Carburetor for Type 220

In Type 220, a carburetor of make Solex, Type 30 PAAI, is used. The carburetor is of the so-called dual downdraft type, that is two separate carburetors are accommodated in one housing. Both suction passages have an inner diameter of 30 mm (1.18"), one idle system and one main carburetion system each. However, the acceleration pump and starting system act on both suction passages.

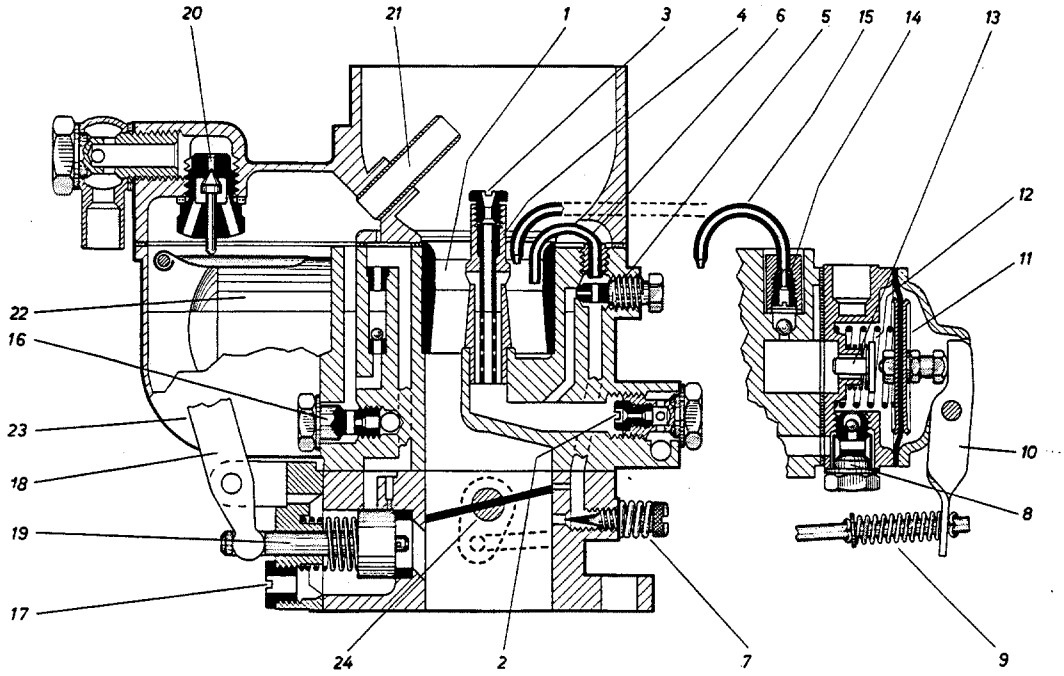

Fig. M 31/01

1 Venturi "K"
2 Main jet "Gg" in main jet carrier
3 Air compensating jet "a"
4 Mixing tube carrier with mixing tube "s"
5 Idle jet "g"
6 Idle suction pipe
7 Idle mixture adjusting screw
8 Nonreturn valve
9 Tie rod with spring
10 Pump lever
11 Pump diaphragm
12 Diaphragm spring
13 Pump valve
14 Fuel jet with injection pipe
15 Injection pipe (low)
16 Starter fuel jet "Gs"
17 Starter air jet "Ga"
18 Starter lever
19 Starter piston
20 Float needle valve
21 Float chamber vent
22 Float
23 Float chamber
24 Throttle valve

In the following the carburetor is described in detail.

Starting System

The piston-controlled two-step starter of the carburetor warrants safe cold starts and proper warming-up of the engine.

When the starting system is cut in (starter knob pulled all the way out), the starter plunger releases two ports, a larger one (1) and a smaller one (2). Fee Fig. M 31/02.

As the throttle valve is nearly closed, the vacuum created when the engine is started acts on the starting system over both ports and draws in fuel. In the starter mixing chamber this fuel forms a bubble mixture (starting emulsion) with the air entering through starter air jet "Ga" (3). The emulsion is mixed with the air drawn in through the throttle valve gap, forming a starting mixture that is so rich it will warrant trouble-free starting at low temperatures.

By pushing the starter knob in, it is possible to cut the starting system out in two steps; i.e. in warming-up position the larger port (1) is closed by displacing the starter piston, so that only the smaller port (2) is free (Fig. M 31/03). In this way the starting emulsion and hence the starting mixture will be made leaner.

In end position the starter piston closes both ports (Fig. M 31/04). Now the mixture is formed over the main jet or idle jet, resp.

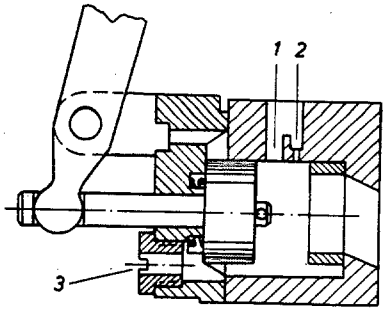

Fig. M 31/02

1 Cold starting port
2 Warming-up port
3 Starter air jet "Ga"

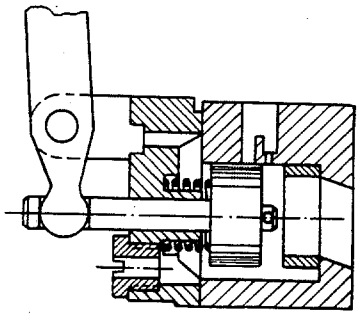

Fig. M 31/03

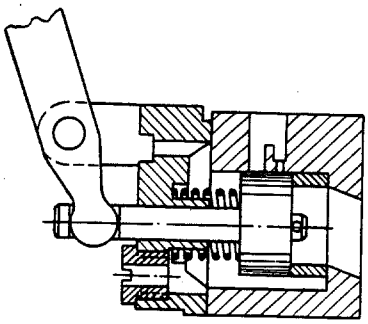

Fig. M 31/04

Idle System

Each of the suction passages has its own idle system, so that the carburetor has two idle suction pipes (1), two idle fuel jets (2), two idle passages (3) and two idle mixture adjusting screws (5).

The task of the idle system is to provide the engine with a fuel-air mixture when it is run without load, that is during "idling". The fuel drawn in through the idle fuel jet "g" (2) is mixed with the idle air. This mixture is directed down the idle passage (3) to the two ports that open into the suction passage near the throttle valve.

In idle position additional air flowing through the by-pass slot (4) (formerly by-pass ports) above the throttle is added to the idle mixture which enters the suction passage through the idle mixture port (6) and mixes with the air flowing past the throttle valve to form the final idle mixture (Fig. M 31/05). The cross-section of the lower of the two ports, the idle mixture port (6), can be altered by means of the idle mixture adjusting screw (5). To make the idle mixture leaner, turn adjusting screw in; to enrich the mixture, turn screw out. If the throttle valve is slightly pitched, mixture will also enter through the by-pass slot to ensure smooth acceleration (Fig. M 31/06).

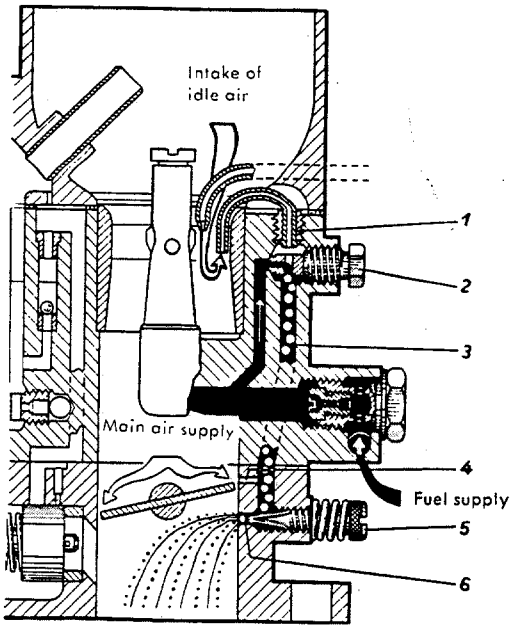

Fig. M 31/05

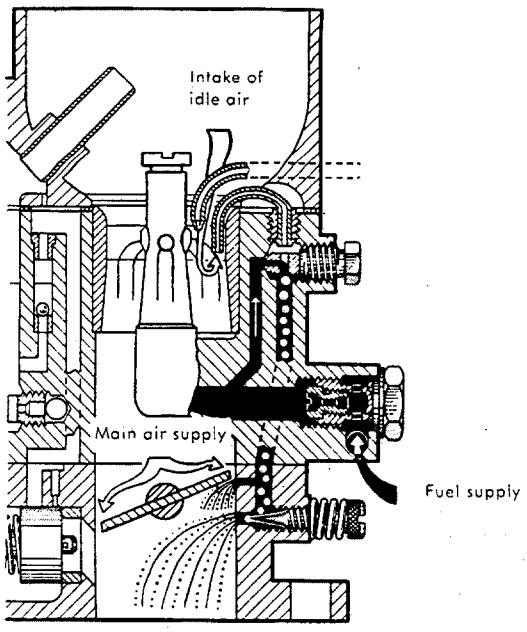

Fig. M 31/06

1 Idle suction pipe
2 Idle fuel jet "g"
3 Idle passage
4 By-pass slot (port)
5 Idle mixture adjusting screw
6 Idle mixture port

In the left-hand suction passage (as seen in direction of travel) a further port is provided beside the by-pass slot. This port leads to the vacuum connection for the pneumatic ignition control (see Fig. M 33/7).

Main Carburetor

The arrangement and operating principle of the main carburetor is that of a conventional downdraft carburetor. The dual downdraft carburetor used comprises two carburetors; i. e. each suction passage represents a carburetor of its own. However, the two suction passages have a common air intake.

Accelerating Pump

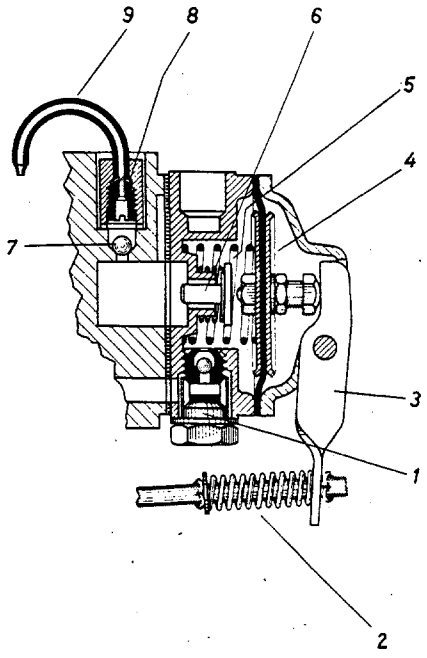

Fig. M 31/07
Old design

1 Lower nonreturn valve
2 Tie rod with spring
3 Pump lever
4 Pump diaphragm
5 Diaphragm spring
6 Plate valve
7 Upper nonreturn valve
8 Fuel jet with injection pipe
9 Injection pipe, calibrated

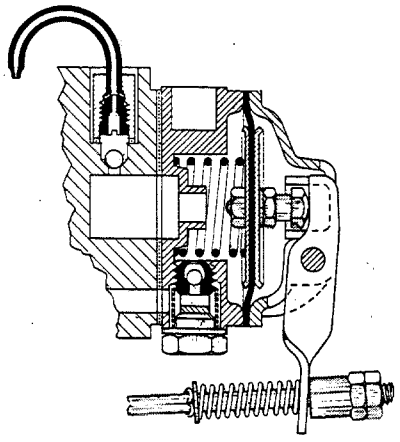

Fig. M 31/08
New design

The accelerating pump is of the mechanical diaphragm type. It is connected with the throttle stem by means of an adjustable linkage. When the accelerator pedal is actuated, the pump injects additional fuel into the mixing chamber through the calibrated injection pipe. In this way the mixture is enriched to ensure that transition and acceleration will be smooth.

In the course of time the Solex 30 PAAI carburetor has been further improved. The old accelerating pump No. 94 (starving pump with plate valve, Fig. M 31/07) was replaced by accelerating pump No. 92 (neutral pump without plate valve, Fig. M 31/08), the injection pipes were calibrated and the connecting linkage was made adjustable to achieve dosing of the injection volume.

When the gas pedal is actuated, pump lever (3) is moved over the tie rod (2). The pump lever presses against the diaphragm (4), whereby the fuel beforethe diaphragm is injected into the mixing chamber over plate valve (6) (old design), upper nonreturn valve (7) and calibrated injection pipe (9). The injection pipe opening is calibrated to a diameter of 0.5 mm (0.02″). During injection the lower nonreturn valve (1) is closed. When the accelerator pedal is released, the diaphragm spring (5) presses the diaphragm back. The upper nonreturn valve closes, thus preventing that air from the mixing chambers will penetrate into the pump system over the injection pipes. New fuel is drawn from the float chamber over the lower nonreturn valve (1).

The additional quantity of injected fuel is solely determined by the pump stroke, which can be altered by turning the nuts on the tie rod in or out. To increase the pump stroke and thus the injection volume, turn the nuts in; to reduce the stroke, turn them out.

An alteration of the fuel jet in the injection pipe does not alter the injection volume, but merely the duration of injection.

Partial and Full Load Control

An additional task of the accelerating pump is the partial and full load control which permits to draw in additional fuel over the injection pipes according to the vacuum prevailing in the mixing chamber without the diaphragm being actuated.

In the case of the accelerating pump No. 94 (old design), this is only done in the partial load range, as the plate valve is still opened. During transition into the full-load range the valve plate closes, so that the vacuum can no longer draw fuel from the pump space (starving pump).

In the accelerating pump No. 92 (new design) the plate valve is omitted and the fuel is drawn from the pump chamber over the injection pipes relative to the prevailing vacuum and in all ranges, but mainly in the upper ones.