

# Chapter 3 Fuel system

*For modifications, and information applicable to later models, see Supplement at end of manual*

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## Specifications

<b>System type</b> .....	Mechanical fuel pump, downdraught fixed jet carburettor
<b>Fuel tank capacity (including reserve)</b> .....	35.0 litres (7.7 gal)
<b>Fuel octane rating</b> .....	See Chapter 13
<b>Air cleaner element</b>	
1981 to 1984 .....	Champion W107
1984 on .....	Champion W121
<b>Carburettor calibration (dimensions in mm)</b>	
Type .....	Weber 32 ICEV 28/250 or 50/251
Venturi .....	22.0
Auxiliary venturi .....	3.5
Main jet .....	1.12
Air bleed jet .....	1.60 (1.70 – 1983 on)
Emulsion tube .....	F86 (F89 – 1983 on)
Slow running jet .....	0.50 (0.47 – 1983 on)
Air idle jet .....	1.10
Pump jet .....	0.40
Pump discharge orifice .....	0.40
Power fuel jet .....	1.30
Power air jet .....	1.40
Power mixture jet .....	2.0
Fuel inlet needle valve .....	1.50
One-way .....	1.70
Mixture .....	1.50
Accelerator pump fuel ejection for every ten strokes .....	4.5 to 5.5 cc
Float setting .....	10.50 to 11.0

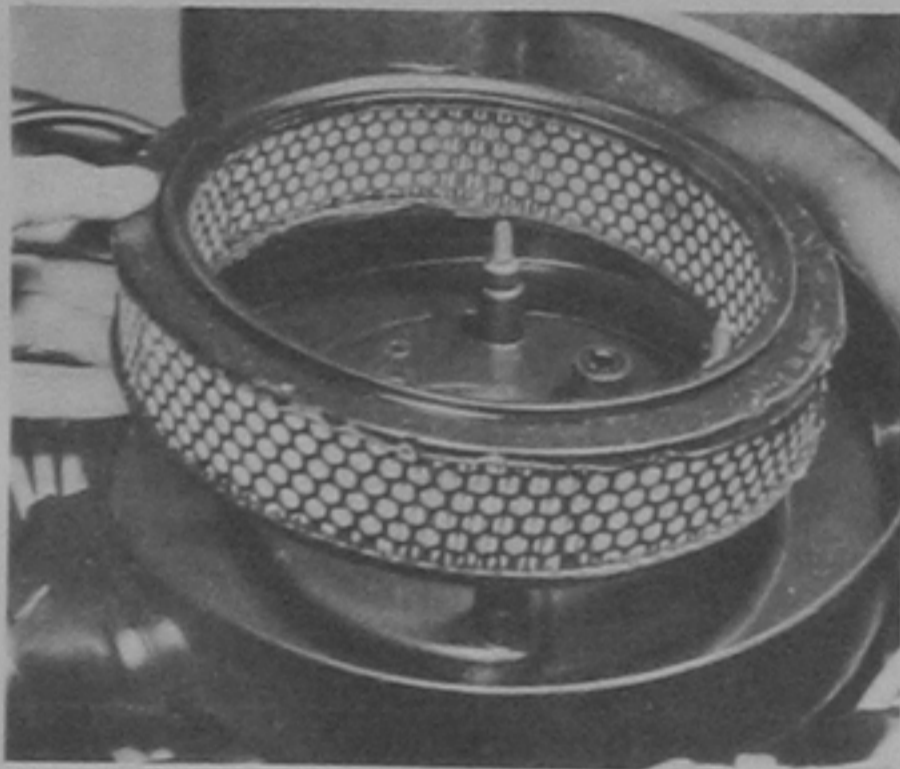
Type.....	Solex C 32 DISA/7 or 11
Venturi .....	22
Auxiliary venturi .....	3.4
Main jet .....	1.20 (1.175 – 1983 on)
Air bleed jet .....	2.0 (1.90 – 1983 on)
Emulsion tube .....	N93
Slow running jet .....	0.47 (0.50 – 1983 on)
Air idle jet .....	1.0 (1.20 – 1983 on)
Pump jet .....	0.50
Pump discharge orifice .....	0.50
Power jet .....	0.90
Power mixture jet .....	2.00
Needle valve .....	1.60
Accelerator pump fuel injection for every ten strokes .....	4.0 to 5.0 cc
Float setting .....	2.0 to 3.0
<b>Idle speed</b> .....	700 to 800 rev/min
<b>CO level at idle</b> .....	2 to 3%

**1 Description and maintenance**

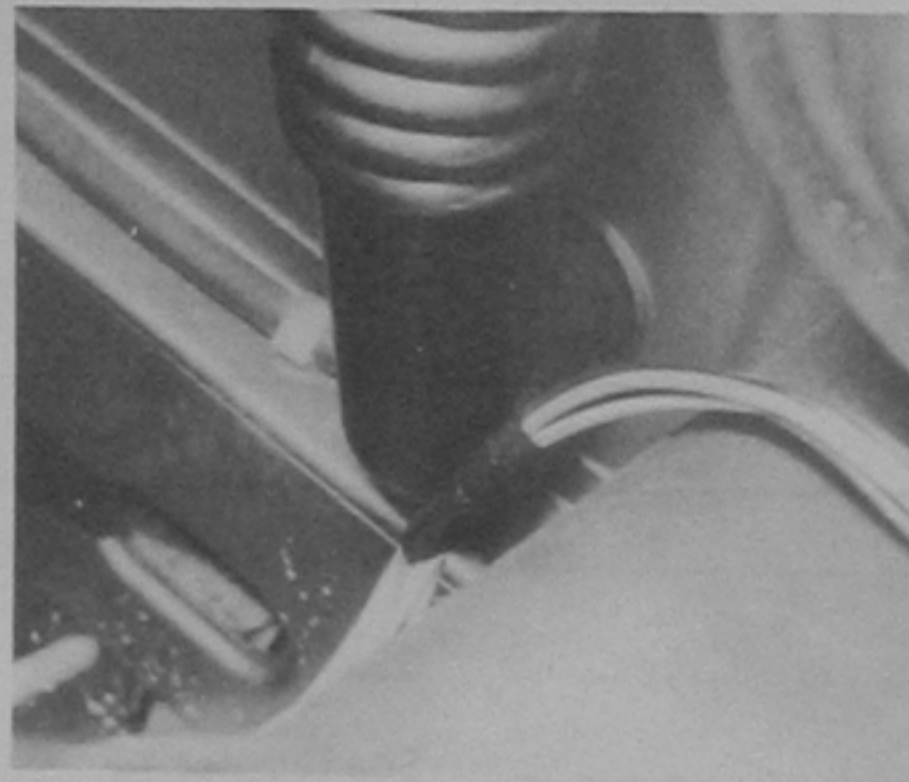
- 1 The fuel system consists of a fuel tank located inboard of the right, rear roadwheel, a mechanically-operated fuel pump, a downdraught carburettor and air cleaner.
- 2 Maintenance consists of renewing the air cleaner element and cleaning the fuel pump at the specified intervals, as described later in this Chapter.

**2 Air cleaner – servicing, removal and refitting**

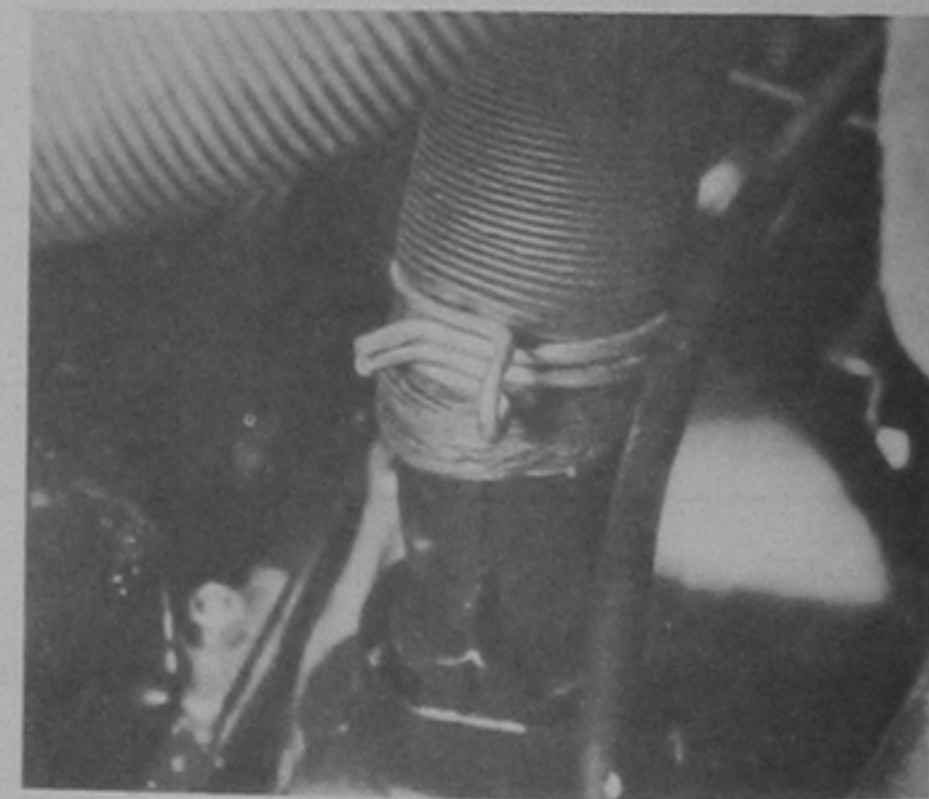
- 1 Open the bonnet and unscrew the wing nuts from the lid of the air cleaner.
- 2 Lift off the lid and take out the element and discard it (photo).
- 3 Wipe out the casing. Fit the new element and replace the lid.
- 4 Winter and summer positions are provided so that the air intake spout can draw air in from the front of the car or from around the



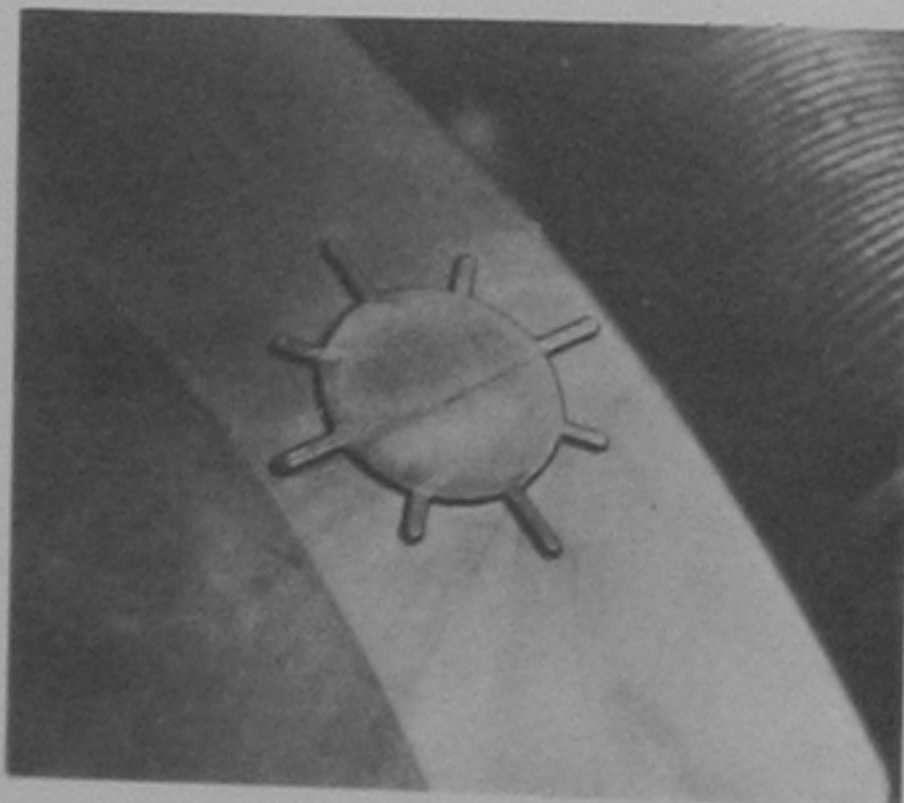
2.2 Air cleaner element



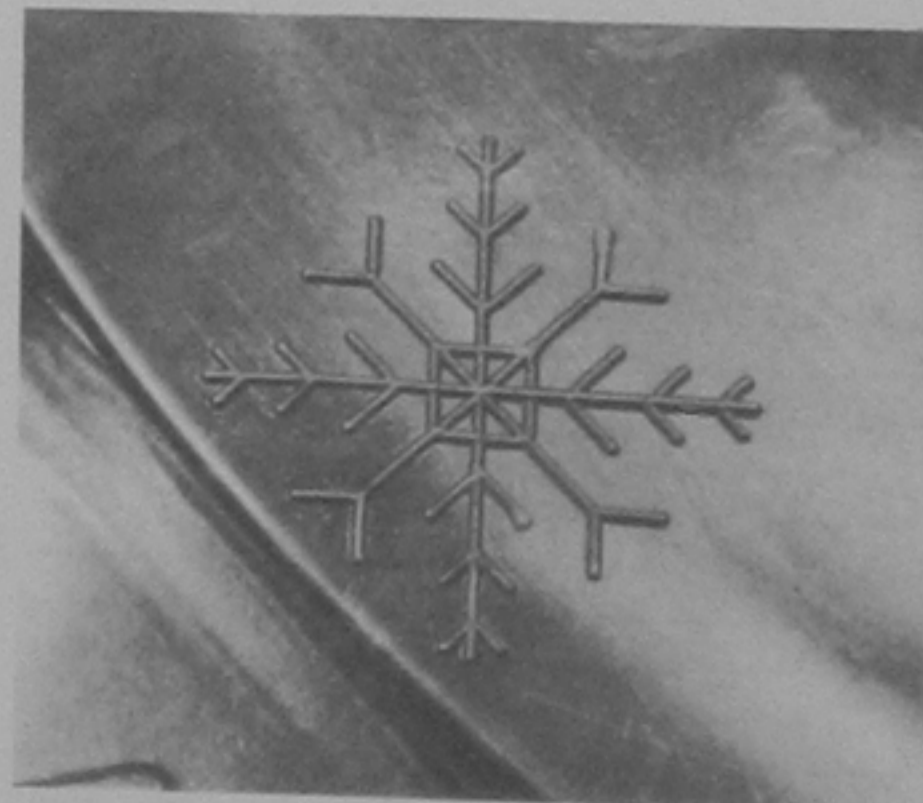
2.4A Air cleaner cold air intake



2.4B Air cleaner hot air intake



2.4C Air cleaner summer setting



2.4D Air cleaner winter setting

exhaust manifold according to ambient air temperature. If the outside temperature is above 13°C (55°F) then align the 'Sun' symbol with the arrow on the air intake spout. If the outside temperature is below 13°C (55°F) then align the 'Snowflake' symbol with the arrow on the spout. Unbolt the cover and turn it to do this (photos).

5 To remove the air cleaner, take out the filter element as previously described.

6 Disconnect the warm air intake hose and unscrew the cleaner casing mounting nuts. Lift the casing away. Note the vent hose attached (photos).

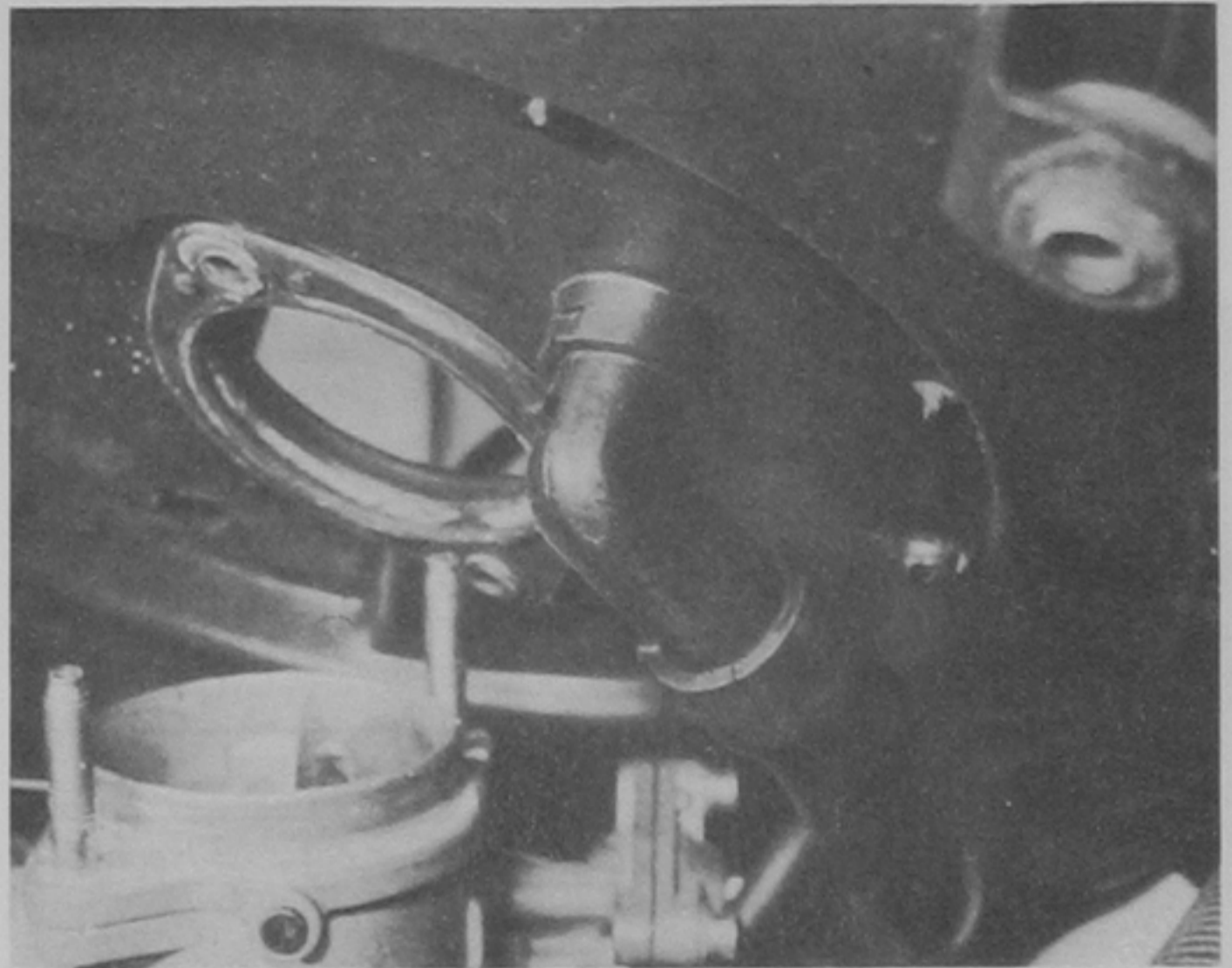
7 Refitting is a reversal of removal. Make sure that the flange sealing gaskets are in good condition (photo).

### 3 Fuel pump – cleaning

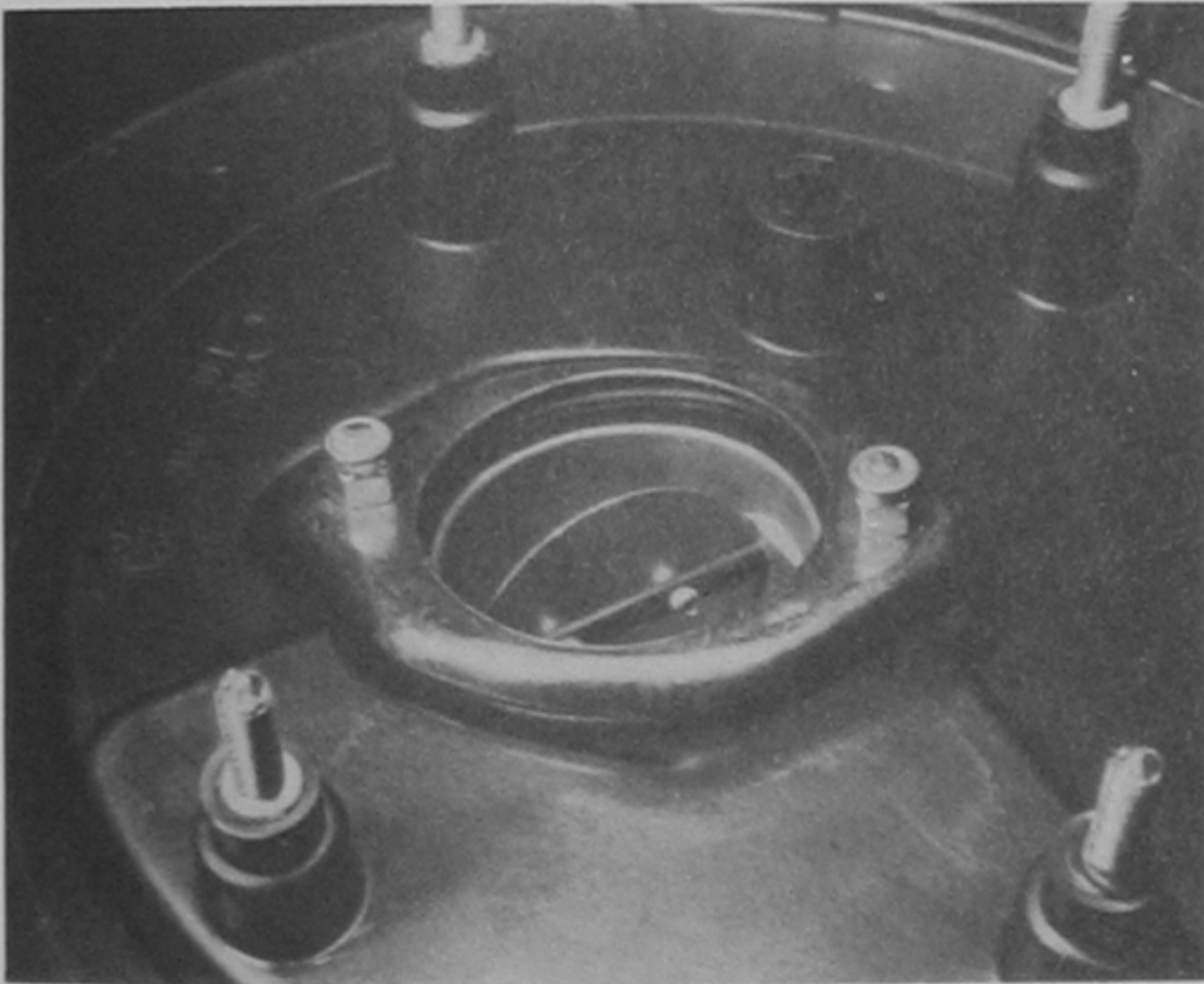
1 If the fuel pump is not of the sealed type, unscrew the cover mounting screw and lift away the screw, sealing gasket and cover.

2 Lift out the filter gauze from the pump upper body.

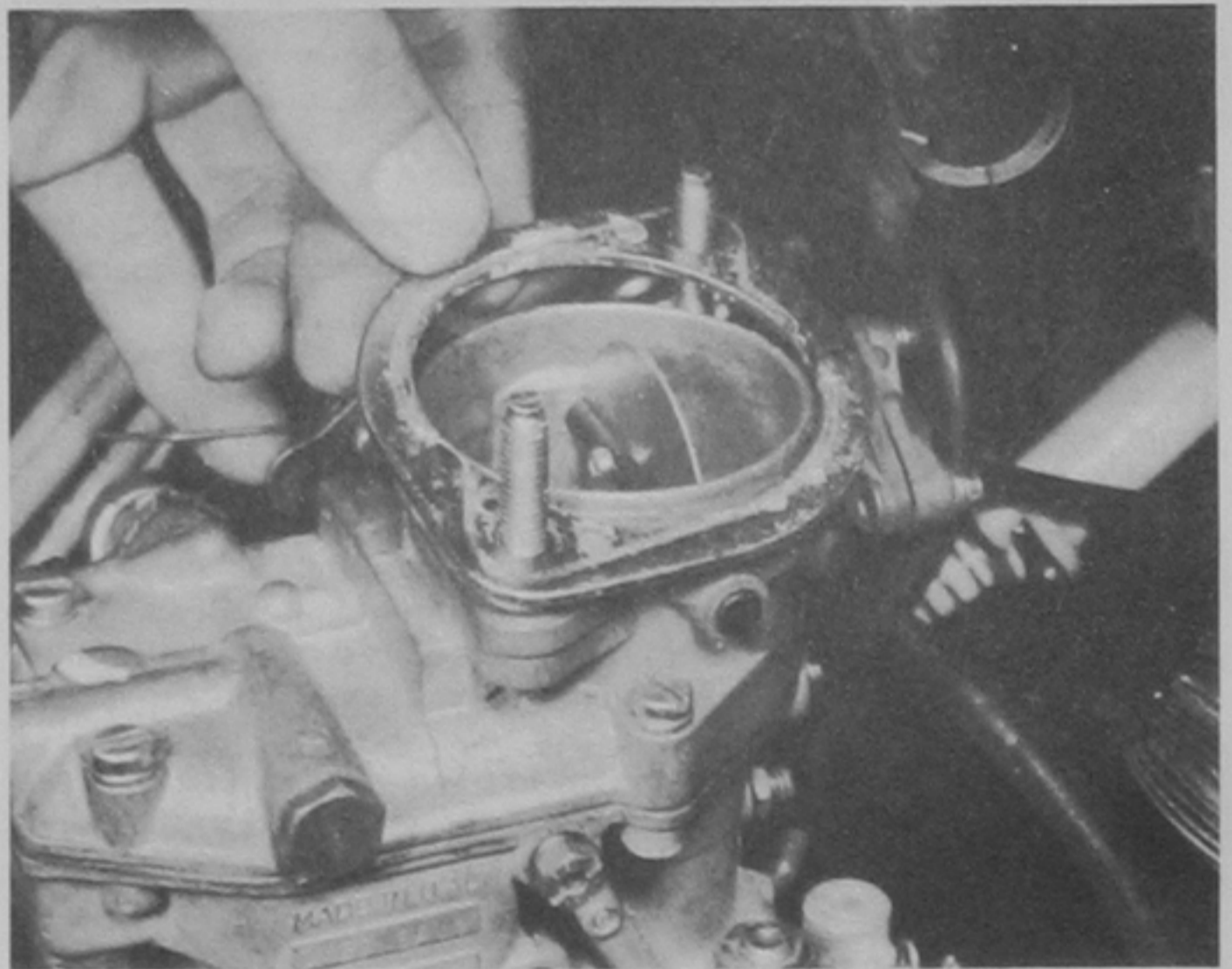
3 Inspect the filter gauze for sediment and, if dirty, clean it with petrol and a soft brush.



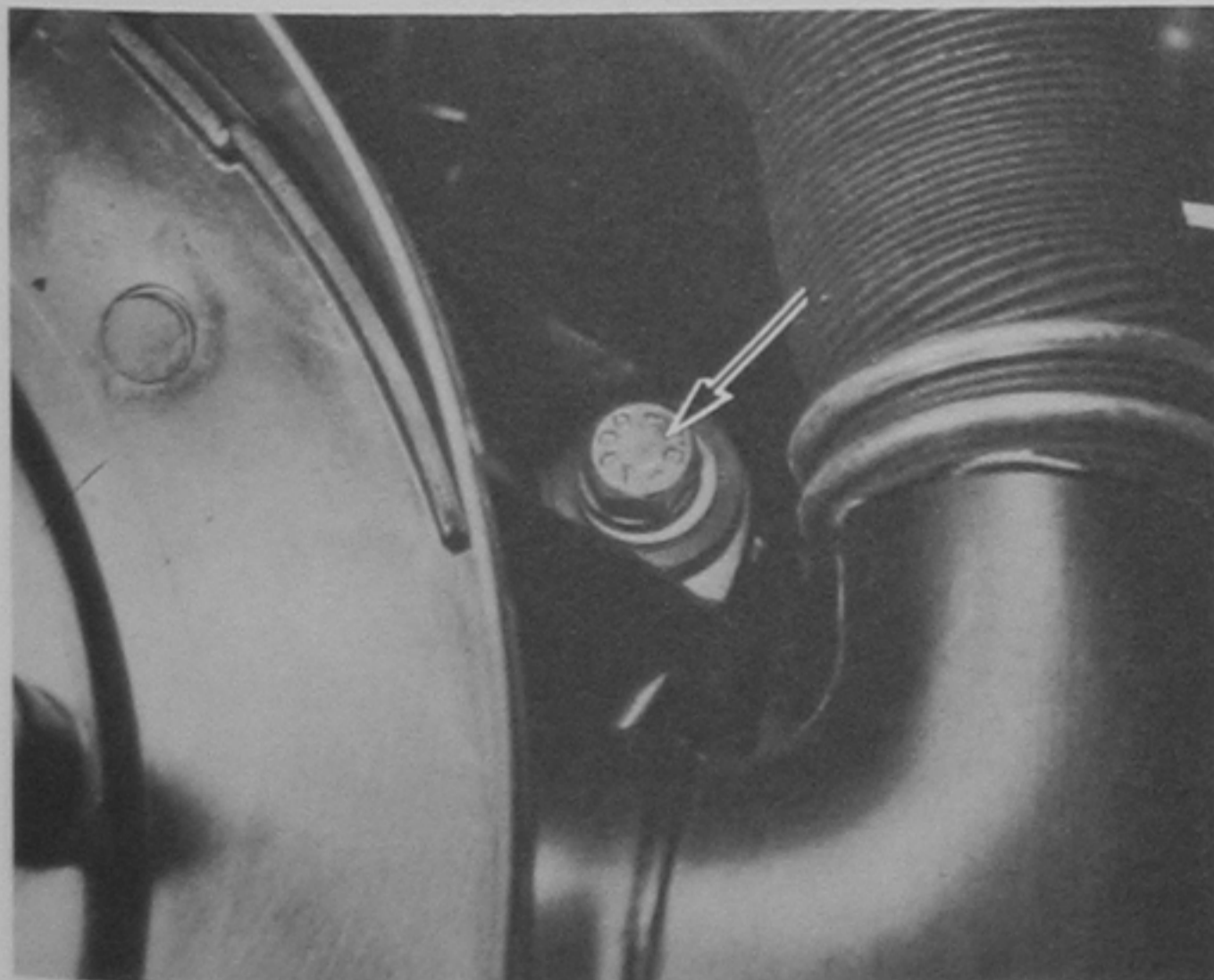
2.6C Underside of air cleaner casing, showing crankcase vent hose connection



2.6A Air cleaner casing and mounting nuts



2.7 Air cleaner lower mounting flange



2.6B Air cleaner casing mounting bracket bolt

4 Check the condition of the gasket and renew it if it has hardened or distorted.

5 Replacement is the reverse sequence to removal. Tighten the centre screw just sufficiently to ensure a fuel-tight joint.

### 4 Fuel pump – testing

1 If the fuel pump is suspected of faulty operation, disconnect the fuel inlet hose from the carburettor and place its open end in a container.

2 Disconnect the LT lead which runs from the ignition coil to the distributor.

3 Have an assistant turn the ignition key to the 'start' position to rotate the crankshaft through a few revolutions. While the engine is turning, observe the end of the disconnected hose. The fuel should be ejected in regular, well defined spurts. If this does not happen and fuel is known to be in the tank, the pump must be removed and overhauled as described in the following Sections.

### 5 Fuel pump – removal and refitting

- 1 Disconnect the fuel lines from the pump (photo).
- 2 Undo and remove the two pump securing nuts and spring washers. Carefully lift away the fuel pump. Recover the two paper gaskets, spacer, pump actuating pushrod and bush from the pushrod bore (photo).
- 3 Refitting the fuel pump is the reverse sequence to removal, but care is necessary to use the right thickness of gasket (photo).
- 4 With the pushrod in its fully retracted position the end of the pushrod should project between 1.0 and 1.5 mm (0.039 and 0.059 in) beyond the spacer outer gasket. The projection can be altered by fitting a gasket of alternative thickness from the sizes available.

### 6 Fuel pump (non-sealed type) – overhaul

**Note:** *If the pump is of sealed type, overhaul is not possible.*

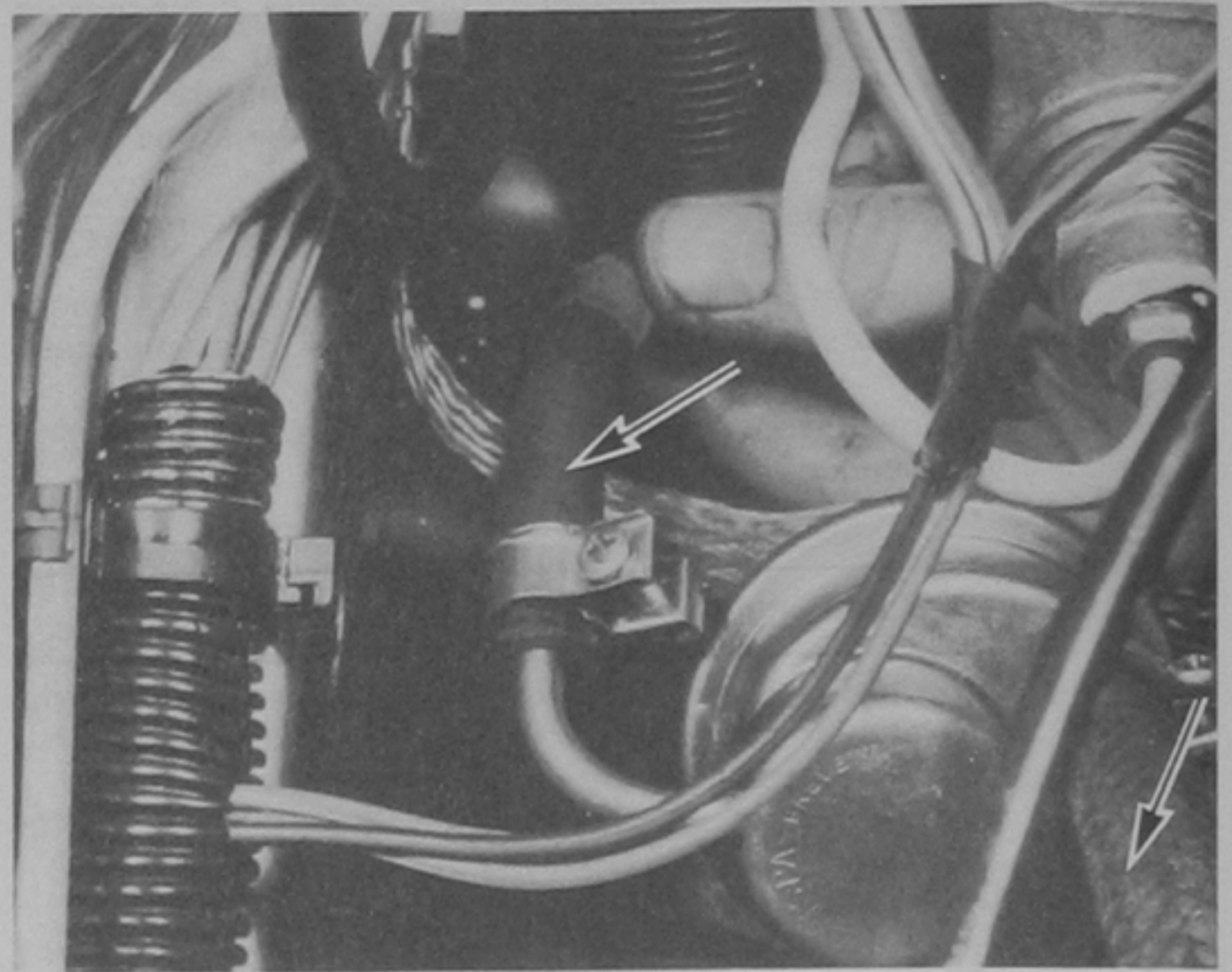
- 1 With the fuel pump removed from the engine, clean away external dirt and grease.
- 2 Unscrew the centre bolt and remove the pump cover.
- 3 Remove the filter gauze.
- 4 Mark the upper and lower flanges of the pump that are adjacent to each other so that they may be refitted in their original positions.
- 5 Undo and remove the six screws and spring washers which hold the two halves of the pump body together. Separate the two halves with great care, ensuring that the diaphragm does not stick to either of the two flanges. This also releases the spacer between the two halves of the pump.
- 6 To release the diaphragm, depress the centre and turn it 90°. This will release the diaphragm pull rod from the stirrup in the operating link, and its associated spring.
- 7 Do not remove the rocker arm and pivot from the body base unless there are signs of excessive wear – in which case it would probably be more economical to obtain an exchange pump.
- 8 To remove the valve assemblies from the body centre section they must be prised out carefully past the stakes which locate them. Remove the sealing ring fitted behind each valve. On some later models the valves are not available as separate spares. Instead, the complete upper half of the pump must be renewed if a valve is faulty.
- 9 A fuel pump repair kit is available which will contain all the renewable items.
- 10 Reassembly of the pump is the reverse sequence of removal. Take care to ensure that the valves are correctly assembled to the upper housing.

### 7 Fuel tank transmitter – removal and refitting

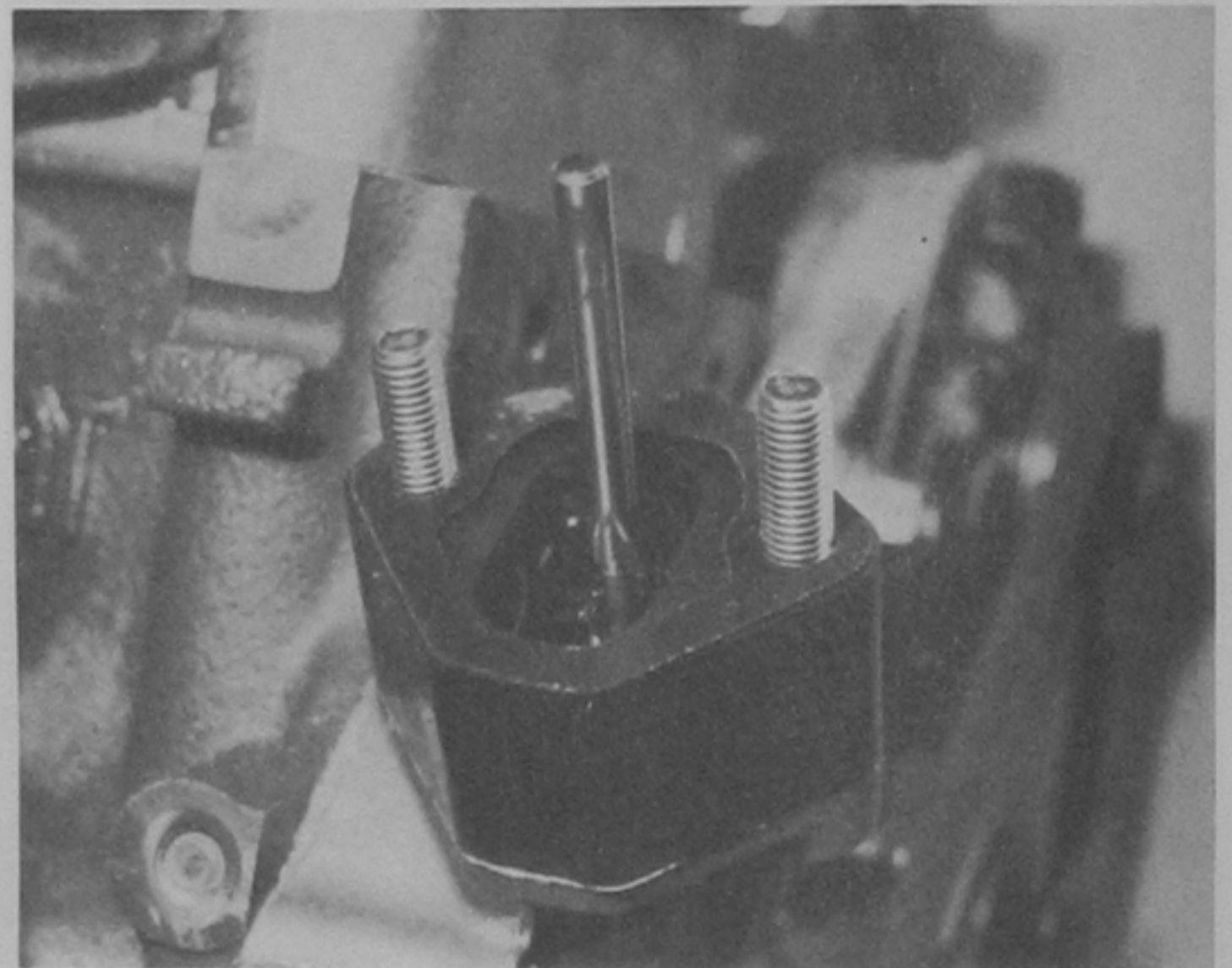
- 1 Access to the tank transmitter can be obtained by lowering the tank as described in the following Section.
- 2 Disconnect the fuel lines and electrical leads and release the transmitter securing ring.
- 3 Withdraw the unit taking care not to damage the float or arm.
- 4 When refitting check that the sealing ring is in good condition.

### 8 Fuel tank – removal and refitting

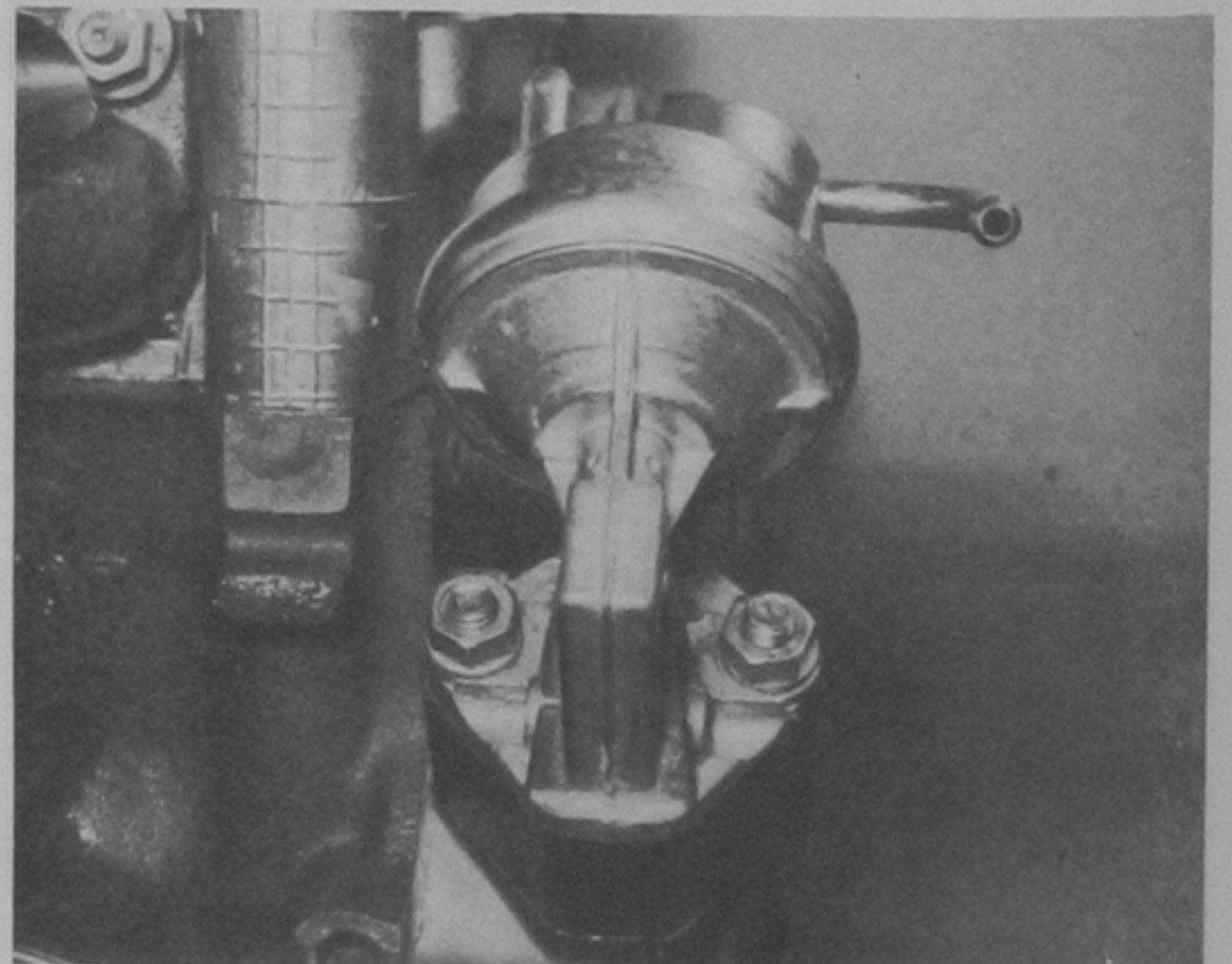
- 1 Syphon as much fuel as possible from the fuel tank into a safe, sealable container.
- 2 Remove the right-hand rear roadwheel and then disconnect the fuel filler and breather hoses from the fuel tank.
- 3 Working under the car, unscrew the mounting nuts from the tank flange and carefully lower the tank (photo).
- 4 Disconnect the fuel lines and electrical leads from the tank transmitter unit.
- 5 Remove the tank.
- 6 If the tank was removed for cleaning, remove the transmitter unit and using several changes of paraffin, shake it vigorously, rinsing finally with petrol.



5.1 Fuel pump hoses



5.2 Fuel pump spacer block and operating rod



5.3 Fuel pump mounting nuts

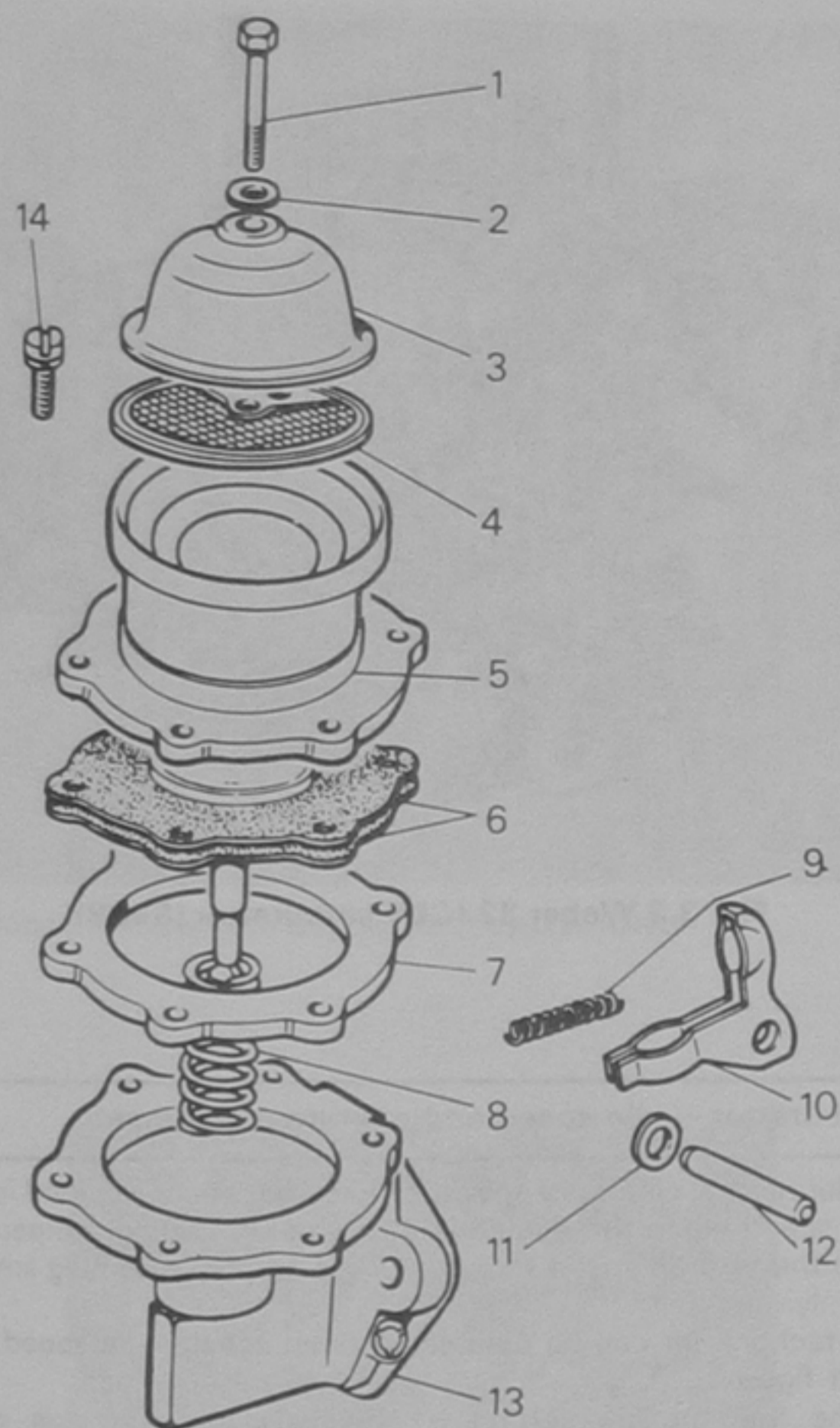


Fig. 3.1 Exploded view of fuel pump (Sec 6)

- |                    |  |
|--------------------|--|
| 1 Cover screw      | 9 Rocker arm spring                        |
| 2 Flat washer      | 10 Rocker arm                              |
| 3 Pump cover       | 11 Shoulder washer                         |
| 4 Filter           | 12 Rocker arm shaft                        |
| 5 Upper body       | 13 Lower body                              |
| 6 Diaphragm        | 14 Upper and lower bodies attachment screw |
| 7 Spacer           |  |
| 8 Diaphragm spring |  |

7 If the tank requires repair, leave this to the professionals, usually radiator repairers. *Never attempt to weld or solder a fuel tank unless it has been thoroughly steamed out to remove all explosive vapour.*  
 8 Refitting is a reversal of removal. Note the upper section of filler pipe under the rear wing (photo).



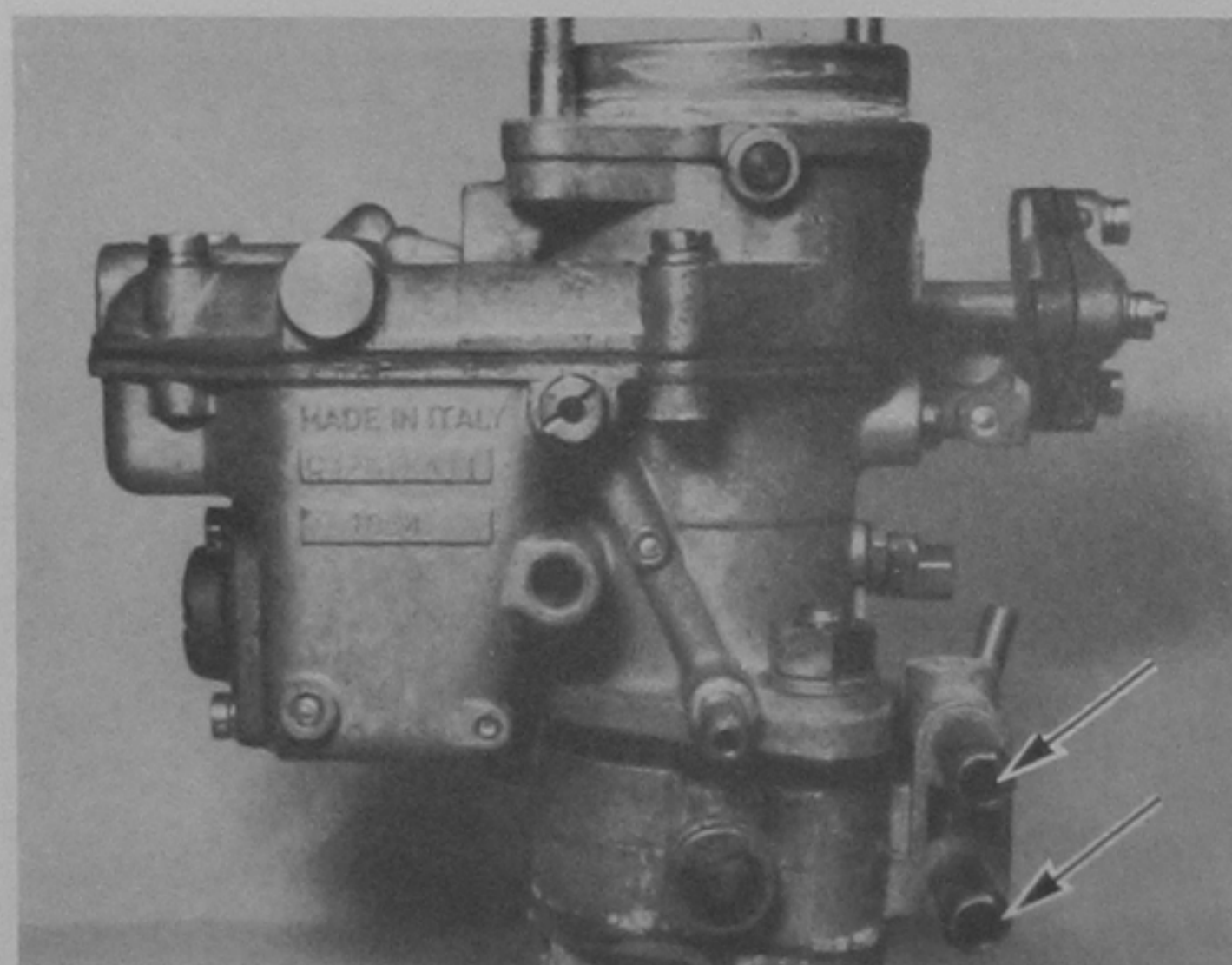
8.8 Fuel tank filler pipe protective sleeve

### 9 Carburettor – description and maintenance

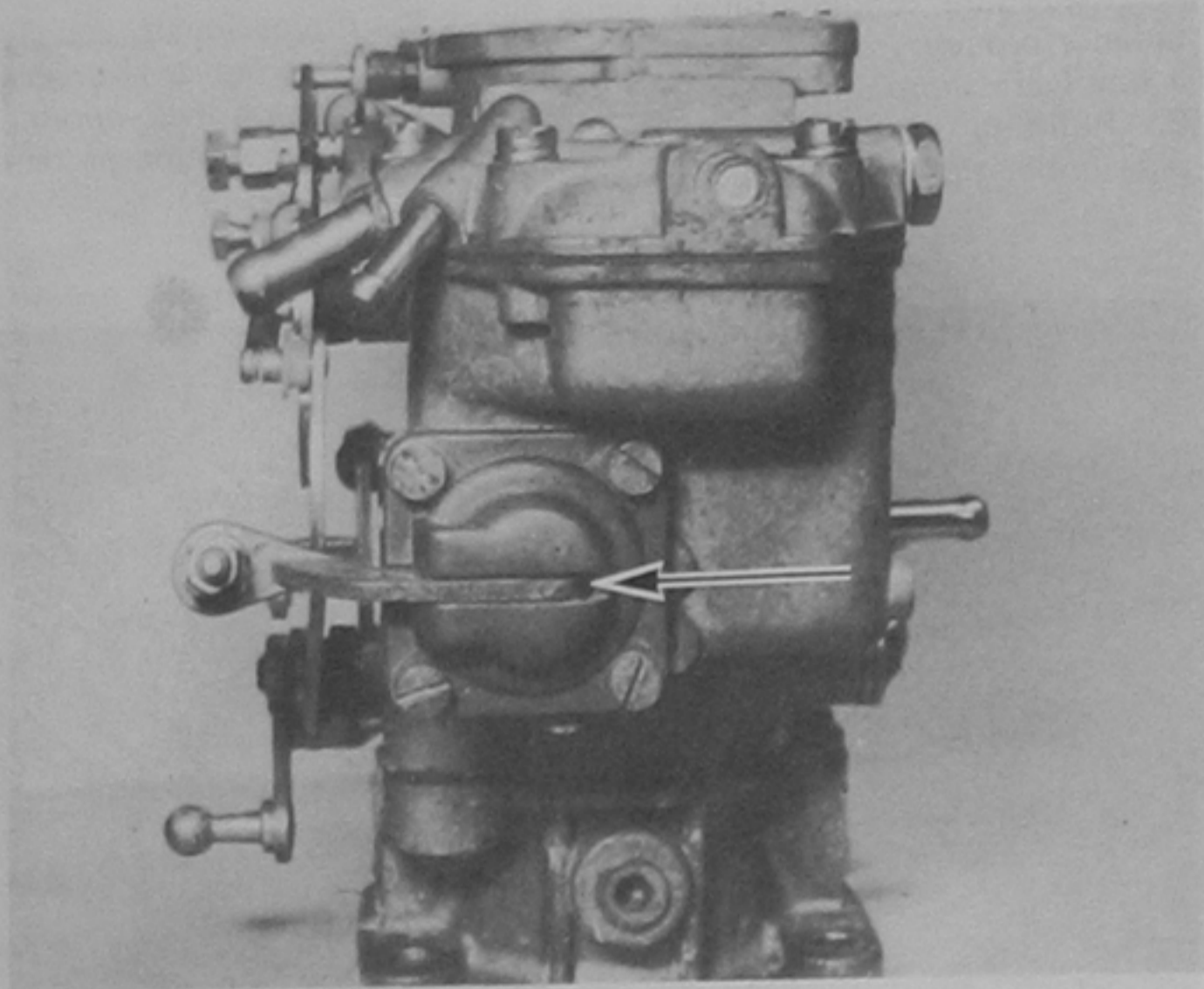
- 1 The carburettor is of single venturi, manual choke, downdraught type of either Weber or Solex manufacture (photos).
- 2 Both carburettors are of fixed jet type with an accelerator pump and coolant-heated throttle block.
- 3 Normal maintenance consists of keeping the exterior clean and the pivots and linkage oiled.
- 4 On Weber units a filter is incorporated at the fuel inlet. Periodically unscrew the filter plug, extract the filter gauze and brush it clean in some fuel.



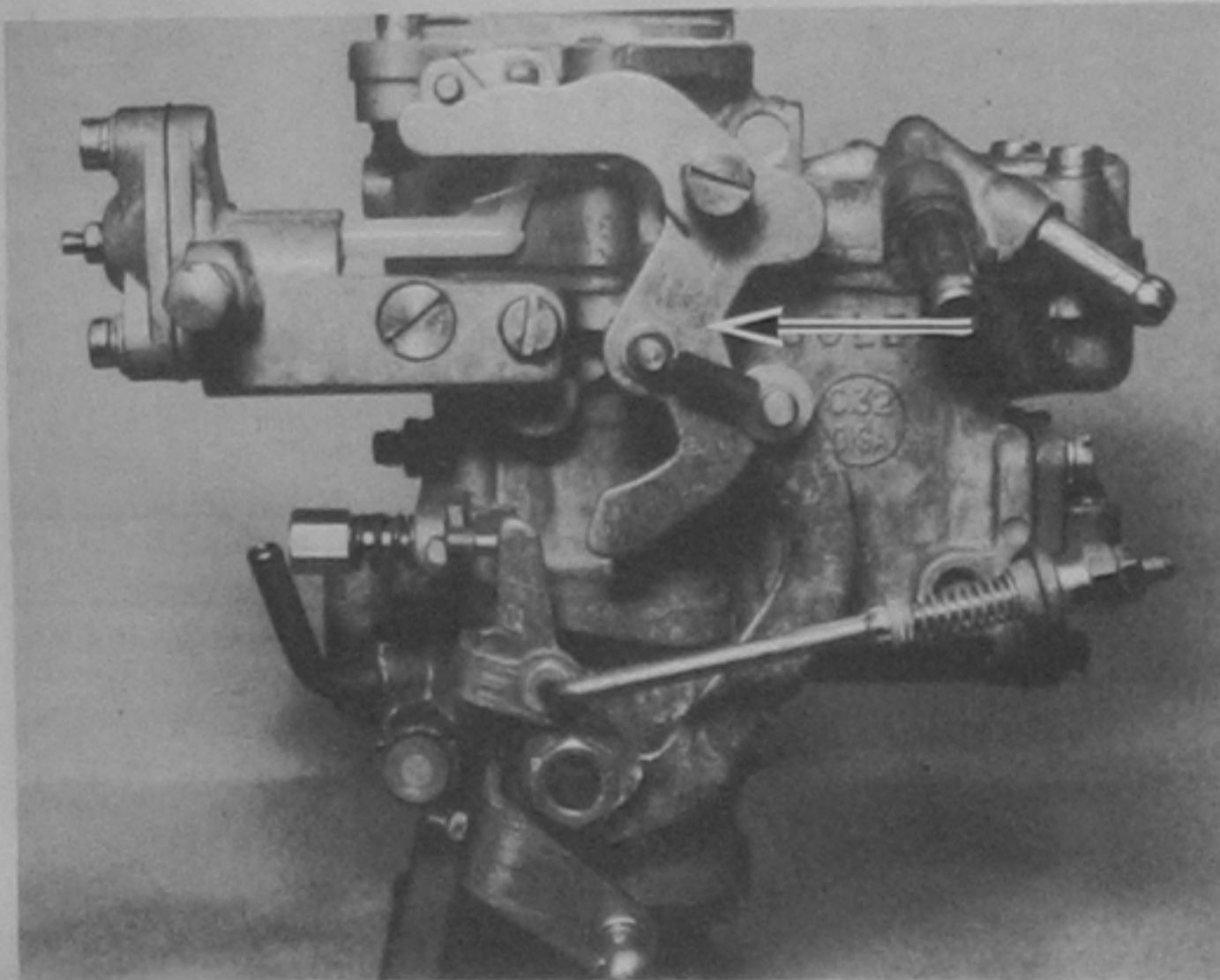
8.3 Fuel tank flange nut



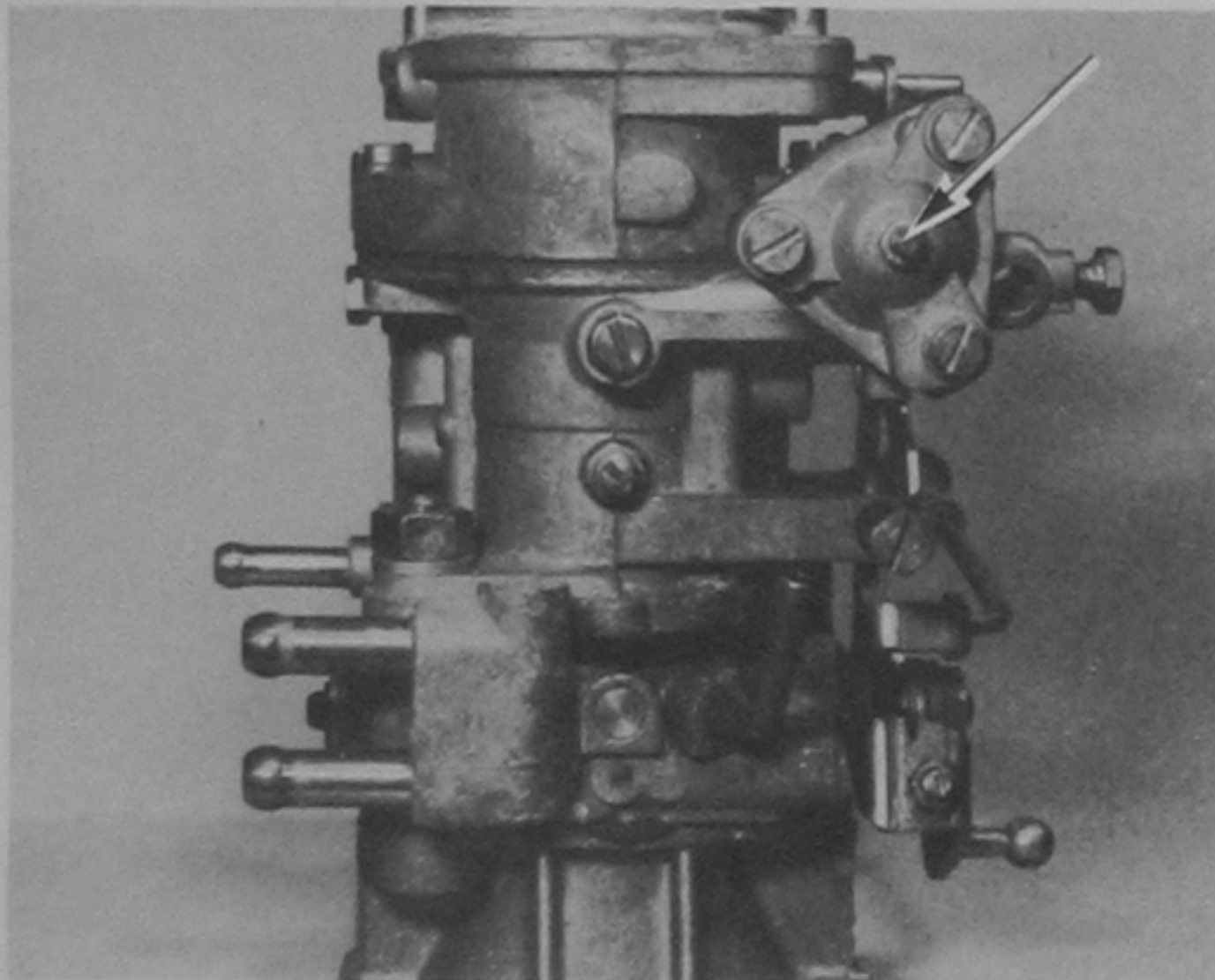
9.1A Solex carburettor showing coolant hose nozzles



9.1B Solex carburettor showing accelerator pump



9.1C Solex carburettor showing choke linkage



9.1D Solex carburettor showing choke unloader

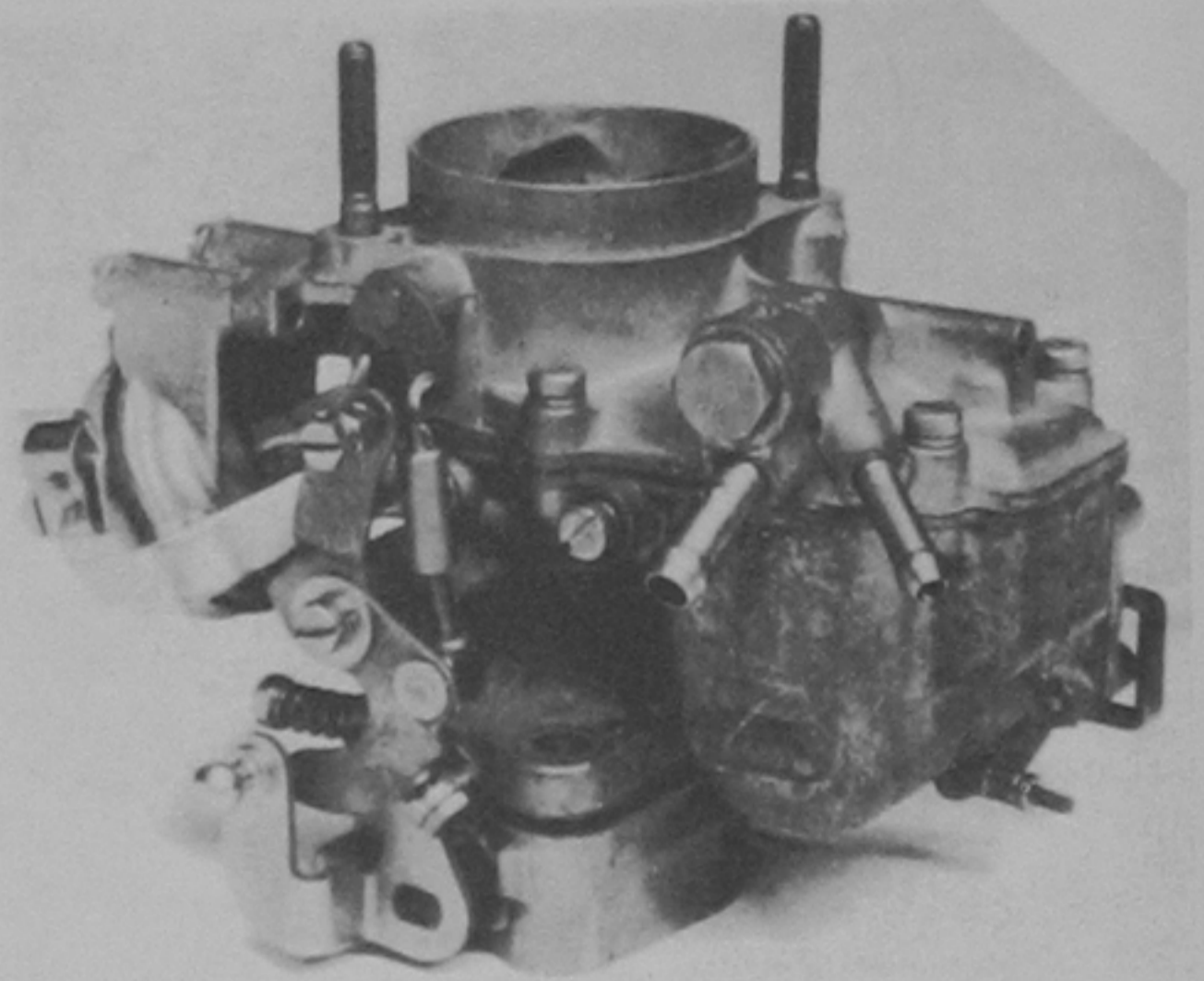
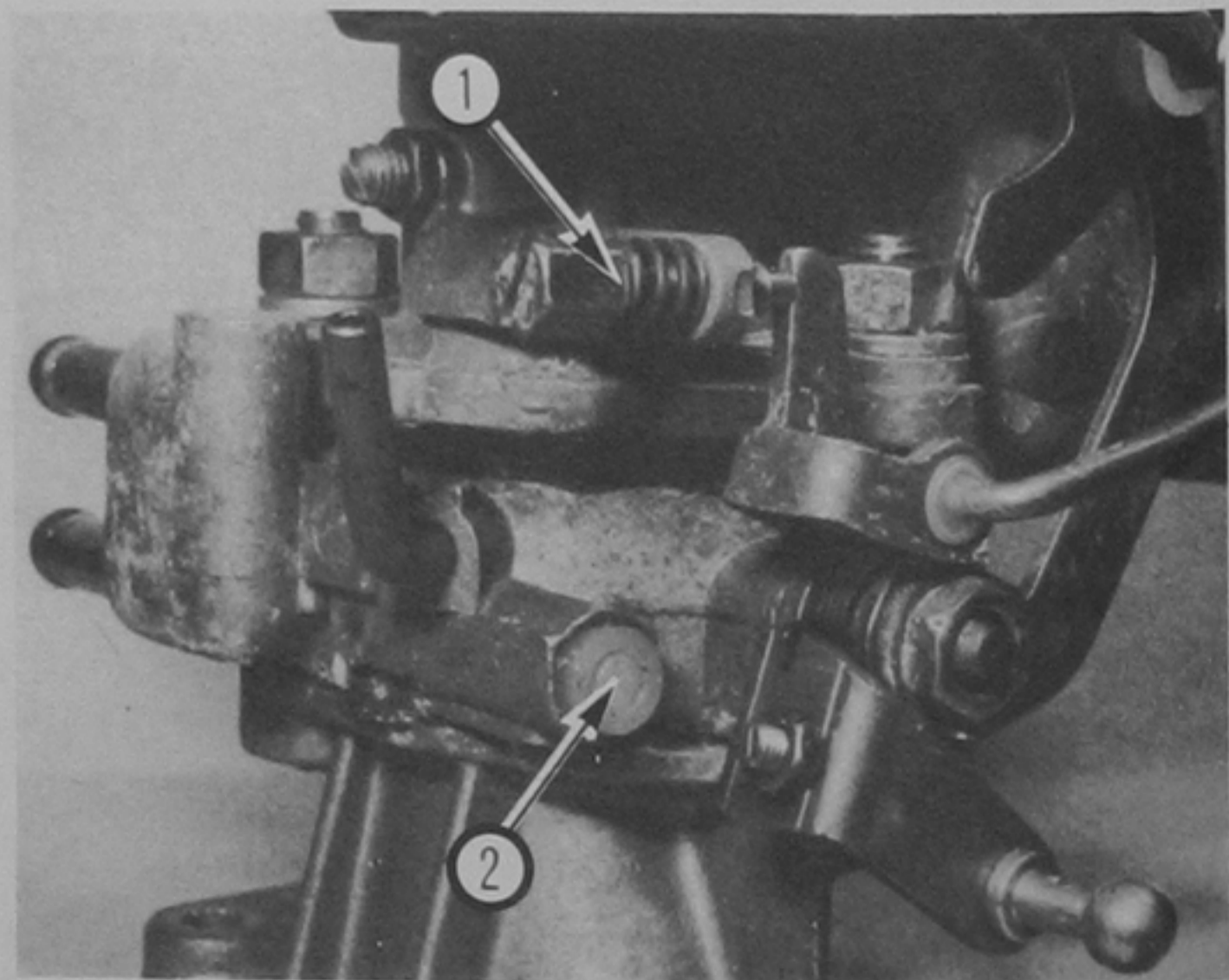


Fig. 3.2 Weber 32 ICEV carburettor (Sec 9)

#### 10 Carburettor – idle speed and mixture adjustment

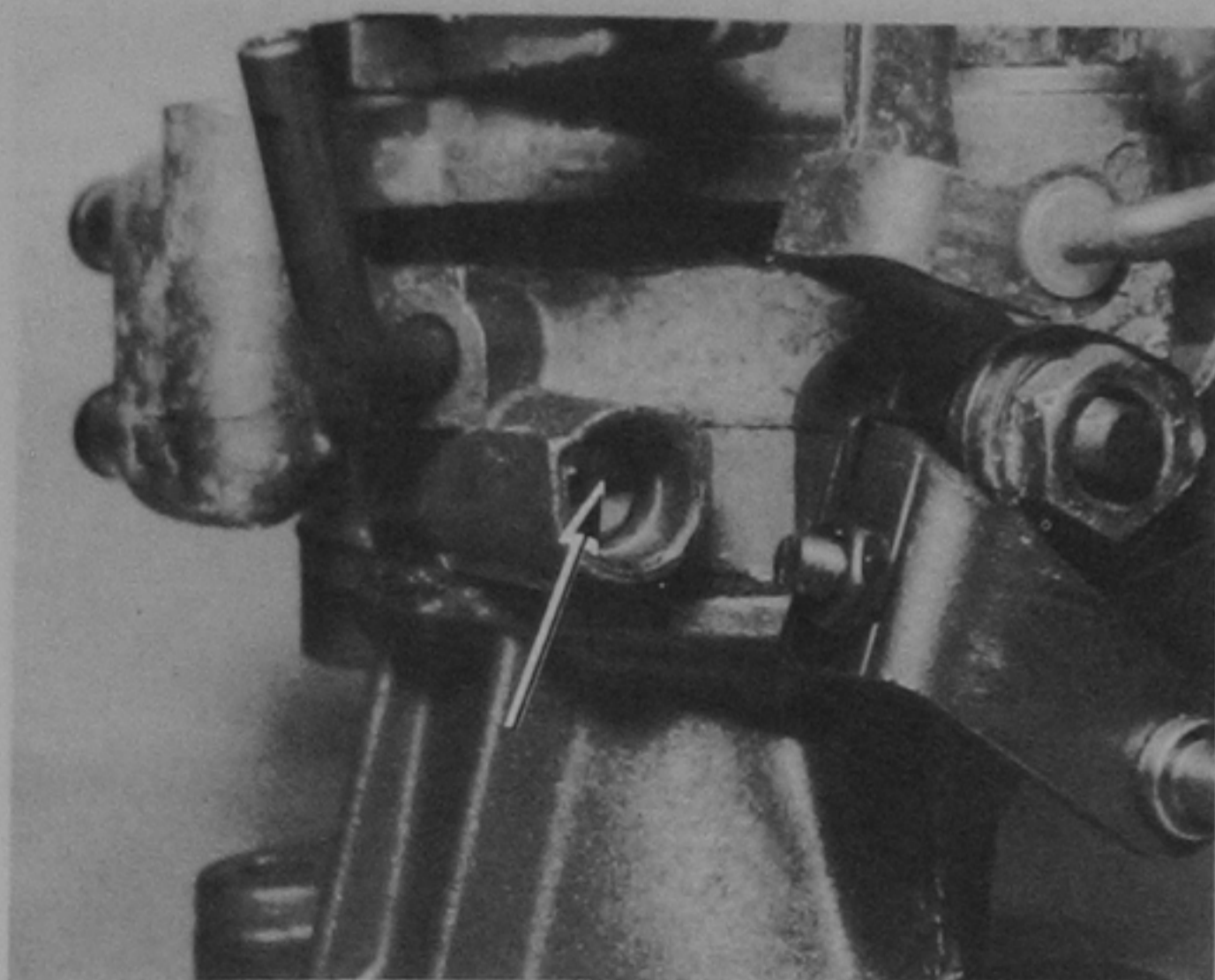
- 1 Under normal circumstances the only adjustment required is to set the idle speed when the engine is at normal operating temperature.
- 2 Turn the throttle speed screw until the engine is running smoothly and evenly.
- 3 If a tachometer can be connected, then set the idle speed to the specified figure.
- 4 If the fuel mixture setting is obviously too rich, this will be indicated by black exhaust and sooty spark plugs. If the fuel mixture is too weak, this will be indicated by a white deposit on the inside of the exhaust pipe and on the spark plug electrodes. There may also be a tendency for the engine to stall. Under these circumstances carry out the following adjustment.
- 5 Remove the tamperproof plug from the lower flange of the carburettor body to expose the mixture screw (photos).
- 6 With the engine at normal operating temperature and idling, turn the mixture screw until the highest idle speed is obtained. Now turn the screw in until the speed just starts to drop. Turn the screw back a fraction if necessary to smooth the running. Obviously, if a tachometer



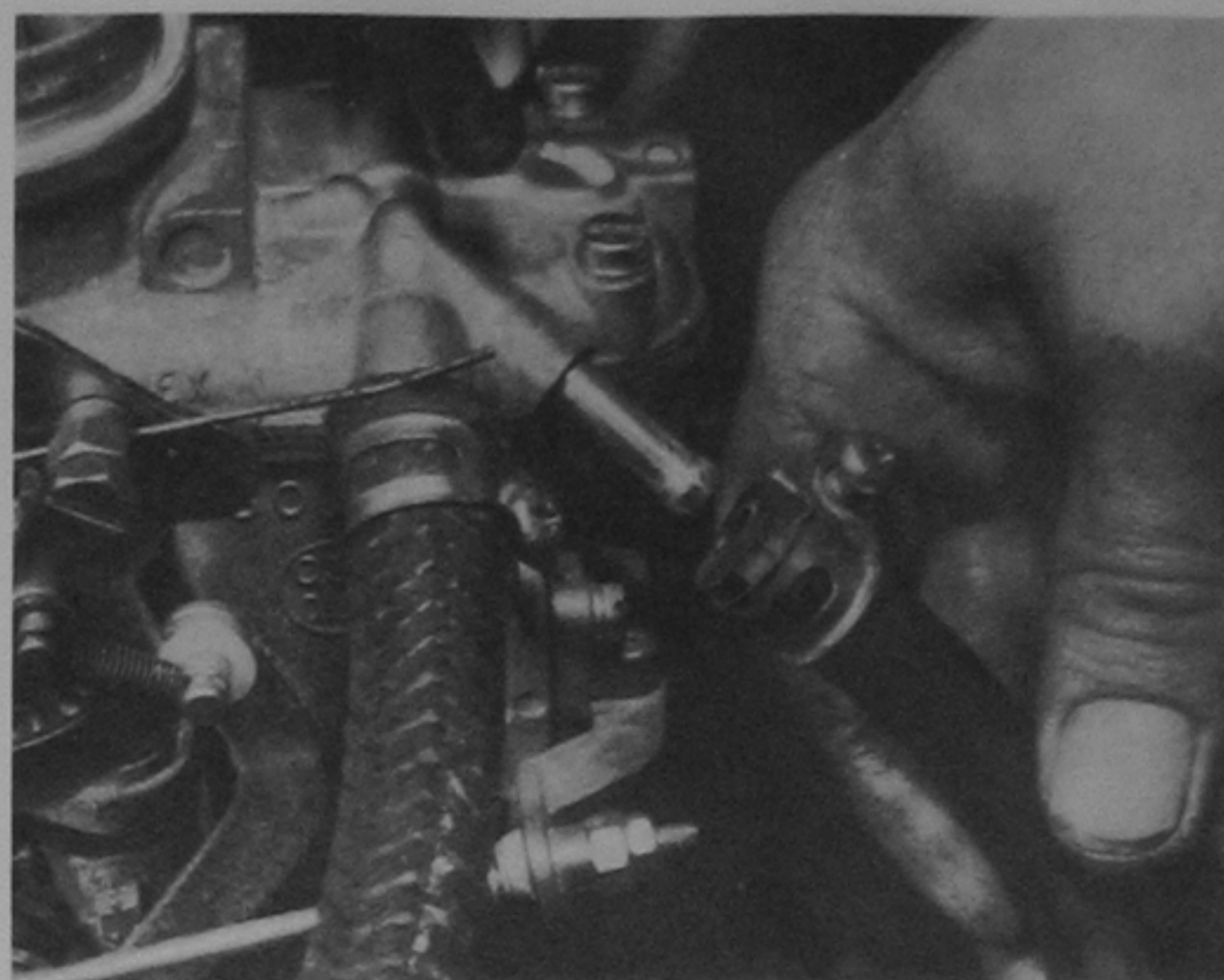
10.5A Solex adjusting screws

1 Idle speed

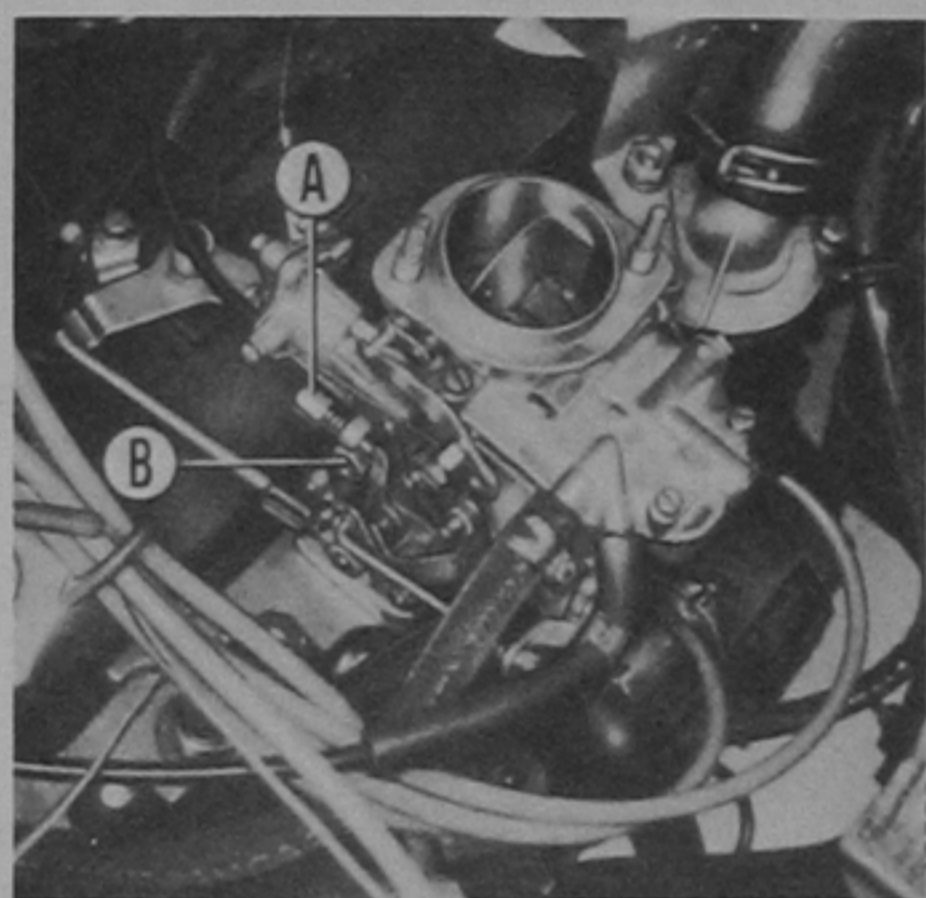
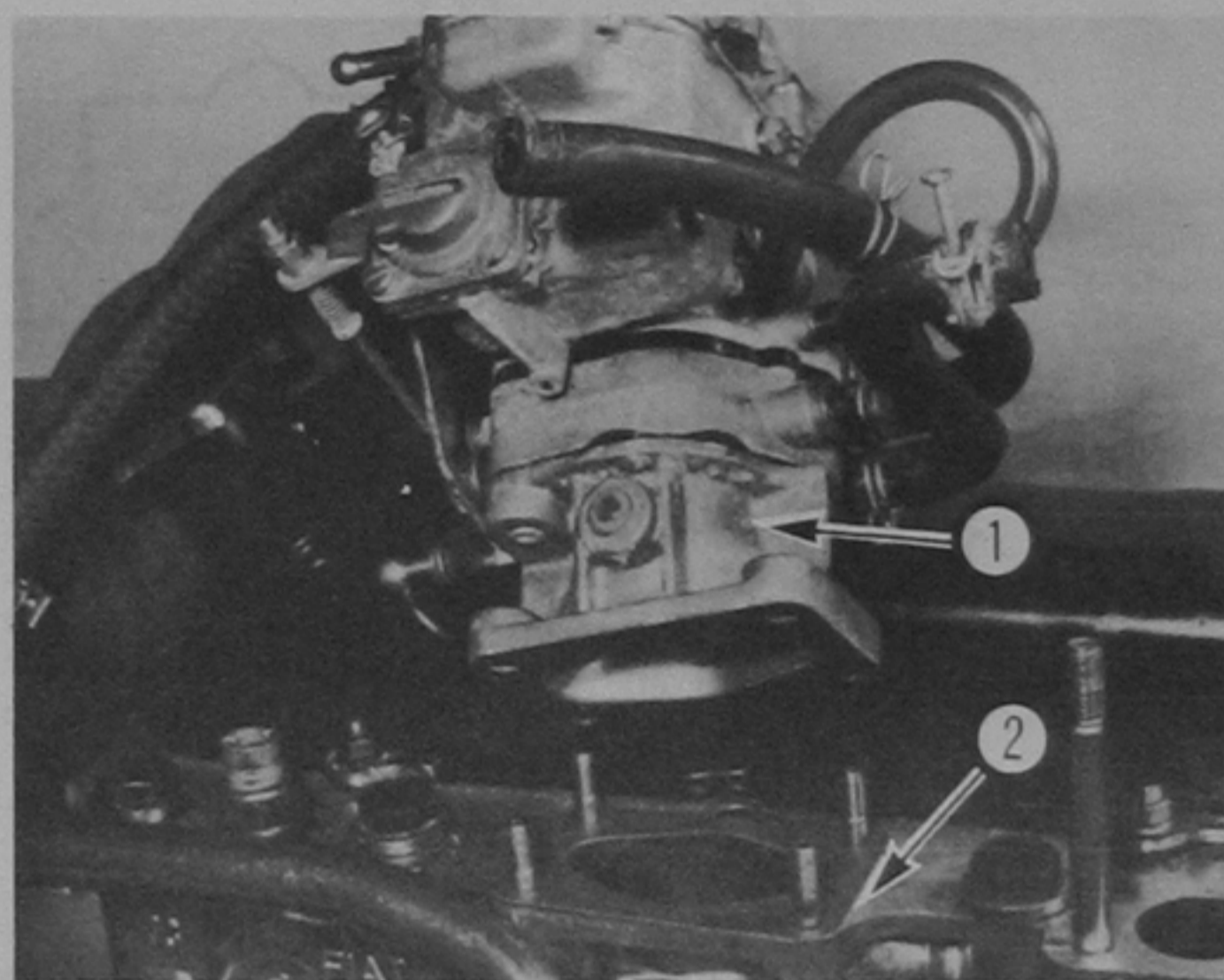
2 Mixture (fitted with tamperproof cap)



10.5B Mixture screw with tamperproof cap removed



11.4 Disconnecting fuel hose from carburettor

Fig. 3.3 Typical idle speed screw (A) and mixture screw (B)  
(Sec 10)11.5 Removing carburettor  
1 Spacer      2 Inlet manifold

is available for connecting to the engine then the points of highest idle speed and drop can be more easily established.

7 If an exhaust gas analyser is available, connect it in accordance with the manufacturer's instructions and adjust the mixture screw until the exhaust gas CO emission level is at the specified level.

8 Finally adjust the idle speed to specified level.

### 11 Carburettor – removal and refitting

- 1 Remove the air cleaner as described in Section 2.
- 2 Disconnect the coolant hoses from the carburettor throttle valve plate block. Tie them up high to avoid coolant loss.
- 3 Disconnect the throttle and choke controls from the carburettor.
- 4 Disconnect the fuel hoses from the carburettor. Identify them in respect of flow and return or they may be confused when reconnecting. Plug the open ends (photo).
- 5 Unscrew the carburettor mounting nuts and lift the unit from the cylinder head (photo).
- 6 Refitting is a reversal of removal. Renew the flange gasket and adjust the choke and throttle controls as described in Sections 13 and 14.

### 12 Carburettor – overhaul

- 1 Overhaul should be limited to the following operations. If more extensive work is required, for example, to renew the valve plate spindles or bushes, then such a generally worn carburettor is best renewed or a good secondhand unit obtained.
- 2 With the carburettor removed and cleaned externally, extract the top cover securing screws and remove the cover.
- 3 As the cover is partially lifted off disconnect the link rod (Weber) or tension spring (Solex) connecting the valve plate levers.
- 4 Mop out the float bowl.
- 5 The various jets and air bleeds may be unscrewed and cleaned by blowing air through them. Never attempt to probe a jet with wire. In extreme conditions of blockage, a nylon bristle may be used.
- 6 Take the opportunity to compare the jets with those listed in the Specifications in case a previous owner has substituted any of incorrect size. The jets are clearly marked, but a magnifying glass will be required to see some of them.

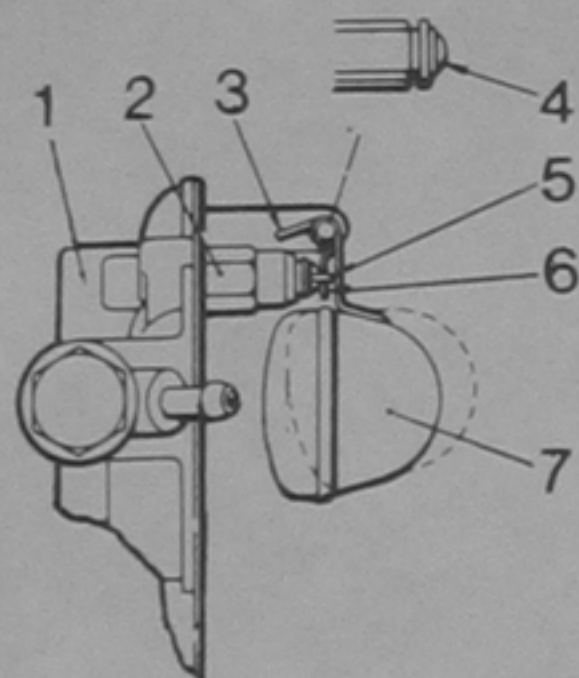


Fig. 3.4 Weber float setting diagram (Sec 12)

- |                           |                    |
|---------------------------|--------------------|
| 1 Carburettor top cover   | 5 Valve hook       |
| 2 Fuel inlet needle valve | 6 Tang             |
| 3 Float stroke stop       | 7 Metal type float |
| 4 Valve ball              |                    |

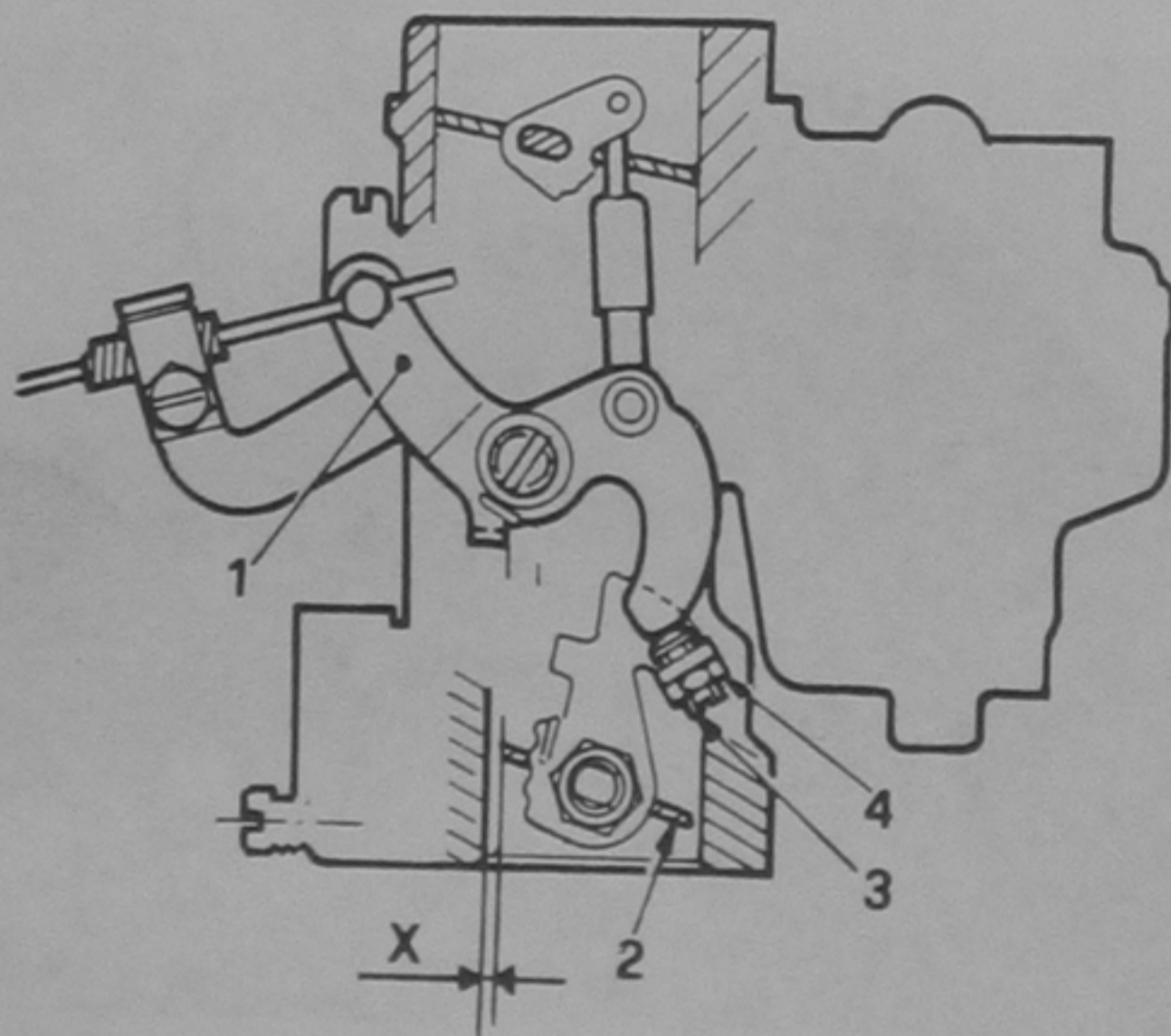


Fig. 3.5 Fast idle adjustment diagram (Sec 12)

- |                        |                            |
|------------------------|----------------------------|
| 1 Control lever        | 4 Locknut                  |
| 2 Throttle valve plate | X Throttle valve plate gap |
| 3 Fast idle screw      |                            |

- 7 Obtain a repair kit for your particular carburettor. This will contain all the necessary gaskets, seals and other renewable items.
- 8 On a carburettor which has been in service for a long time, it will be worthwhile renewing the fuel inlet needle valve. To do this, very carefully tap out the float pivot pin (Weber) or release the spring clip and slide the float from its rod (Solex).
- 9 Withdraw the needle from the valve and then unscrew the valve body. Note the soft metal sealing washer.
- 10 Locate the new sealing washer and screw in the valve body. Tighten firmly but do not overdo it or the threads in the carburettor top cover will strip. On the other hand, if it is not tightened enough, fuel will leak past the sealing washer and bypass the needle and cause the carburettor to flood.
- 11 Refit the float and check the float setting. To do this, hold the top cover vertically on Weber carburettors so that the float arm just contacts the ball of the needle valve. With a flange gasket held in position, measure between the nearest point on the float and the

surface of the gasket. This should be between 10.5 and 11.0 mm (0.41 and 0.43 in). If it requires adjustment, bend the tab which bears on the needle valve.

12 On Solex carburettors, the float setting is checked by inverting the top cover, so that the weight of the float fully depresses the ball of the needle valve. The float-to-flange dimension should be between 2.0 and 3.0 mm (0.079 to 0.118 in). If adjustment is required, do not bend the float, but alter the thickness of the sealing washer used under the fuel inlet valve.

13 Extract the screws from the accelerator pump cover and remove the cover. If the diaphragm is in anything but perfect condition, renew it.

14 The pump stroke can be adjusted if the locknut is released and the adjuster nut turned to give an ejection of between 4 and 5 cc of fuel for every ten strokes of the pump rod. Obviously the fuel bowl will have to be filled and a measuring glass required for this test.

15 Close the choke valve plate by pulling the control lever (1) (Fig. 3.5). The throttle valve plate should be open so that the gap (X) is between 0.75 and 0.80 mm (0.030 and 0.032 in). Measure with a wire of known diameter. If adjustment is required release the locknut (4) and turn the fast idle screw (3) (Fig. 3.5).

16 Once the carburettor is reassembled, refit it to the engine. Starting will take longer than usual unless the float bowl has been filled from an outside supply.

17 With the choke control fully out, start the engine. Check the fast idle speed. If necessary, this can be adjusted to the specified level by releasing the locknut and turning the fast idle screw.

18 Now run the engine to normal operating temperature and check the idle speed and mixture adjustment.

### 13 Accelerator pedal and linkage

1 The accelerator pedal is of pendant type which actuates the carburettor throttle lever using a cable.

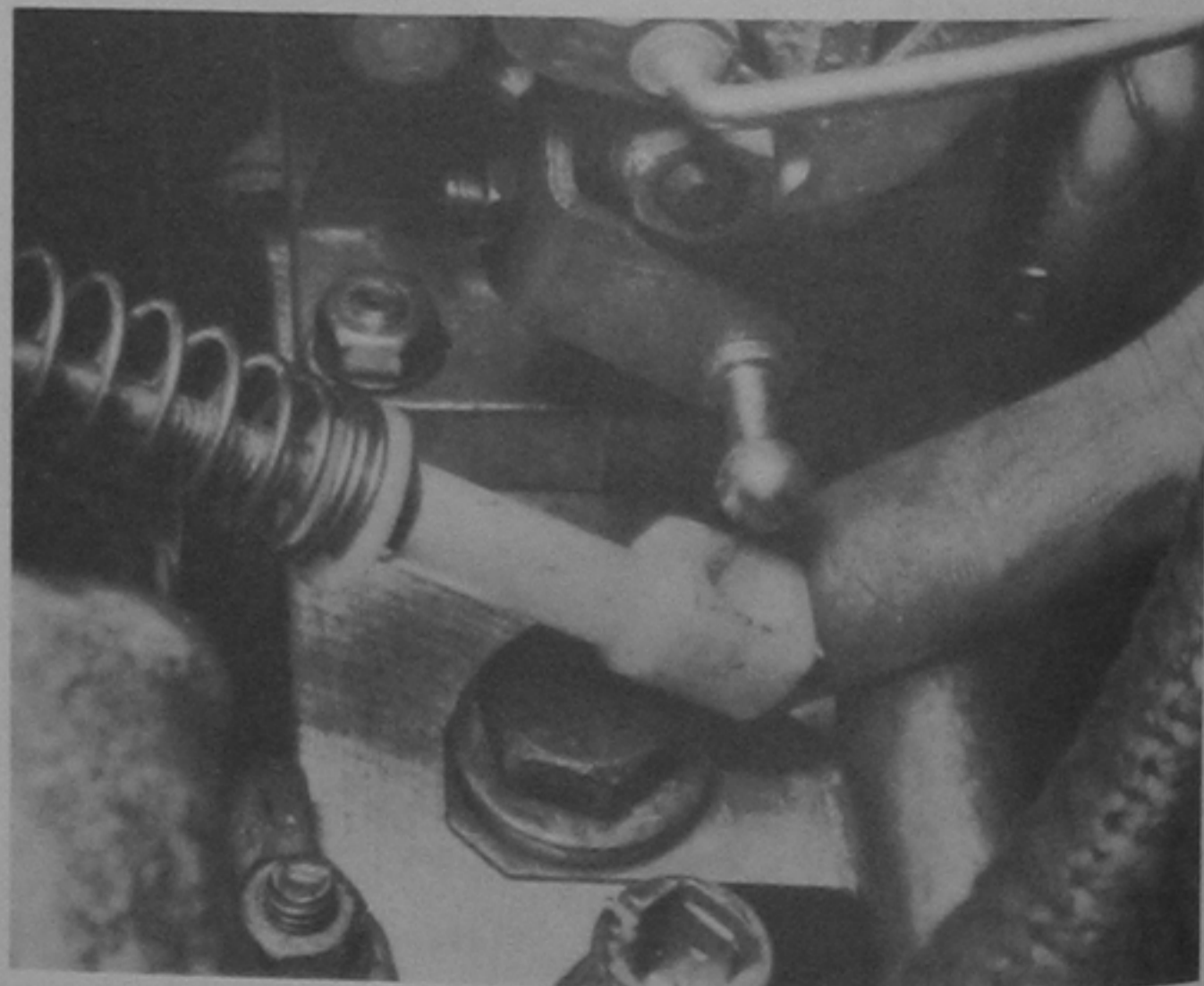
2 The cable should be adjusted by means of the nuts at the end fitting at the carburettor. The adjustment should provide only the slightest amount of free movement. Check that with the accelerator pedal fully depressed, the throttle lever is fully back against its stop on the carburettor (valve plates fully open).

3 To remove the accelerator cable, fully release the cable adjustment and disconnect the cable from the throttle quadrant at the carburettor, a ball and socket type connector is used (photos).

4 Working under the instrument panel inside the car, unhook the cable from the fork at the top of the pedal arm (photo).

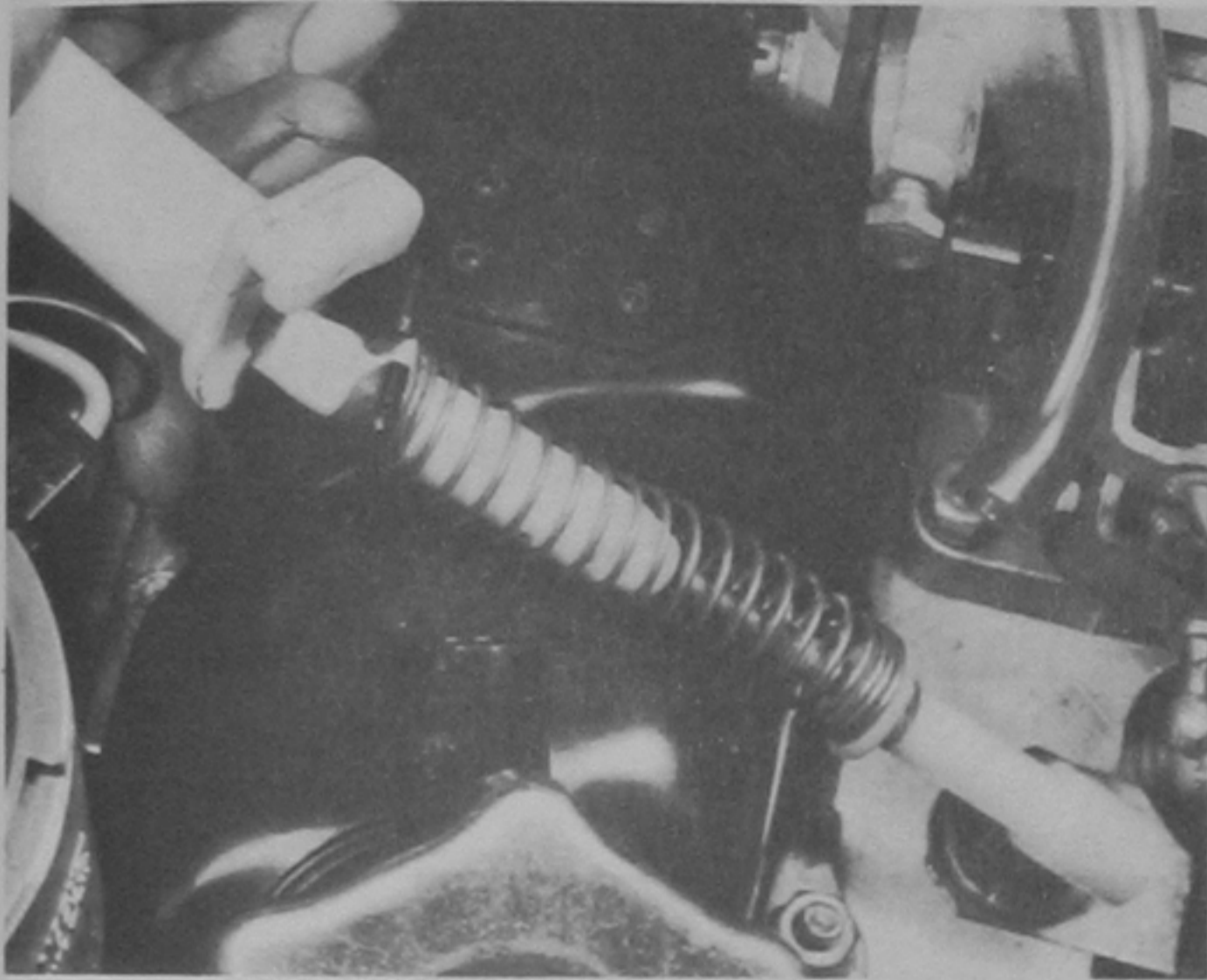
5 Release the bulkhead grommet and withdraw the cable.

6 Fitting the new cable is a reversal of removal. Adjust as described earlier in this Section.

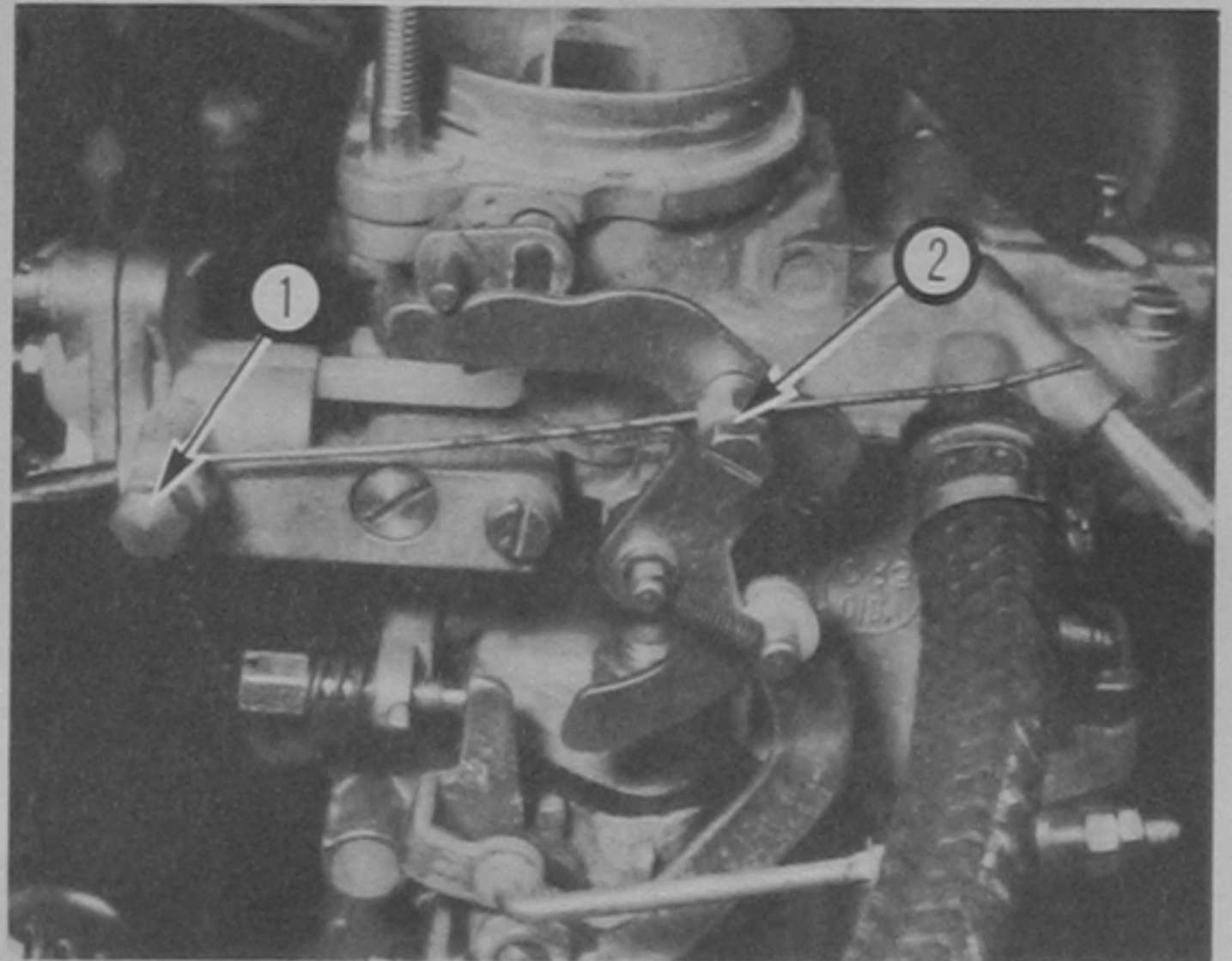


13.3A Throttle cable end fitting



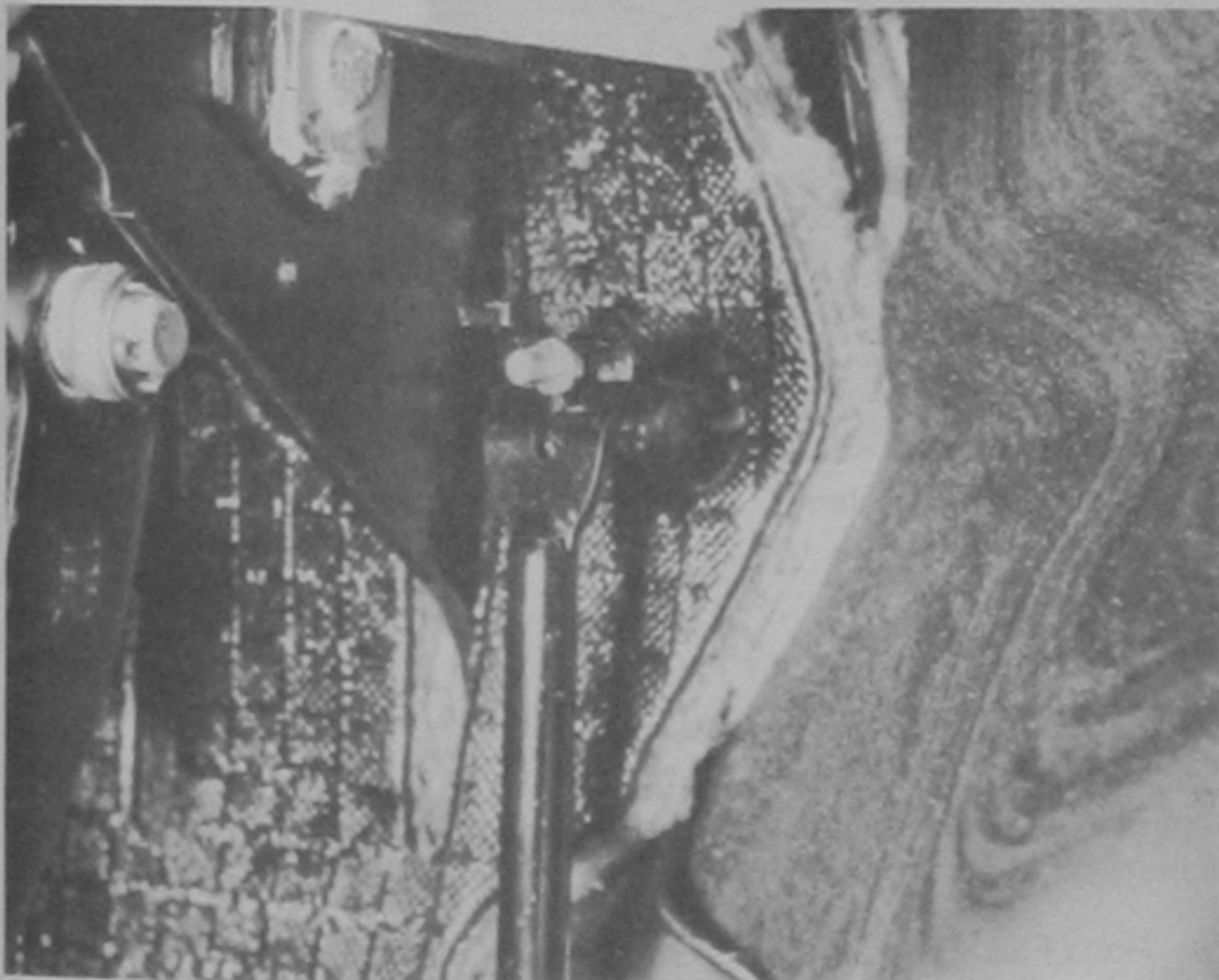


13.3B Throttle cable bracket clip



14.1 Choke cable at carburettor

1 Outer cable clamp 2 Inner cable trunnion swivel



13.4 Accelerator pedal and cable end fitting

#### 14 Choke control cable – adjustment and renewal

1 The choke cable is attached to the choke butterfly valve lever by means of a swivel trunnion. The outer conduit is clamped to a bracket (photo).

2 To set the cable correctly, release the pinch-bolt on the trunnion at the carburettor and make sure that the choke valve plate (strangler) is in the fully open position. Push the choke control fully in and then withdraw it about 3.0 or 4.0 mm. Tighten the trunnion pinch-bolt. This method of setting will ensure that with the control pushed fully in, the choke valve plate is fully open.

3 To renew the inner cable, release it from the carburettor and withdraw it into the car. Smear the new cable with grease before sliding it into the conduit.

4 The conduit can be removed if it is unclamped from the carburettor and released from the fascia (claw type fitting).

5 Withdraw it through the bulkhead after releasing the sealing grommet.

#### 15 Manifolds and exhaust system

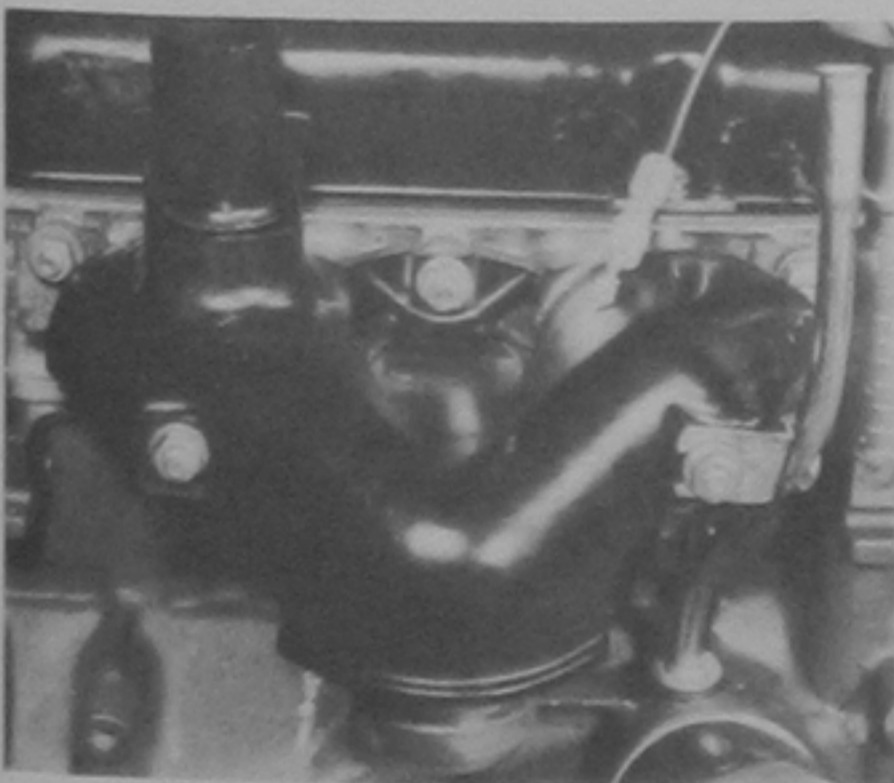
1 The intake manifold is integral with the cylinder head, with a spacer fitted between the head and the carburettor.

2 Always use a new gasket on each side of the spacer.

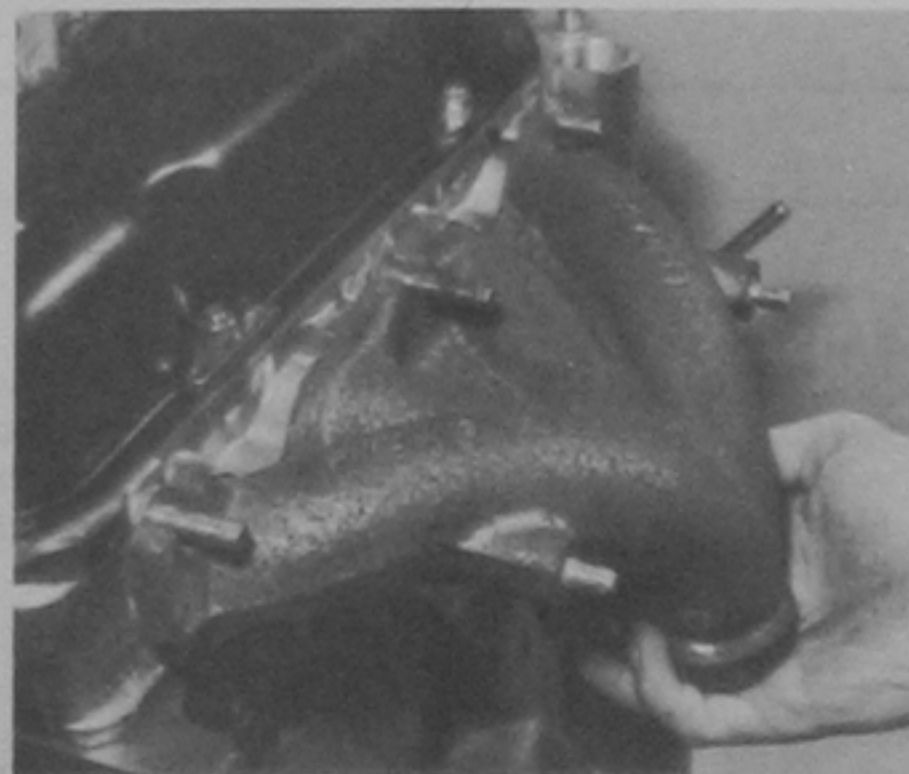
3 The exhaust manifold is bolted to the side of the cylinder head and has a hot air collector attached to it from where the air cleaner draws air for the carburettor during low temperature operation (photos).

4 Always use a new gasket when fitting the exhaust manifold (photo).

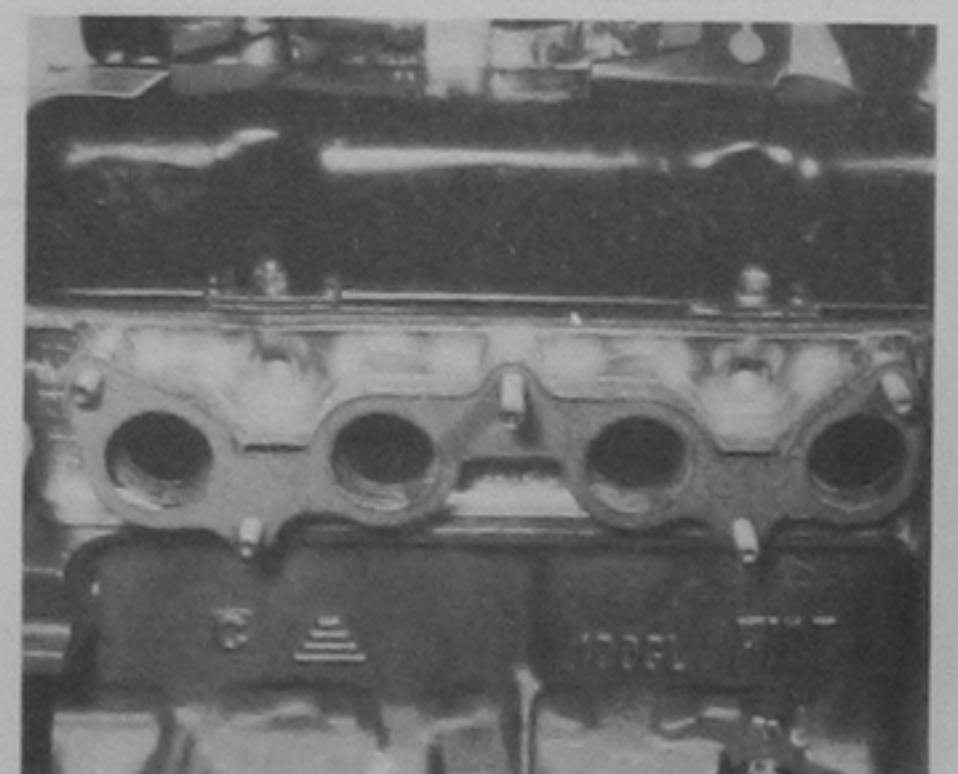
5 The exhaust system is in separate sections incorporating front pipe and silencer assemblies.



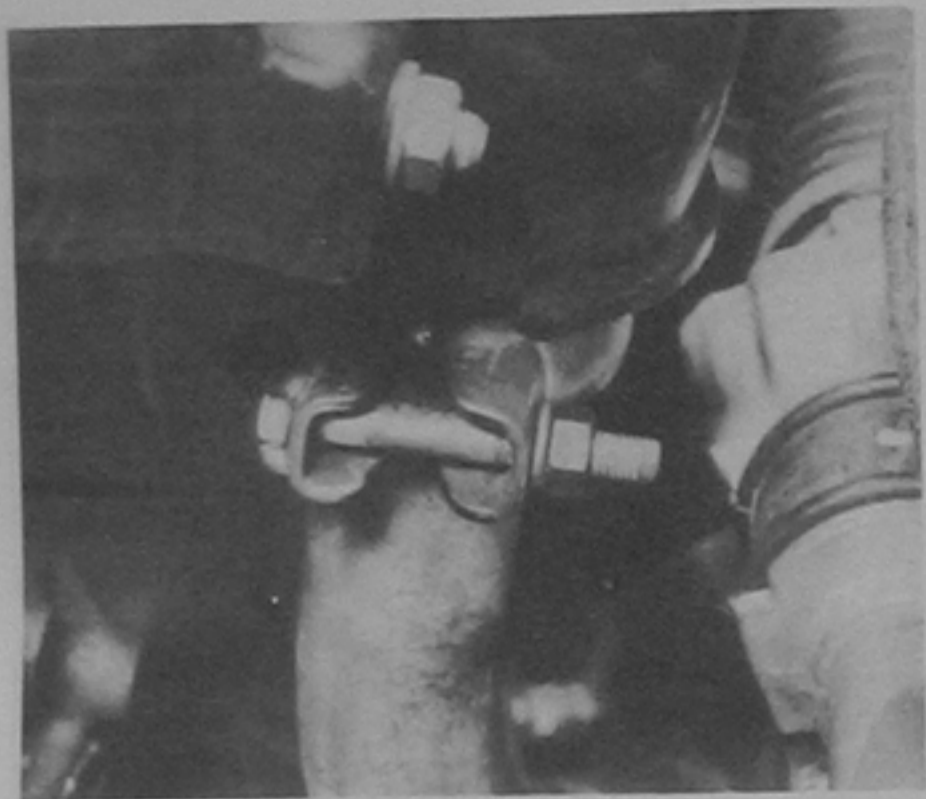
15.3A Exhaust manifold hot air collector



15.3B Exhaust manifold



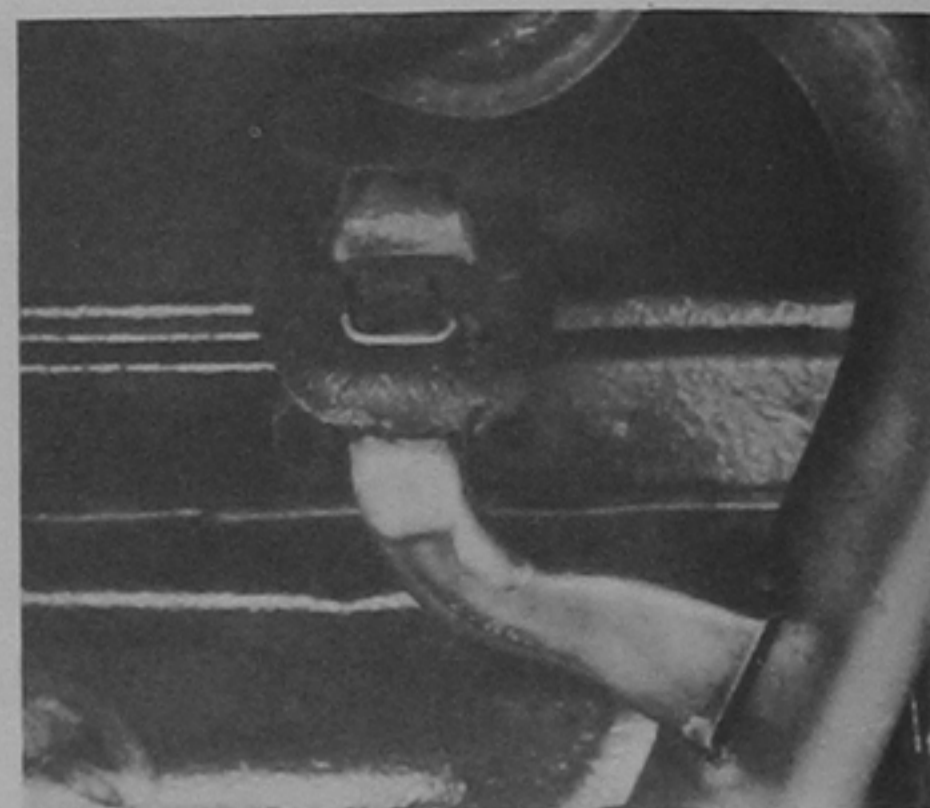
15.4 Exhaust manifold gasket



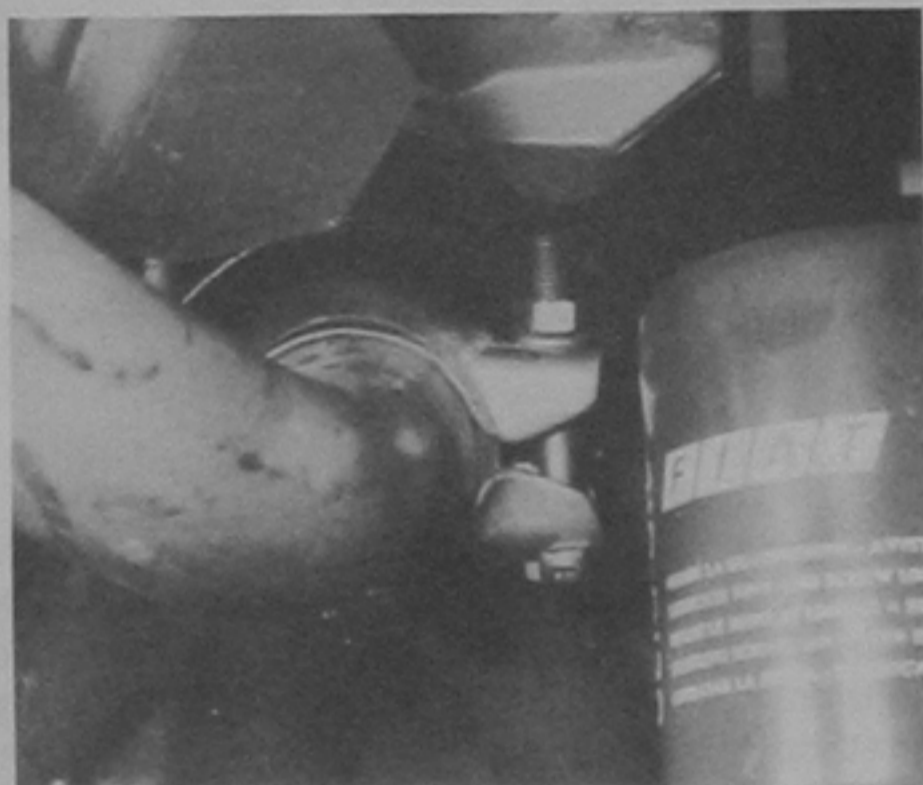
15.6A Exhaust downpipe connection from side



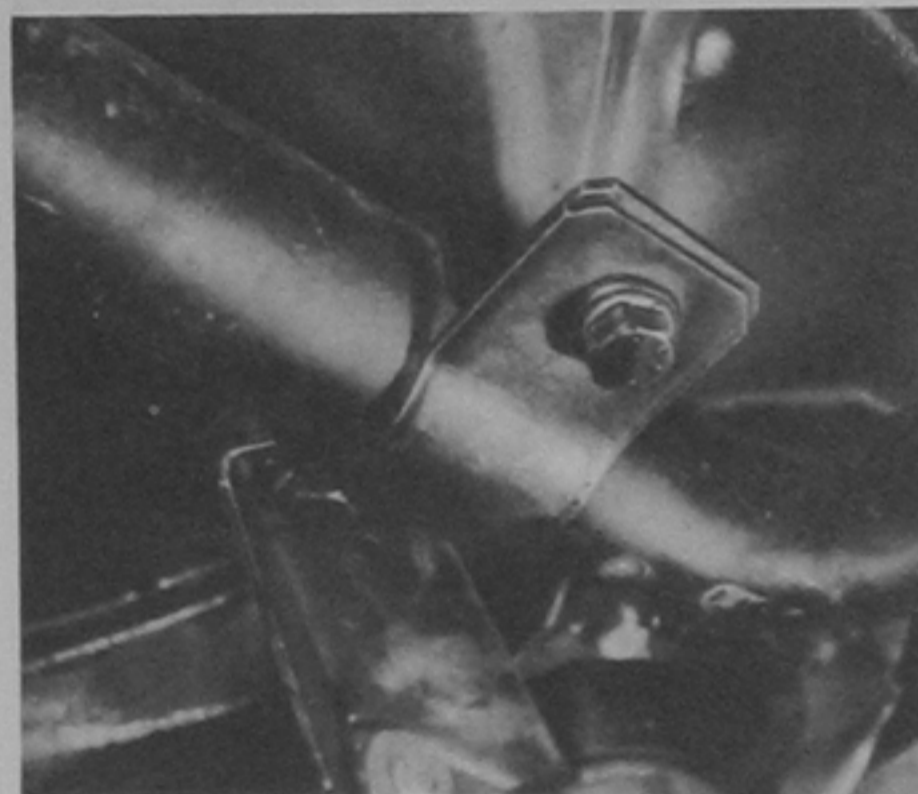
15.6B Exhaust flexible mounting



15.6C Exhaust flexible mounting



15.7A Exhaust downpipe clamp from underneath



15.7B Exhaust pipe clamp

6 If only one section of the system requires renewal, it is recommended that the complete exhaust is withdrawn from under the car to make separation easier. Do this by disconnecting the downpipe from the manifold and releasing the flexible mountings (photos).

7 When reassembling the system, do not tighten the clamps until the exhaust has been attached to the car. Once the pipe and silencer have been correctly aligned and they are not likely to knock against

any adjacent suspension or body components, fully tighten the clamps (photos).

8 Holts Flexiwrap and Holts Gun Gum exhaust repair systems can be used for effective repairs to exhaust pipes and silencer boxes, including ends and bends. Holts Flexiwrap is an MOT approved permanent exhaust repair.

## 16 Fault diagnosis – fuel system

*Unsatisfactory engine performance and excessive fuel consumption are not necessarily the fault of the fuel system or carburettor. In fact they more commonly occur as a result of ignition and timing faults. Before acting on the following it is necessary to check the ignition system first. Even though a fault may lie in the fuel system it will be difficult to trace unless the ignition is correct. The faults below, therefore, assume that this has been attended to first (where appropriate).*

Symptom	Reason(s)
Smell of petrol when engine is stopped	Leaking fuel lines or unions Leaking fuel tank
Smell of petrol when engine is idling	Leaking fuel line unions between pump and carburettor Overflow of fuel from float chamber due to wrong level setting, ineffective needle valve or punctured float
Excessive fuel consumption for reasons not covered by leaks or float chamber faults	Worn jets Over-rich setting Sticking mechanism Dirty air cleaner element Sticking air cleaner thermostatic mechanism

Symptom	Reason(s)
Difficult starting, uneven running, lack of power, cutting out	One or more jets blocked or restricted Float chamber fuel level too low or needle valve sticking Fuel pump not delivering sufficient fuel Faulty solenoid fuel shut-off valve (if fitted) Induction leak
Difficult starting when cold	Choke control incorrectly set Insufficient use of manual choke Weak mixture
Difficult starting when hot	Excessive use of manual choke Accelerator pedal pumped before starting Vapour lock (especially in hot weather or at high altitude) Rich mixture
Engine does not respond properly to throttle	Faulty accelerator pump Blocked jet(s) Slack in accelerator cable
Engine idle speed drops when hot	Defective temperature compensator Overheated fuel pump
Engine runs on	Faulty fuel cut-off valve