D. Idle System

The idle system is incorporated in Stage 1 only of the carburetor (Fig. M 31 S/012). Stage 2 has no idle system. The appropriate bores are made in the housing but are closed with grub screws.

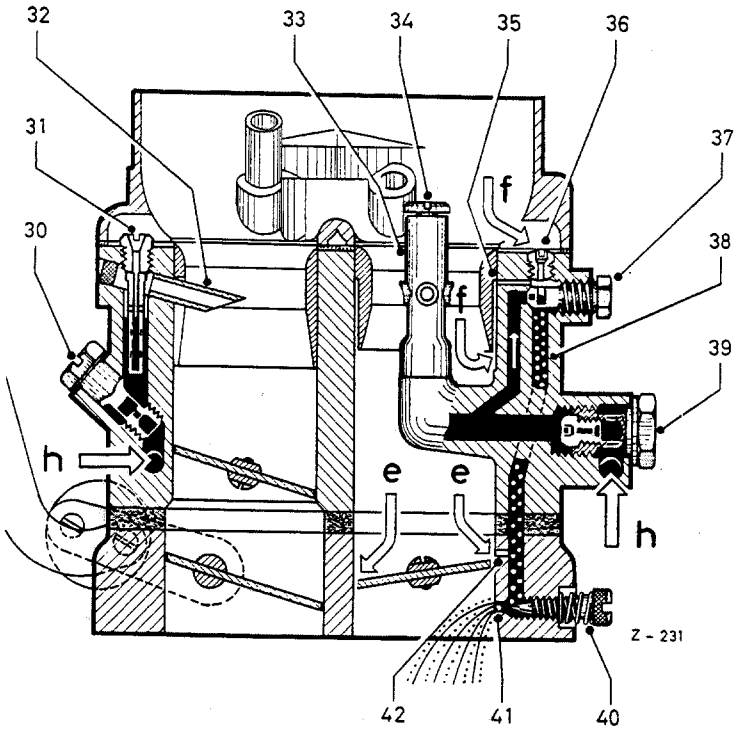

Fig. M 31 S/012

Idle — Phase 1

e) Main air supply
f) Entry of idle air
h) Fuel feed
30 Main jet plug with main jet Gg of Stage 2
31 Air correction jet a with mixing tube of Stage 2
32 Exhaust tube of Stage 2
33 Mixing tube holder with mixing tube of Stage 1
34 Air correction jet a Stage 1
35 Idle air canal
36 Idle air jet u
37 Idle fuel jet g
38 Idle canal
39 Main jet plug with main jet Gg of Stage 1
40 Idle mixture adjustment screw
41 Idle mixture bore
42 By-pass bores

a) **Idle — Phase 1.**

The idle air supply is not only drawn in via the idle air jet (36) but also via the air canal (35) from the mixing chamber below the air horn (vacuum compensation) (Fig. M 31 S/012). The fuel which is drawn in via the idle fuel jet (37) is mixed with the idle air supply, forming a mixture which is then conveyed into the idle canal (38). In the idle position, a further supply of air for the idle mixture enters through the by-pass bores (42) above the throttle valve and this then passes into the suction canal through the idle mixture bore (41) and combines with the air flowing past the throttle valve to form the final idle mixture. The idle mixture bore can be varied in section by the idle mixture adjustment screw (40). The final idle mixture can be attenuated by tightening the idle mixture adjustment screw and enriched by slackening it.

b) **Idle — Phase 2.**

Slight application of the throttle causes the mixture to flow through both by-pass bores. This now ensures a smooth speed build-up (Fig. M 31 S/013).
At the same height as the by-pass bores, but offset to one side, there is a further bore. It leads to the vacuum union on the carburetor flange. The vacuum line to the pneumatic ignition control of the distributor is connected to this vacuum union. As of engine No. 180 924 650 14 20, a further bore, in addition to the vacuum union for the distributor, has been incorporated. This bore leads to the suction canal and is made for connecting a vacuum test gage. It is closed by a grub screw.

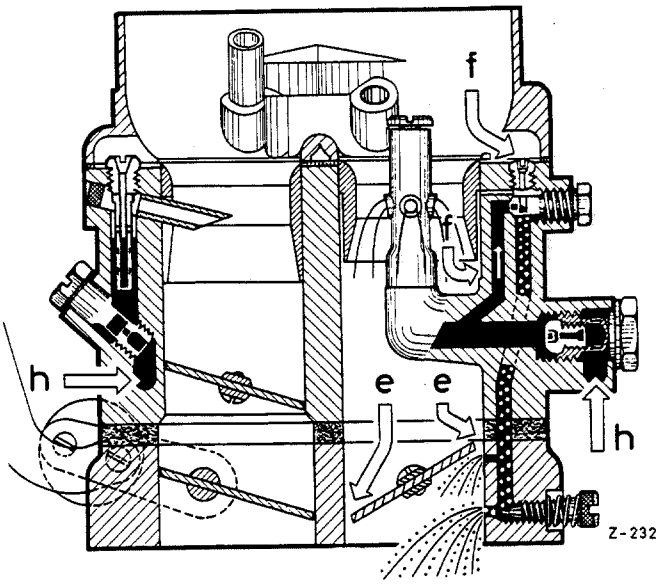

Fig. M 31 S/013

Idle — Phase 2

e) Main air supply
f) Entry of idle air
h) Fuel feed

Normal Running Condition (Main Carburetor System)

a) **Partial load range**

When the throttle is opened still further, the depression (vacuum) moves upward from the throttle valve of Stage 1 and now takes effect at the mixing tube holder, i.e., the carburetor begins to exercise its normal function in Stage 1 (Fig. M 31 S/014). In Stage 1, the down-draft carburetor principle and arrangement of the main carburetor is retained in the form employed hitherto.

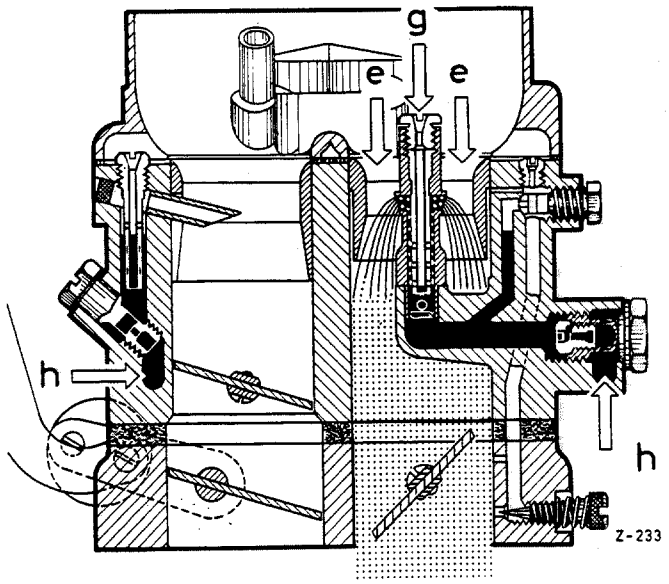

Fig. M 31 S/014

Function in partial load range

e) Entry of main air
g) Entry of compensating air
h) Fuel feed

b) **Full-load range — low engine speed**

In full-load range at low engine speed, the throttles of Stage 1 and 2 are open when full acceleration is applied. But the slight depression is still insufficient to open the vacuum valve of Stage 2. At first, the fuel mixture only reaches the engine via Stage 1 (Fig. M 31 S/015).

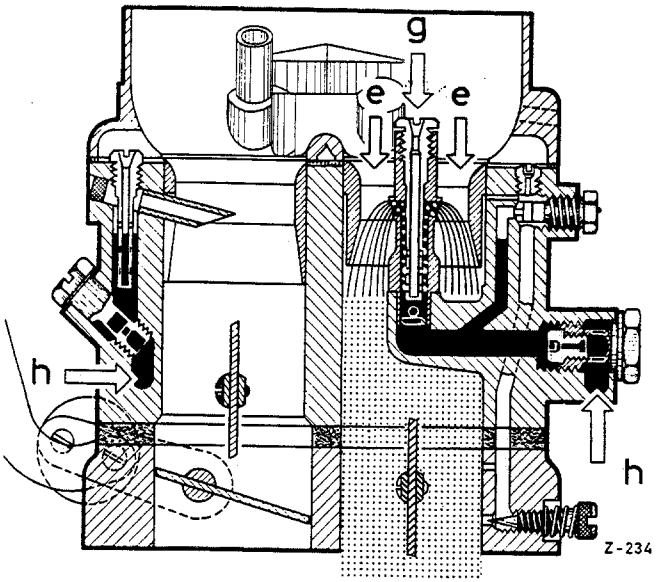

Fig. M 31 S/015

Function in full-load range at low engine speed

e) Main air flow entry
g) Entry of compensating air
h) Fuel feed

c) **Full-load range — high engine speed**

As the engine speed increases in the full-load range, the degree of depression in Stage 2 also increases and in consequence, the vacuum valve opens. Fuel-air mixture is now supplied by both stages (Fig. M 31 S/016). The mixture is supplied from Stage 2 via the main jet (30), the mixing tube with air correction jet (31) and the exhaust tube (32).

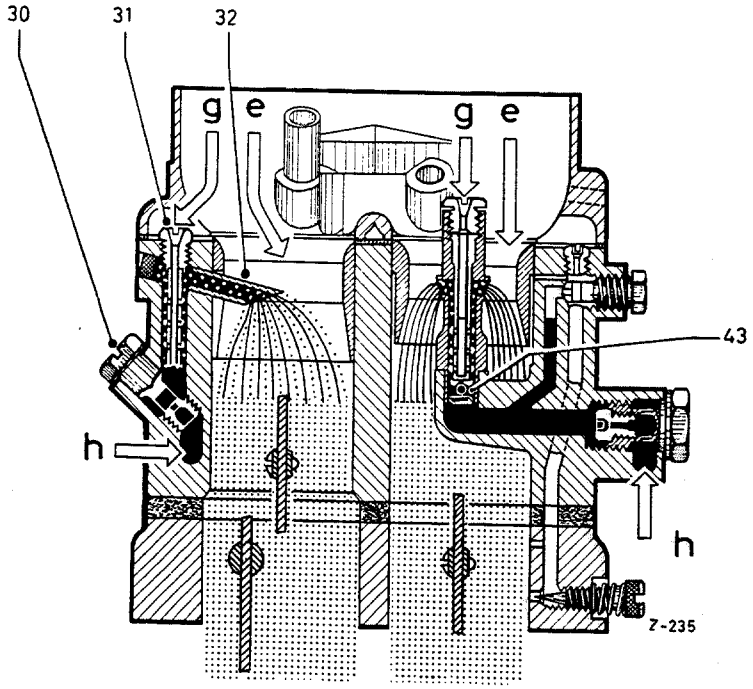

Fig. M 31 S/016

Function in full-load range at high engine speed

e) Main air flow entry
g) Entry of compensating air
h) Fuel feed

30 Main jet plug with main jet Gg of Stage 2
31 Air correction jet a with mixing tube of Stage 2
32 Exhaust tube of Stage 2
43 Ball valve (polyamide ball)

d) **Ball valve in mixing tube holder**

An additional ball valve (polyamide ball) has been incorporated in the mixing tube holder of Stage 1. This ball valve (43) is designed to prevent the engine from stalling even when the brakes are applied suddenly (see Fig. M 31 S/016). When the vehicle is in motion, the polyamide ball is raised from its seat by the fuel emerging. If the accelerator is released, the throttle of Stage 1 closes and the polyamide ball falls back onto its seat because there is no longer any depression at the mixing tube holder. The polyamide ball now prevents air from penetrating into the idle system when the brakes are suddenly applied. This therefore prevents the engine from stalling, as it otherwise would because the fuel flows back into the float chamber at the front by virtue of the inertia.

E. Accelerating Pump

The accelerating pump used is a so-called "neutral" pump, i. e., the engine can draw in fuel via the injection tube according to the degree of depression prevailing in the intake manifold. The accelerating pump (Fig. M 31 S/017) is a mechanically-operated diaphragm pum which is connected to the throttle of Stage 1 by means of an adjustable lever-linkage. When the accelerator is depressed, the diaphragm pump sprays extra fuel into the mixing chamber of Stage 1. By virtue of this additional injection, a smooth speed build-up and good acceleration is achieved. When the accelerator is depressed, the pump arm (49) is moved by means of the connecting rod (51). The pump arm in turn presses on the diaphragm (48) and in consequence, the fuel which is in front of the diaphragm is injected via the plate valve (47), the pump jet (45), the ball valve (44) and the injection tube (43) into the mixing chamber of Stage 1. The aperture of the injection tube takes the form of a precision bore of 0.8 mm ϕ.

During the injection, the ball valve (50), operating as a check valve, is closed. When the accelerator pedal is released, the diaphragm spring (46) presses the diaphragm back. The ball valve (44) now closes (operating as a check valve) and fresh fuel is drawn up from the float chamber via the ball valve (50).

Extra fuel can be drawn in without operating the accelerating pump in proportion to the degree of depression obtaining in the inlet manifold above the air horn, it flows via the drilled plate valve (47).