), resting on a cam with variable profile, which constitutes the main regulating element of the injection system.
The quantity of fuel injected is controlled by the stroke variation of piston (1). The lower the piston is moved by the action of the controlling profile of cam (11) or by the lowering of the point of articulation of rocker lever (3), the greater is the delivered amount of fuel. This in other words means that the fuel delivery is increased when the radius of cam (11) diminishes or when the point of articulation of the rocker lever (3) is lowered. The cam (11) has two simultaneous movements:

– Angular displacement of approx. 300°
– Lateral displacement.

The angulars displacement is controlled by a magnetic corrector (10) which consists of the following components:

– a magnetic sleeve (hollow cylinder) (10), driven by the injection pump camshaft;

– a magnetic core, linked to the cam (11) by a gearwheel drive. The pull of the core, produced by the magnetic force, is proportional to the engine speed.

– a spring (8) opposes the pulling torque of the core, maintaining the correction system in balance when the operating conditions remain the same and therefore there is no need for variations in the amount of fuel injected. The cam rotates in accordance with the required angle of a constant engine speed.

The lateral displacement of the cam (11) is determined by the accelerator pedal, in other words by the load, since the connecting rod (15) is linked to the butterfly valve control lever.
When the temperature of the water in the cooling system is below 50°C (122° F), the enrichment takes place automatically and proportionally to the temperature.

Cold Running

The enrichment is obtained by the movement of the lever (14) under the action of the control rod (2), which is pushed by the spring (16). The movement of the control rod (20) results in the opening of valve (19), which allows the intake of additional air.

Hot Running

As the engine reaches its normal operating temperature, the capsule (petroleum wax) enclosed in the thermo control element "B", situated in the water chamber (17) in the air distributor, expands and pushes the control rod (20) gradually downwards, thereby making the valve (19) and the enrichment lever (14) inoperative.

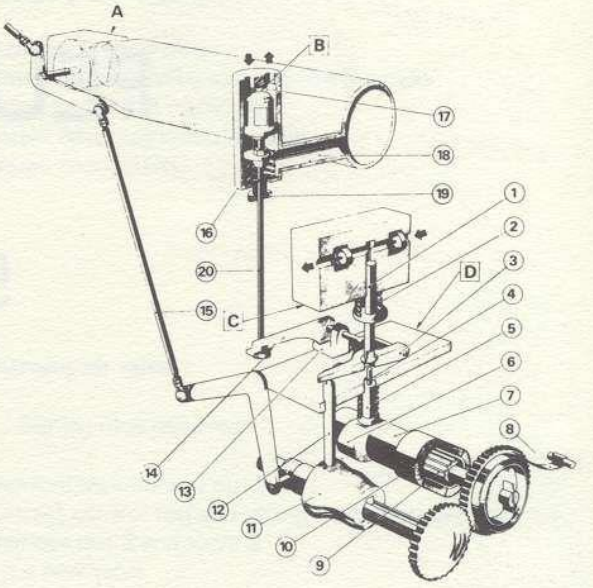

Fig. 1.01 Operating diagram for the fuel injection pump •

1. *Piston*
2. *Piston spring*
3. *Rocker lever*
4. *Push rod*
5. *Push rod spring*
6. *Cam*
7. *Camshaft*
8. *Spring*
9. *Magnetic core*
10. *Magnetic housing*
11. *Delivery control cam*
12. *Push rod*
13. *Stop*
14. *Enrichment lever*
15. *Connecting link*
16. *Thermostatic element spring*
17. *Distributor water chamber*
18. *Additional intake air tube*
19. *Valve*
20. *Control lever*

A. *Air distributor - Throttle valve body*
B. *Thermostatic element*
C. *Hydraulic head*
D. *Injection and control system*

2.0. AIR INTAKE SYSTEM

The aspirated air passes successively through:

1. The oil bath air cleaner
2. The throttle valve mechanism (Fig.2.01)
3. The air distributor
4. The inlet manifold

Oil bath air cleaner:
Bowl capacity: 0.270 litres (0.48 Imp. pints, 0.55 U.S. pints)
Oil grade: ESSO Extra Engine Oil 20 W/30/40

Strainer:

Diameter of filter insert	178 mm (7.00 in.)
Total diameter	233 mm (9.173 in.)
Total height	97 mm (5.818 in.)

2.0.0. Maintenance

Every 5000 km (3000 miles):
Clean the filter insert and submerge it in clean engine oil.
Change the oil.

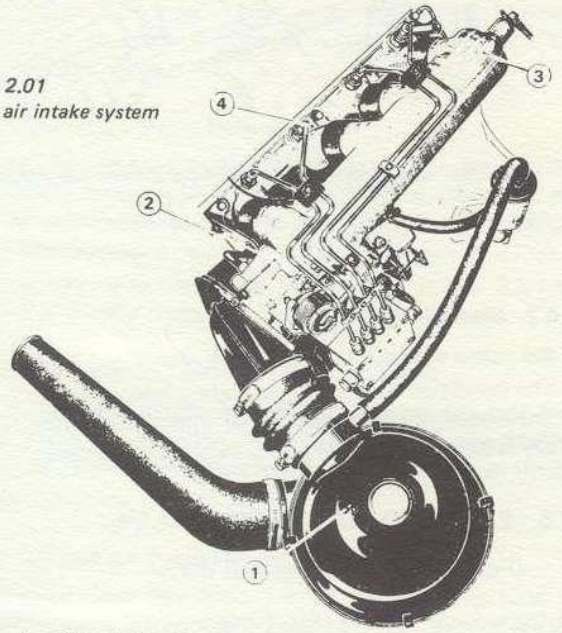

Fig. 2.01
The air intake system

1. *Oil bath air cleaner*
2. *Throttle valve body incorporated in the air cleaner*
3. *Air distributor*
4. *Inlet manifold*

2.1 FUEL INJECTION SYSTEM

2.1.0. Filters

The fuel is filtered successively by:

1. The fuel tank strainer
2. The pre-filter, situated at the entrance of the fuel feed pump.
3. The main filter
4. The pre-filter (fine filter) in the inlet adaptor of the injection pump
5. The suction filters in the injection pump.

2.1.1. Maintenance

In general it is only necessary to service the pre-filter on the fuel feed pump and the fuel main filter.

The pre-filter situated at the entrance of the fuel feed pump is checked when the car is serviced after the first 1000 km (600 miles and then changed every 15,000 km (10,000 miles), or when it is clogged.

IMPORTANT: This filter cannot be cleaned with compressed air, since a pressure of more than 0.5 kg/sq.cm. (7 psi.) would damage it, so that the filter would lose some of its efficiency.

The main filter should be drained every 5000 km (3000 miles) and the cartridge replaced every 20,000 km (12,000 miles).

2.2. MAIN FILTER

Make	PURFLUX
Type	C P 15 DE
Filter cartridge	C 113
Surface	150 sq. cm.
Filtering capacity	Up to 1 micron
Bleeding hole	In the upper part of the filter
Tightening torque of connectors	0.9 kgm (7.0 lb. ft.)

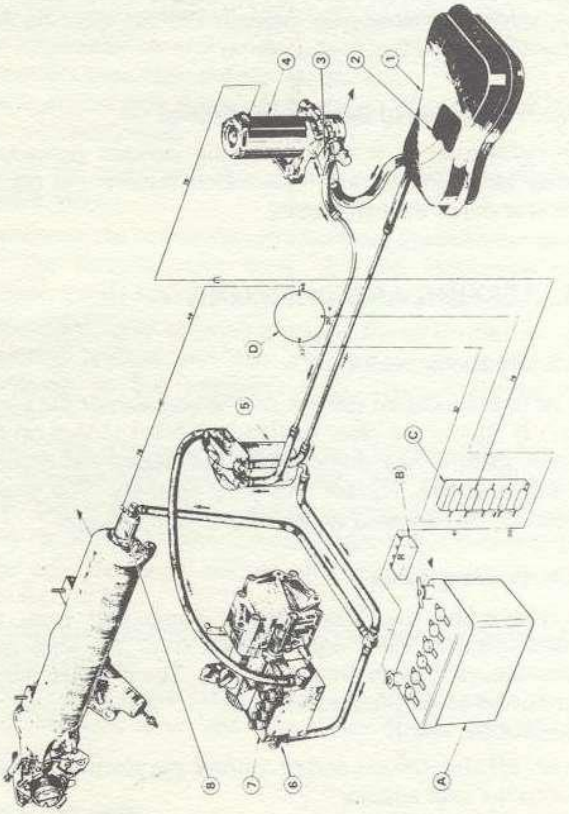

Fig. 2.02 Petrol injection circuit

Electrical circuit:
A. Battery
B. Relay
C. Fuse box
D. Ignition switch

Fuel circuit:
1. Fuel tank
2. Suction strainer in fuel pump
3. Inlet filter in fuel pump
4. Electric fuel pump
5. Main filter
6. Inlet filter in injection pump
7. Injection pump
8. Electro-magnetic valve

2.2.0. Draining of the Main Filter

Place a container under the draining connector, slacken the drain screw and drain the fuel from the filter bowl. Close the screw and tighten it to 0.75 kgm (5.5 lb.ft.) If the amount of water contained in the fuel is more than 10 c.c., remove the bowl and clean it, removing the deposit from the bottom of the bowl. Clean the pipes.

Replace the Filter cartridge if it is not in perfect condition and from then on replace periodically every 20,000 km (12,000 miles).

2.3. FUEL FEED PUMP

Type	PLF6
Hydraulic part	Kugelfischer
Electrical part	AEG
Capacity (delivery)	50 litres (approx. 11 gall.)/hour under a pressure of 1.2 kg/sq.cm. (17 psi.).
Electric motor	12 volts, max. output 28 watts.

2.3.0. Removal of the Fuel Feed Pump

Disconnect the battery and the supply cable from the fuel pump. Disconnect the fuel inlet pipe and close the outlet pipe, using a suitable plug. Remove the two securing nuts and withdraw the fuel feed pump.

2.3.1. Installation of the Fuel Feed Pump

The installation is a reversal of the removal procedure. During each removal and installation replace the copper joint washers of the banjo bolts.

2.4. TESTING AND CHECKING

2.4.0. Hydraulic Leak Test

No leakage should be present on the adaptors or the pump body. If this is the case, tighten the Allen screws on the bottom plate of the pump. When the leakage has occured on the adaptors, replace the joint washers. The screws should not be tightened excessively to stop leakages.

2.4.1. Pressure Check

Disconnect the fuel inlet adaptor banjo bolt from the electro-magnetic valve and connect it to the inlet of a pressuregauge. Switch on the ignition. The pressure indication on the gauge should be between 1.1 and 1.7 kg/sq.cm. (15.6 and 24.1 psi.).

Switch off the ignition and re-connect the electro-magnetic valve to the inlet adaptor.

If the pressure is below 1 kg/sq.cm. (14 psi.), check:

The fuel content in the tank (it should have a minimum of 5 litres (approx. 1 gall.).

The condition of the main filter cartridge and that of the pre-filter in the fuel pump. They should be clean.

The voltage supply to the pump. This should be between 12 +/–0.1 volts.

The fuel pipes for leakage.

After carrying out the above checks, re-check the pressure as described above.

If the pressure is above 1.7 kg/sq.cm. (24.1 psi), check:

If the filter in the inlet adaptor of the injection pump is clean.

That the jet (2) (Fig.2.03) in the hydraulic head of the injection pump, as well as the return pipes to the tank are free of obstructions.

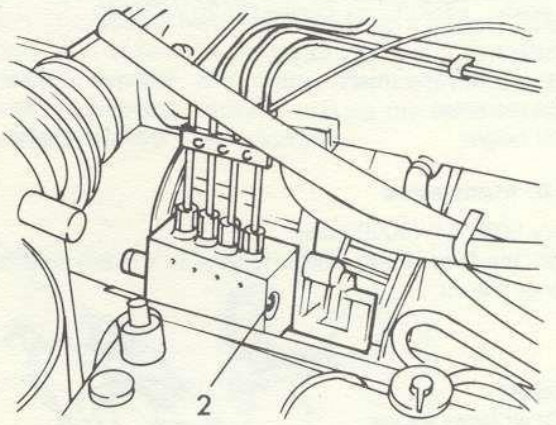

Fig. 2.03 Checking the pressure of the electric fuel pump.

2. Jet in the hydraulic head of the injection pump.

2.4.2. Electrical Test

If the pump motor is not operating, check:

– The condition of the corresponding fuse
– The electrical circuit and the earthing connection.

If the failure persists, the pump should be changed.

2.5. ELECTRO-MAGNETIC VALVE

(For enrichment during cold starts)

Make: Jaeger France (Fig. 2.04)

This electo-magnetic valve allows the atomizing of an additional amount of fuel in the air distributor, during the operation of the starter motor, facilitating the starting of the engine. The fuel inlet adaptor should be tightened to 0.75 kgm (5.5 lb.ft.).

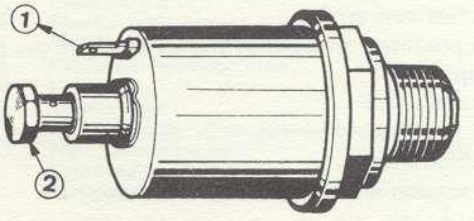

Fig. 2.04 Jaeger electro-magnetic valve

1. Feed terminal
2. Fuel inlet connector

2.5.0. Checking for Leaks

Remove the fuel inlet adaptor and switch in the ignition. No leaks should be present on the valve. If this is the case, the electro-magnetic valve should be replaced together with a new metal-plastic joint washer.

2.6. INJECTION PUMP

2.6.0. Testing the Injection Pump Delivery

This test should be made when the engine slow-running speed becomes irregular. Proceed as follows:

Slacken the union nuts on the injectors, one by one, to determine which of the cylinders is responsible for the irregular slow-running speed of the engine.

Interchange the faulty injector with the next cylinder. If the fault is also present in this cylinder, the cause is the incorrect functioning of the injector and this should be replaced.

If the fault is no longer present when the injector has been installed in the next cylinder, it is necessary to check the pump delivery valve.

2.6.1. Bleeding a Pump Delivery Valve

Remove the injection pipe and slacken the nut securing the valve of the faulty cylinder. (Tool 8.0112 G). Switch in the ignition and wait until the fuel runs out of the connection. Re-tighten the valve retaining nut to 5.0 kgm (36.2 lb.ft.).

Replace the injection pipe, tightening it to 2.5 kgm (18 lb.ft.). Finally check the circuit for signs of leaks.

2.6.2. Checking the Delivery Valves for Leaks

Switch on the ignition in order to operate the fuel feed pump. With the injection pipes disconnected, the adaptor cavities should not be filled in less than 30 seconds. If not, replace the faulty valves.

2.6.3. Changing a Pump Delivery Valve

Thoroughly clean the upper part of the hydraulic head to avoid the entry of foreign matter. Slacken the valve nut, using special tool 8.0112 G and remove the valve. Blow with compressed air into the valve seat and pour a small amount of engine oil into the seat before fitting the new valve.

Fit the new valve together with its compensating bush, locating the lug of the valve seat in the valve groove. Tighten the nut to 5.0 kgm (36.2 lb.ft.), connect the injection pipes (tightening torque 2.5 kgm/18.0 lb.ft.) and check the circuit for signs of leaks.

2.6.4. Removal and Installation of the Injection Pump

2.6.4.0. Removal

Disconnect the earth cable of the battery from the timing gear cover and the vacuum pipe from the ignition distributor. Then disconnect the following parts:

The fuel inlet and return lines from the pump.
The Mastervac vaccum pipe.

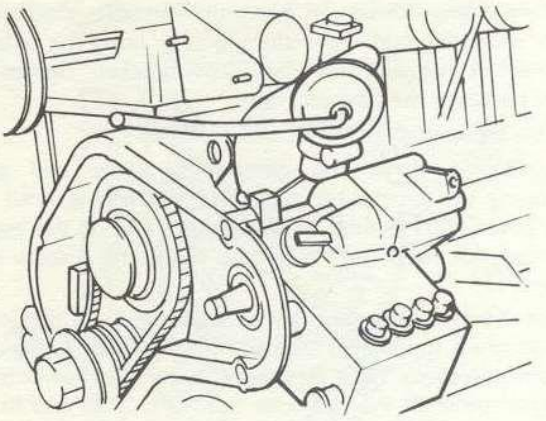

Fig. 2.05 Timing the injection pump

Once the marks on the sprockets are in line with the cadium plated links, rotate the pump shaft to point the boss towards the hydraulic head lower corner.

The pipe and feed cable from the electro-magnetic valve.
The crankcase ventilation pipe from the air distributor.
The accelerator control cable.
The outlet hose from the air cleaner.
The injection pipe flanges from the air distributor and the four injection pipes.

Protect the pump and the injector connections by inserting suitable plugs.

Disconnect the connecting rod between the injection pump and the throttle valve body and the lubricating pipe between the oil filter body and the injection pump.

Remove the upper securing screws of the air distributor rear mounting bracket and also the screws securing the air distributor to the injection pump. Remove the air distributor.

Remove the alternator drive belt and the crankshaft pulley nut. Remove the crankshaft pulley and the timing gear cover and unscrew the securing screws for the injection pump sprocket. Remove the pump sprocket, fitted with the Sedis drive belt with the aid of a suitable puller (Special Tool 8.0112 K).

Remove the pump rear mounting bracket and withdraw the injection pump.

IMPORTANT: Once removed, care should be taken not to bend the Sedis drive belt to a radius of less than 20 mm (approx. 1 in.).

2.6.4.1. Installation

Attach the pump to the timing gear case, coating the faces with Perfect Seal jointing compound. Tighten the securing bolts to 2.0 kgm (14.5 lb.ft.).

Fit the rear mounting bracket to the pump, following the sequence given below to avoid forcing the front mounting:

Fit the pump mounting bracket to the cylinder block, keeping the bracket firmly pushed to the rear of the pump body. Tighten the two bolts to 2.0 kgm (14.5 lb.ft.). Insert the two securing bolts for the pump into the mounting

bracket and tighten to 0.75 kgm (5.5 lb.ft.).

If there is any difficulty in inserting these bolts, slacken the front mounting and move the pump to bring the holes at the rear in line with the holes in the bracket. Tighten the front bolts and then the rear bolts.

Fill the pump with ESSO OLEOFLUID 40 EP.

Provisionally install the crankshaft pulley and after removing the distributor cap, turn the engine until the distributor rotor points towards the front of the engine between the outlet points for the No. 1 and 3 spark plug cables.

Check that the reference mark on the cover plate protecting the camshaft sprocket is opposite the two cadmium plated links in the chain. Position the pump shaft key towards the bottom corner of the hydraulic head (Fig.2.05) and fit the pump sprocket and the Sedis drive belt. The mark on the sprocket should be located between the two marks on the belt.

The other mark on the belt should be located opposite the one on the cover plate of the camshaft sprocket.

Slide the pump sprocket over the pump shaft making sure that the slot in the sprocket is opposite the shaft key. Rotate the engine very slowly in both directions to line up the key and the key slot.

Once the sprocket is pushed fully home, rotate the crankshaft one complete turn in the reverse direction of normal rotation and check that the marks are correctly aligned, when the crankshaft is turned in the normal direction of rotation.

Tighten the pump sprocket securing bolts to a torque of 3.25 kgm (23.5 lb.ft.) and lock them.

Fit the ignition distributor cover.

Once these operations are carried out, remove the nut of the crankshaft pulley and fit the timing gear cover (to centre the cover the use of tool 0.0128 is advisable), the crankshaft pulley and the crankshaft pulley nut (tightening torque 17.0 kgm (22.5 lb.ft.).

Fit the air distributor to the inlet maifold, checking that the control rod for the thermostatic element is properly engaged in the slot of the pump enrichment lever. Secure the air distributor, tightening the screws to 2.0 kgm (14.5 lb.ft.).

Connect the following parts:

The pump lubricating pipe.
The accelerator control cable.
The crankcase ventilation pipe.
The Mastervac vacuum pipe.
The tube and feed cable of the electro-magnetic valve.
The fuel inlet and return lines.
The distributor vacuum pipe.
The battery earth cable.
The injection pipes (torque 2.5 kgm/18.0 lb.ft.).
The retaining flanges.
The air cleaner outlet hose.
The alternator belt.
The connecting rod from the pump to the throttle valve.

Carry out the following adjustments:

I. Co-ordination of injection pump/throttle valve
II. Maximum opening of throttle valve.
III. Minimum opening of throttle valve.

The control drum of the air valve has on its surface an angular, graduated quadrant which permits the checking of the various openings of the throttle valve (Fig.2.06):

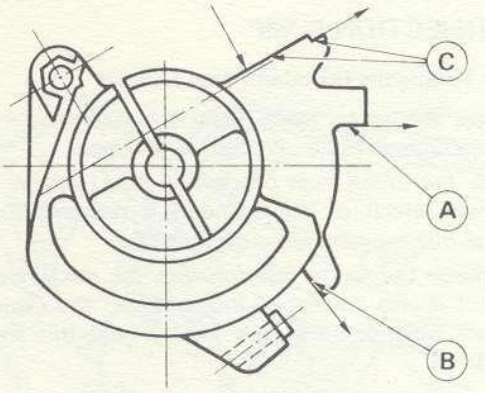

Fig. 2.06 The air valve setting segment (quadrant).

A. Mark indicating throttle opening of 43°
B. Mark indicating maximum throttle opening of 94°
C. Mark indicating a minimum throttle opening of 10 to 12°

Mark A: Opening of the throttle valve to 43° (Adjustment I)

Mark B: Opening of the throttle valve to a maximum of 94° (Adjustment II)

Mark C: Opening of the throttle valve to a minimum of 10 to 12° (Adjustment III)

The tightening of the control drum on the throttle valve shaft is obtained by a tangentially located Allen screw which is accessible after the removal of the accellerator return spring.

2.6.5. Co-Ordination of Injection Pump and Throttle Valve

Disconnect the metal sleeve connecting the air cleaner to the air distributor and the connecting rod between the injection pump and the throttle valve.

Measure the distance between the ball joints of the connecting rod either by means of the special gauge 8.0112 R or with a ruler. The distance should be 97.3 ± 0.1 mm (3.65 ± 0.004 in.). If this is not the case, adjust the length of the rod by turning the nuts, after the locknuts have been slackened. Tighten the locknuts and re-connect the connecting rod.

Insert a rod of 5 mm in diameter (Fig.2.07) in the pump lever hole and in the corresponding hole in the injection pump.

Slacken the securing screw on the throttle valve control lever and introduce gauge 8.0112 S in the bottom slot, inside the air distributor, placing the end of the gauge peg on the throttle valve. The hole at the gauge foot should be outside. Tighten the securing bolt (2) of the control lever, leaving a distance of 2 mm (0.08 in.) between the lever and the air distributor (press on the gauge 8.0112 S when tightening bolt 2).

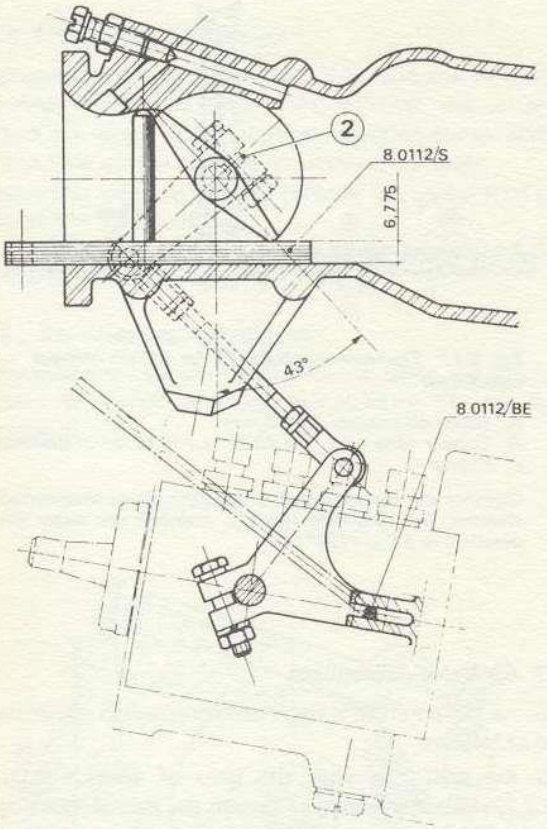

Fig. 2.07 Adjustment for injection pump/throttle co-ordination.

2. Clamp bolt for throttle control lever

8.0112/S: Gauge
8.0122/BE: 5 mm (0.2 in.) diameter rod

The control segment should be placed in position B = 43° Between the ball joint axles: 97.3 ± 0.1 mm (3.65 ± 0.004 in.)

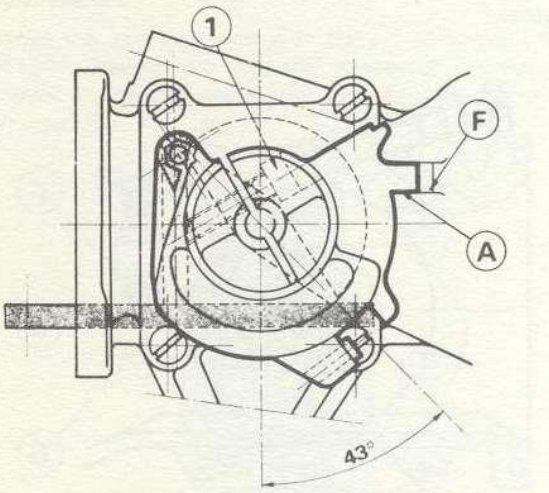

Fig. 2.08 Co-ordination of injection pump and throttle valve

1. Allen screw securing control drum

The mark A (43°) on the control segment should coincide with the bottom edge "F" in the distributor projection

Remove the return spring for the accelerator and slacken the Allen screw securing the throttle control drum. Align mark A (43°) on the drum with the bottom mark "F" (Fig.2.08) on the air distributor projection. Tighten the Allen screw (1) taking care not to alter the adjustment. Leave a distance of 1.0 mm (0.04 in.) between the drum and the projection on the air distributor.

Remove the gauge 8.0112 S and the rod.

2.6.5.0. Maximum Opening of the Throttle Valve

With the engine switched off, depress the accelerator pedal fully and slacken locknut (3) (Fig.2.09). Turning the screw (4), raise the mark "B" (94°) on the control drum until it corresponds with the bottom face "F" on the air distributor projection.

Tighten the locknut, taking care not to alter the adjustment.

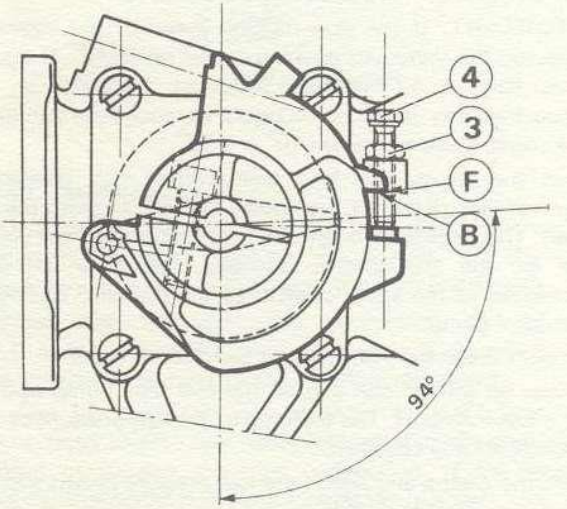

Fig. 2.09 Throttle maximum opening adjustment

2. Locknut
4. Adjustment screw

Using the screw (4) bring the mark (B) on the control segment to coincide with the bottom face of the distributor projection "F"

Replace the return spring for the accelerator and check that the maximum opening of the throttle valve is correctly adjusted.

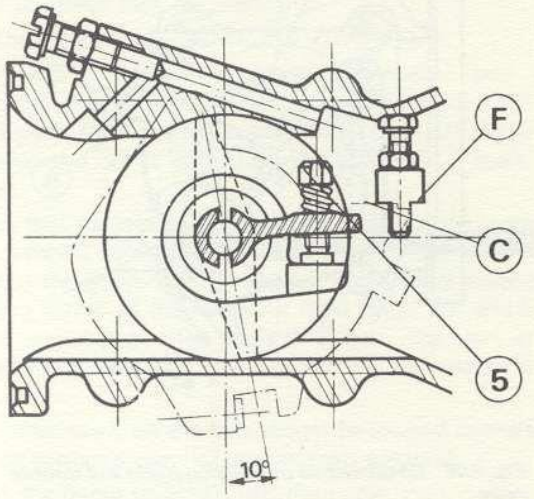

Fig. 2.10 Throttle valve minimum opening

5. Minimum opening adjustment screw
C. 10°
F. Distributor boss

2.6.5.1. Minimum Opening of the Throttle Valve

Turn the screw (5) in Fig.2.10 to bring the mark "C" in line with the mark "F" on the air distributor boss.

IMPORTANT: If the slow-running speed of the engine is irregular, the minimum opening can be set to 12°. If on the other hand a 12° opening produces "banging" in the exhaust system, it will be necessary to reduce the minimum opening to a value between 10° and 12°

Once the adjustments have been carried out, connect a thermometer (8.0112 C) as shown in Fig.2.11, with the tap open. The thermometer should be connected to the return line of the thermostatic element, which is the pipe connected to the upper adaptor of the element, leading to the water pump.

Connect the battery and re-start the electric clock.

Switch on the ignition and let the fuel feed pump operate for a few moments. The bleeding of the low pressure circuit is automatically obtained.

Start the engine and check the low pressure circuit and the injection circuit for leaks.

Bleed the lubrication pipe for the hydraulic head, slightly slackening the connector screw on the oil inlet of the pump. Carry out the following adjustments:

2.6.6. Enrichment

By closing the slow-running by-pass screw, bring the engine to a speed of more than 1000 r.p.m. Reduce the water circulation around the thermostatic element by means of the tap in the thermometer pipe in order to stabilize the temperature.

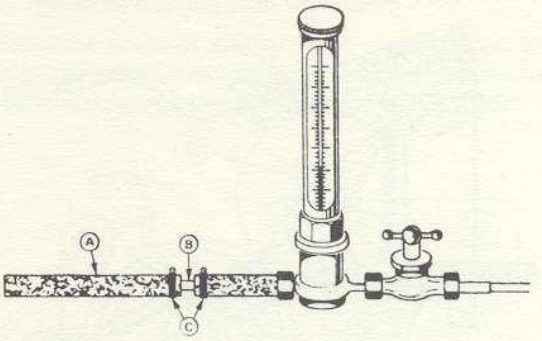

Fig. 2.11 Thermometer 8.0112C for the enrichment adjustment

A. Diesel oil adaptor 7 x 16 mm
B. Copper tube of 8 mm (0.31 in.) in external diameter
C. Clamp

Connect the thermometer to the pipe of the thermostatic element and operating the tap, stabilize the water temperature to 50°C (121°F)

2.6.7. Air Valve Adjustment

Once the temperature is stabilized, proceed to adjust the air valve as follows:

Hold the pull rod with the help of wrench 8.0112 (Fig.2.12). Slacken the nut (7) with the aim of inserting the gauge 8.0112 N between the nut (7) and the closing plug (8). Tighten the nut, to obtain a play of 1.0 ± 0.1 mm (0.04 ± 0.004 in.) as determined by the thickness of the gauge.

The gauge should be left in position, as it is necessary for the following adjustment. Remove wrench 8.0112 P and

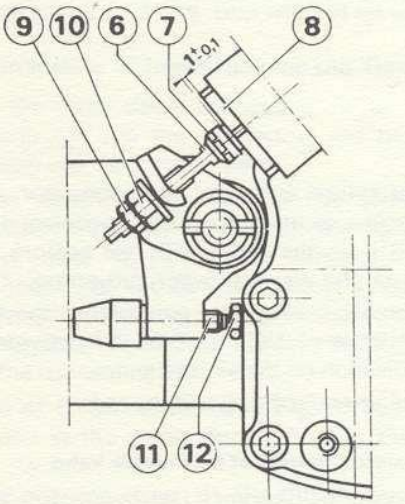

Fig. 2.12 Air valve and enrichment adjustment

6. Pull rod
7. Clearance adjustment nut (1 ± 0.1 mm)
8. Closing plug
9. Locknut
10. Enrichment lever securing nut
11. Enrichment lever
12. Lever stop

switch off the engine. Close the thermometer tap.

2.6.8. Enrichment Adjustment

Slacken the locknut (9) in Fig. 2.12 and the nut (10) to free the enrichment lever (11), so that the latter can contact the stop (12) on the fuel injection pump. Screw in the nut (10) until it touches the enrichment lever.

Tighten the locknut (9) and remove the gauge 8.0112 N. Remove the thermometer.

Fit the connecting sleeve between the air cleaner and the air distributor. Start the engine.

2.69 . Slow-running Adjustment

This adjustment should be carried out when the engine has reached its normal operating temperature. The fan should be engaged.

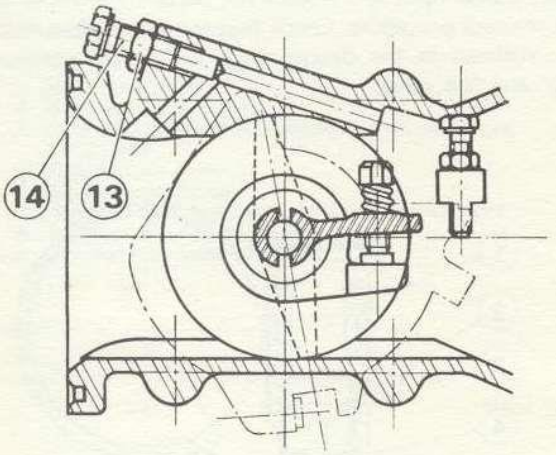

Fig. 2.13 Slow-running adjustment

13. Locknut for by-pass screw
14. By-pass screw

Slow-running adjustment: 800 - 850 r.p.m.

Slacken the locknut (13) in Fig.2.13. Turning only the by-pass screw (14), adjust the engine speed to 800-850 r.p.m. Screwing in, reduces the slow-running speed; unscrewing increases the speed. Finally tighten the locknut (13).

2.6.10. Adjustments during the first 1000 km (600 miles)

Discard the 0.5 mm (0.02 in.) washer under the stop for the enrichment lever. This washer enriches the mixture during the running-in period of the engine. Check all previous adjustments.

2.7. INJECTORS

Make: Kugelfischer
Type: DLO 20 B (Fig. 2.14)

2.7.0. Removal and Installation of Injectors

2.7.0.0. Removal

Remove the injection pipe with the aid of special wrench 8.0112 H, leaving the injector connected to the inlet manifold adaptor. Remove the injector and plug-up the inlet pipe bore.

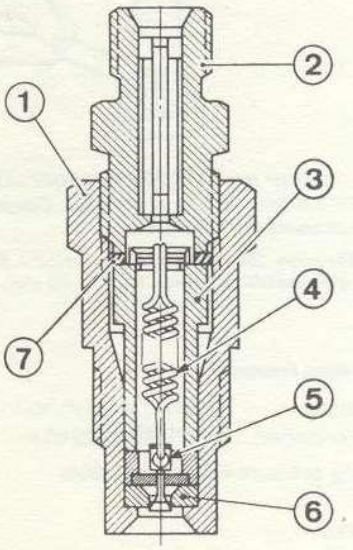

Fig. 2.14 Kugelfischer DLO 20 B Injector

1. Injector holder
2. Connection
3. Injector body
4. Spring
5. Valve
6. Seat
7. Steel joint washer

2.7.0.1. Installation

Each time an injector is replaced, the copper joint washer should be renewed. Tighten the injector to the inlet manifold with a torque reading of 2.0 kgm (14.5 lbft.).

Tighten the injection pipe connection to 2.5 kgm (18.0 lb.ft.). When the pipe connection is tightened, the injector should be held by the manifold connector.

In case of leaks, do not attempt to overtighten the connections to stop any leaks. Instead, start the engine and tighten or slacken the pipe connection. If the leakage persists, change the complete pipe or the injector.

2.7.1. Checking the Injectors

To check the injectors, the use of tester PM, type 22.41.01.002, equipped with a pressure gauge (0-50 kg/sq.cm.) is necessary. The injector should be connected to the end of the tube.

Use clean diesel oil, test oil or petrol to carry out the tests.

Once the injector is connected to the tester, operate the pump several times to eject all impurities in the inside of the injector and then proceed with the tests.

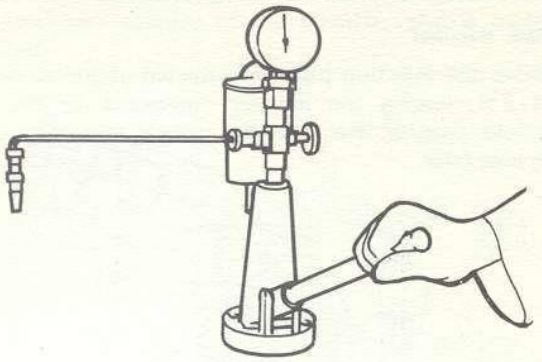

Fig. 2.15 Injector tester PM.22.41.01.0002 with pressure gauge 8.0113 A for checking of injectors. Gauge range should be between 0-50 kg/sq.cm.

Initial calibration 30 - 38 kg/sq.cm. (42.7 - 54.08 psi). Minimum permissible: 15 kg/sq.cm. (21.35 psi).

2.7.1.0. Calibrating Pressure

Initial calibration	30 (42.7 54.0 lb/sq.in.)
Minimum permissible	15 (21.35 lb/sq.in.)

The calibrating pressure is not adjustable.

2.7.1.1. Leak Test

Establish a pressure of 15 kg/sq.cm. (21.35 lb/sq.in.) and check that no fuel is dripping from the injector within a period of 5 seconds.

2.7.1.2. Jet Spray Pattern

The spray should be very fine and show a conical pattern.

If any of the injectors are not operating in accordance with any of these specifications, it is necessary to replace them.

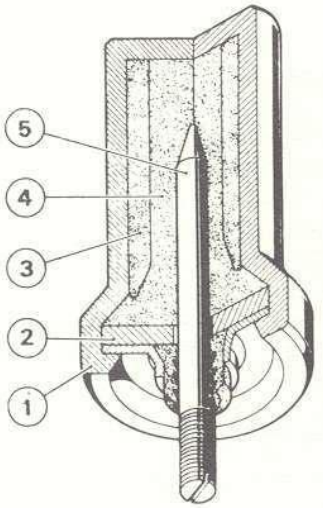

Fig. 2.16 Sectional view of the thermostatic element

1. *Brass covering*
2. *Shim*
3. *Element*
4. *Rubber sleeve*
5. *Sliding rod*

2.8. THERMOSTATIC ELEMENT

Make: Sopac (Figs. 2.16 and 2.17)

The thermostatic element should not be heated by a naked flame to check its operation. Care should be taken not to remove the sliding plunger from its seating.

2.8.0. Testing the Thermostatic Element in the Vehicle

With the engine in cold condition, check that the enrichment lever is in the lifted position and that the air valve is open, to obtain an engine speed of 900-1200 r.p.m.

2.8.1. Removal of the air Valve

Drain the cooling system, Remove the locknut and the adjustment nut from the enrichment lever and unscrew the air distributor.

Remove the closing plug and take out the pull rod, the thermostatic element, the spring and the cap. Unscrew the air valve.

Insert a new valve and replace the parts in reverse order to the removal procedure. Check that the valves slides without any stiffness in the closing plug. Adjust the enrichment lever and the valve.

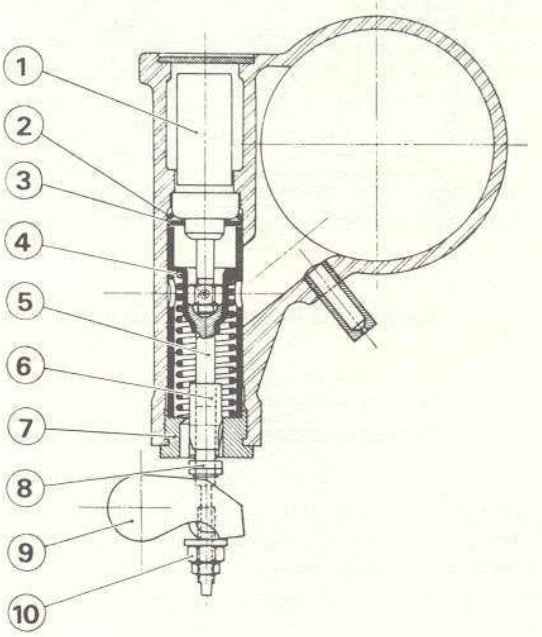

Fig. 2.17 Sectional view of the thermostatic valve and the air valve

1. *Thermostatic element*
2. *Joint washer*
3. *Steel washer*
4. *Thermostatic element spring*
5. *Pull rod*
6. *Air valve*
7. *Locknut*
8. *Air valve adjustment nut*
9. *Enrichment lever*
10. *Enrichment lever adjustment nut*

2.8.2. Thermostatic Element Replacement

Follow the instructions given above for the removal of the air valve and then remove the thermostatic element. Fit a new element and refit the parts, reversing the order of dismantling. Adjust the enrichment and the air valve.

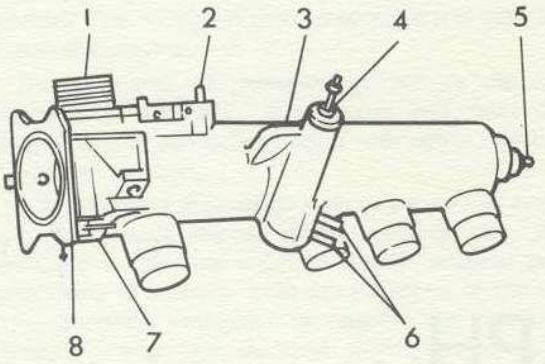

Fig. 2.18 Air distributor

1. *Accelerator drum*
2. *Mastervac vacuum inlet*
3. *Calibrated orifice for reaspiration of oil vapours at idling speed*
4. *Thermostatic element*
5. *Electro-magnetic valve*
6. *Water chamber heat inlet of thermostatic element*
7. *Injection pump control lever*
8. *Distributor vacuum inlet*