

# FUEL PUMP

## General

Fuel is fed to the carburetors by a diaphragm pump which is flange-mounted to the crankcase. It is operated mechanically from a cam on the distributor drive shaft over an actuating rod. The quantity of fuel delivered by the pump is automatically controlled as the fuel is consumed by the float bowls.

The fuel pump consists of the pump cover, containing suction valve, delivery valve and a fuel strainer, and a fuel pump housing, incorporating the rocker mechanism. The diaphragm and spring are situated between the cover and the housing. The diaphragm consists of several layers of special flexible, clothlike material which is not affected by the fuel and two protecting discs which are riveted to the diaphragm actuating rod.

## Operation

As the distributor drive shaft revolves, the cam causes the actuating rod to move against the rocker arm which pushes the diaphragm downward against the diaphragm spring. This movement creates a vacuum above the diaphragm which lifts the suction valve off its seat so that fuel can be drawn in. When the actuating rod moves backward, the loaded diaphragm spring pushes the diaphragm upward, forcing the fuel in the pump through the delivery valve and into the carburetors. This process is repeated at every turn of the cam (once every two revolutions of the engine).

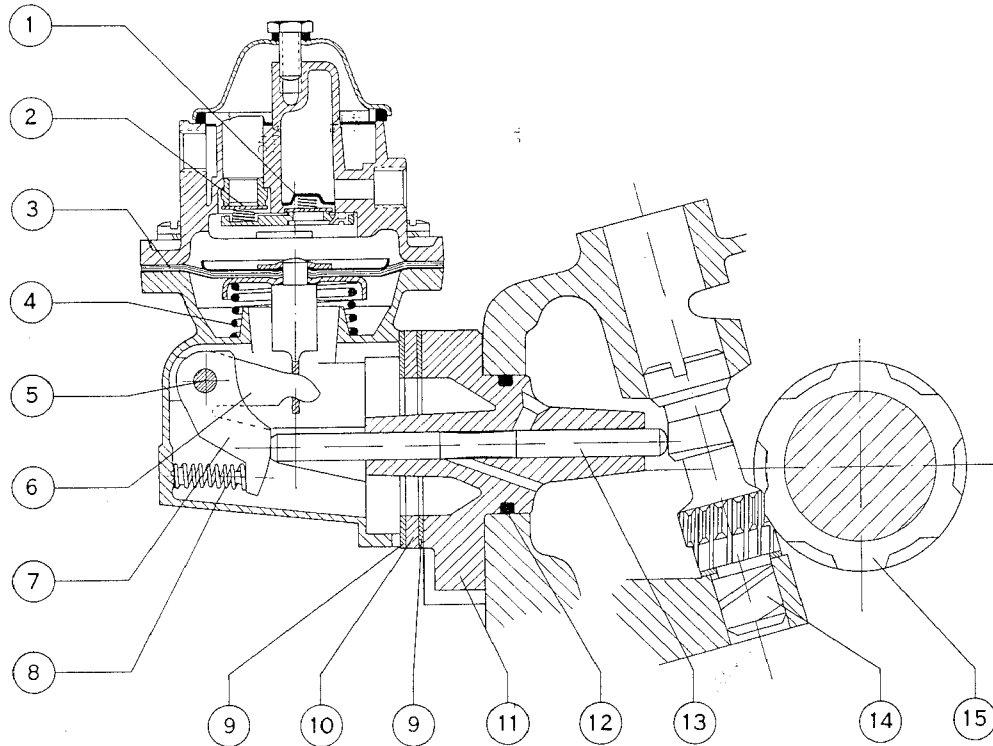


Fig. 29

## Fuel Pump (Cutaway)

- |                    |                     |                                     |
|--------------------|---------------------|-------------------------------------|
| ① Delivery valve   | ⑥ Rocker arm link   | ⑪ Intermediate flange (light alloy) |
| ② Suction valve    | ⑦ Rocker arm        | ⑫ O-ring                            |
| ③ Diaphragm        | ⑧ Rocker arm spring | ⑬ Actuating rod                     |
| ④ Diaphragm spring | ⑨ Gasket            | ⑭ Distributor drive shaft           |
| ⑤ Rocker arm pin   | ⑩ Fibre flange      | ⑮ Distributor drive gear            |

## Fuel Pump Components

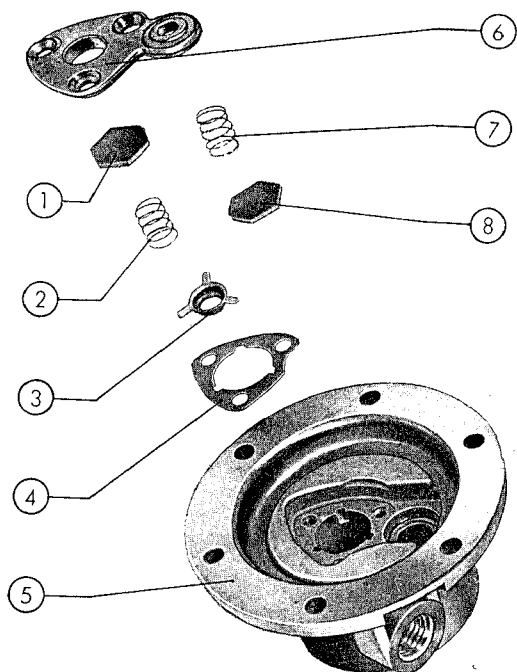


Fig. 30

- ① Valve plate for exhaust valve
- ② Valve spring for exhaust valve
- ③ Spring seat for exhaust valve
- ④ Gasket for valve retainer plate
- ⑤ Pump Cover
- ⑥ Valve retainer plate
- ⑦ Valve spring for intake valve
- ⑧ Valve plate for intake valve

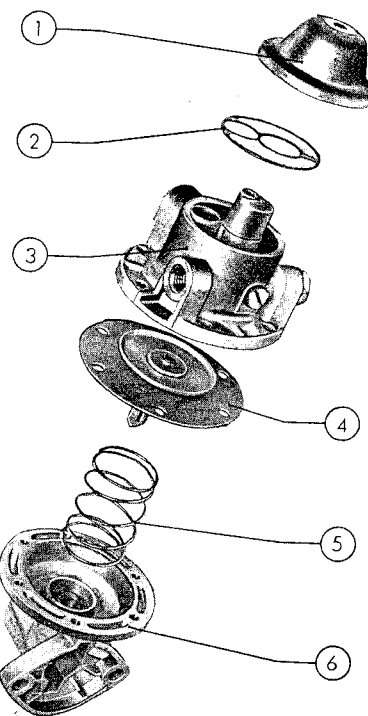


Fig. 31

- ① Housing cover top
- ② Filter
- ③ Housing cover
- ④ Diaphragm
- ⑤ Diaphragm spring
- ⑥ Pump housing

## Checking Pump Pressure

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### General

The pump pressure depends on how much the spring is compressed during the pump suction stroke. The spring is so balanced that fuel is forced to the carburetor via the pressure valve only if the float needle valve is open. In case the float needle valve closes with rising float, the pressure in the fuel line and pump housing increases while the pump working stroke decreases. Under normal conditions the diaphragm is moved only some fractions of an inch (approx. 2/100").

A hole is provided for venting the chamber below the diaphragm. This hole also permits draining of fuel which might have entered the lower chamber.

### Checking

The pump pressure should amount to .13 to .18 atü with the float needle valve closed and the engine running at 1000 to 3000 r.p.m. The minimum amount of fuel delivery is 18 ltrs/h = 300 c.c. per minute at 4500 r.p.m.

To check the pump pressure use a pressure gauge which is connected to a fuel line between the pump and the carburetor by means of a T-fitting. The fuel line is fitted with a fuel shut-off cock behind the pressure gauge. The specified pump pressure is determined by the correct adjustment of the actuating rod stroke and the diaphragm spring tension.

Adjustment of the pump stroke is effected by fitting corresponding flange gaskets.

If the stroke adjustment does not give the desired result, replace the diaphragm spring. If the pump pressure is too low, the intermediate coils of the spring may be stretched apart, should this be necessary.

Too high a pump pressure will result in overflow of the carburetor and, consequently, in dilution of the engine oil. If it is too low, insufficient fuel will be delivered and an uneven running and missing of the engine at high speed as well as a decrease in performance will be the result.

## Removing and Installing Fuel Pump

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### Special Tools:

VW 126 a Fuel Pump Wrench

VW 328 a Fuel Pump Push Rod Gauge

### Removal

1. Disconnect fuel lines from carburetors and fuel pump.
2. Remove retaining screws on pump flange (using fuel pump wrench VW 126 a).
3. Take off pump.
4. Remove actuating rod, fibre flange and gaskets.

### Adjusting Stroke of Fuel Pump

1. Place intermediate flange, actuating rod, and a gasket, which should be in perfect condition, on crankcase. The oil hole in the intermediate flange must face upwards. The convex end of the actuating rod must face toward the cam of the distributor drive shaft.

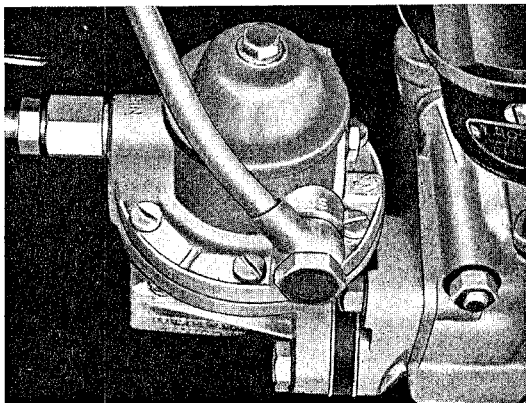


Fig. 32

2. Attach gauge VW 328 a to the flange and tighten it to the same torque as for the fuel pump in order to compress the gaskets to their usual thickness. The actuating rod stroke of about .16" (4 mm) is determined by the cam on the distributor drive shaft. The stroke should move within a range of 2" (5 mm) which is marked on the gauge. The marks correspond to a length of 1.14" (29 mm) and 1.34" (34 mm) measured from the fuel pump contact flange (including gaskets) to the projecting actuating rod end. Crank the engine to check the pump stroke. The specified stroke can be adjusted by fitting an appro-

appropriate number of gaskets to the intermediate flange. Do not fit less gaskets than required, as this would

have a detrimental effect on the diaphragm and the drive mechanism.

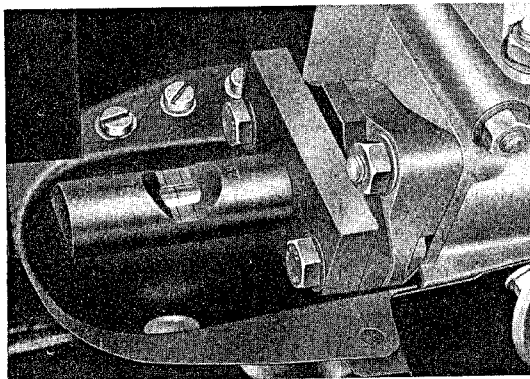


Fig. 33

#### Installation

1. Fill fuel pump housing with special grease before installing it.
2. Fit fuel pump.
3. Connect fuel lines.  
See to it that the fuel line rubber grommet is correctly seated in the engine front cover plate!

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### Reconditioning Fuel Pump

Special Tool: VW 328 b Fuel pump diaphragm gauge

#### Disassembly

1. Remove hex. hd. retaining screws on pump cover.
2. Take off pump cover and fuel strainer.
3. Unscrew the six slotted screws and take off pump cover.

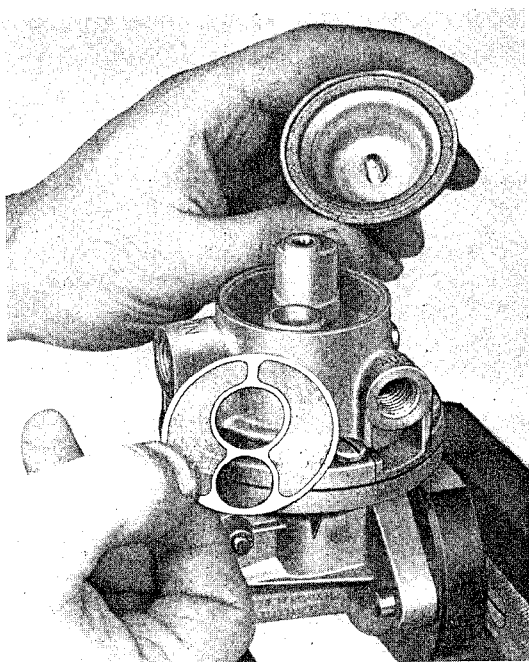


Fig. 34

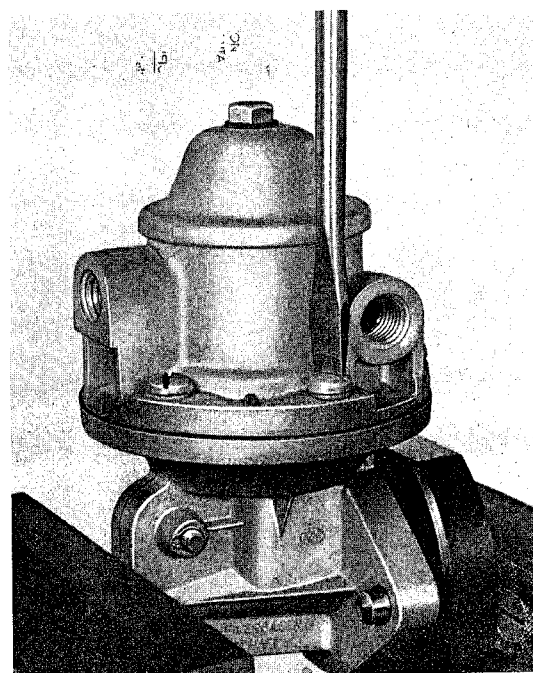


Fig. 35

4. Press down diaphragm and disconnect it from the pump rocker arm link. Remove diaphragm with spring.
5. Force out rocker arm link pin. Remove rocker arm link, rocker arm and spring.

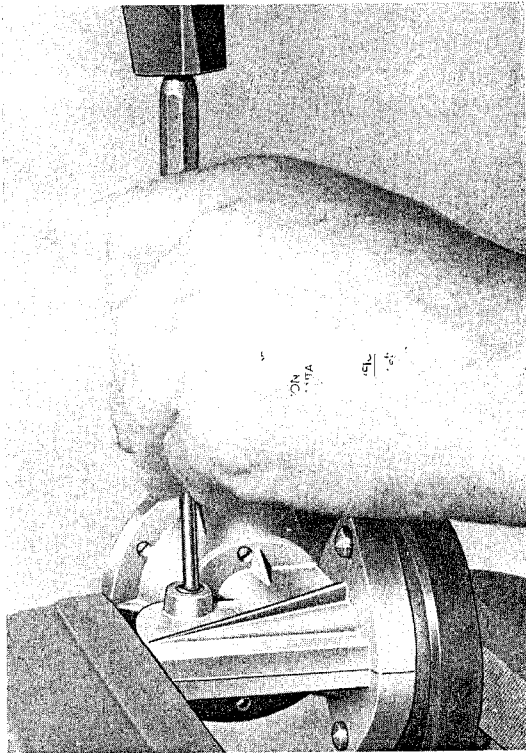


Fig. 36

6. Unscrew valve retainer plate from pump cover by pressing down valve retainer plate until the three screws have been screwed out. Carefully take off the plate to avoid the components jumping off.

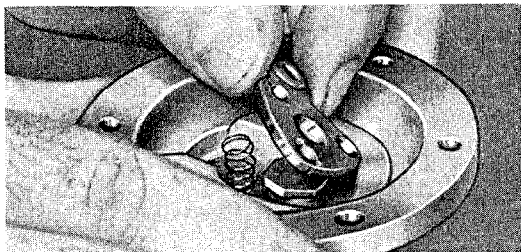


Fig. 37

7. Thoroughly clean all pump components in fuel.

### Assembly

1. Check valve seat in pump cover for perfect condition.
2. Check valve seat at valve retainer plate.
3. Replace valve plates, valve springs and valve retainer plate gasket. Place valve plates in position taking care that their sides with red coated face contact with the valve seat.
4. Place and hold valve retainer plate in position until the screws are tightened uniformly.
5. After installation of the valves check to see whether opening and closing is perfect.
6. Install rocker arm link, rocker arm and spring in pump housing. Check rocker arm pin for wear. Install pin and secure.
7. Place spring and diaphragm in position. Engage the diaphragm actuating rod in the rocker arm link. Replace diaphragm if it shows traces of hardening or wear.
8. Place fuel pump housing in a vice with the gauge VW 328 b inserted. Thus the rocker arm is pressed 1.4" (35 mm) inwards (measured from flange joining face), bringing the diaphragm to the required assembling position.
9. Fit pump cover, taking care that the diaphragm is perfectly even. Securely tighten cover screws diagonally and uniformly.
10. Check pump cover gasket, if necessary replace.
11. Place fuel filter in position and tighten cover screws.

12. Fill fuel pump housing with special grease (anti-freeze). At operating temperature the grease assumes a liquid condition, thus lubricating all moving parts. Lubrication is improved by engine oil which is fed into the pump housing through the bore in the light alloy flange. Another grease packing is therefore not necessary. Rocker arms and actuating rods which are lacking grease indicate a leaking diaphragm.

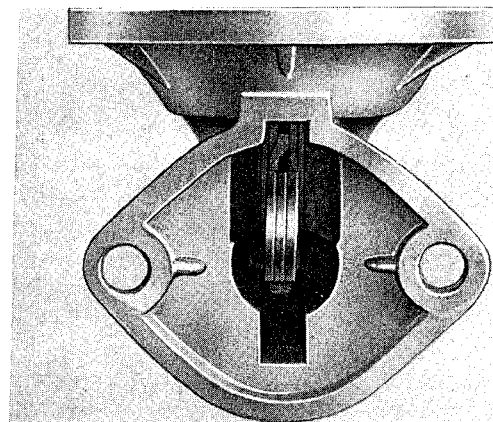


Fig. 38

### Fuel Pump Troubles and Their Cure

Trouble	Cause	Remedy
1. Pump leaking between housing and cover; loss of fuel	a) Slotted screws loose b) Diaphragm cracked	a) Tighten screws b) Replace diaphragm
2. Diaphragm leaks at rivets; loss of fuel	Diaphragm damaged by inexperienced installation	Replace diaphragm acc. to specification
3. Diaphragm material leaking; loss of fuel	Diaphragm material damaged by solvent ingredients in fuel	Replace diaphragm
4. Excessive pump stroke: overstraining of the diaphragm	Pump incorrectly installed, gasket too thin	Install pump correctly, if necessary check diaphragm
5. Pump pressure too low	a) Pump incorrectly installed, gasket too thick b) Spring tension too low	a) Install pump correctly b) Replace spring, or if necessary stretch it apart
6. Pump pressure too high; float needle valve forced down	a) Pump incorrectly installed, gasket too thin b) Spring tension too high	a) Install pump correctly b) Replace spring, or if necessary bring intermediate coils closer together
7. Fuel pump inoperative or insufficient fuel delivery	Valves leaking or sticking	Check valves, if necessary replace valve plates and valve seats