Fast-running engines need carburetors of large section. This large section has, however, the disadvantage that at low engine speed the air flows through the carburetor at relatively low velocity, which results in relatively poor carburetion. This poor carburetion makes the engine sluggish at low engine speed and results in poor speed build-up. The compound carburetor has none of these disadvantages. In principle, it consists of two coupled carburetors, the so-called stages. At low engine speed, only Stage 1 is in operation. The small section of the air horn and suction tube results in perfect carburetion even at low engine speeds. When, at intermediate and high engine speeds, the engine demands more air and mixture, Stage 2 is brought into operation. Thus the required large section of the carburetor is available to the full extent.

B. Arrangement and Function of the Throttle Valves

Both stages of the carburetor are combined in one housing (Fig. M 31 S/01). Throttle valve (23) of Stage 1 is located as usual in the lower part of the carburetor, set an angle of 8°. Stage 2, however, has two throttle valves, set an angle of 17°, the one (25) in the center section of the carburetor and the other (26) in the lower section. Throttle valves (23) and (25) of Stages 1 and 2 are coupled together by a linkage. The second throttle valve (26) of Stage 2 is not coupled to the other two. It is operated automatically by the pressure flow. The off-set shaft of the throttle valve is fitted with a lever, bearing a weight (27) (Fig. M 31 S/02).

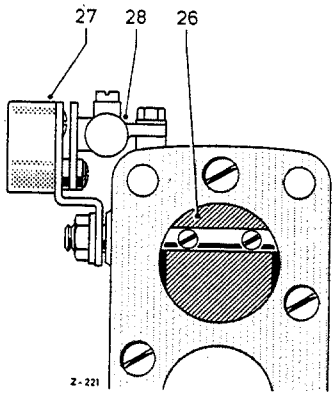

Fig. M 31 S/02

26 Vacuum valve
27 Counterweight with lever
28 Oil shock-absorber

This weight keeps the throttle valve closed under normal conditions. It is only when a certain pressure, coupled with decreased pressure in the body of Stage 2, develops that the effect of the weight is overcome and this throttle valve, the so-called vacuum valve, opens. In order to prevent the vacuum valve from being forcibly opened by the centrifugal effect on narrow left-hand bends, the movement of the vacuum valve is neutralized via the valve lever by an oil shock-absorber (28) (see Fig. M 31 S/02).

In the idle position the two throttles (2) and (3) of Stage 2 are completely closed (Fig. M 31 S/03). When the accelerator pedal is depressed only the throttle valve (1) of Stage 1 opens at first (Fig. M 31 S/04).

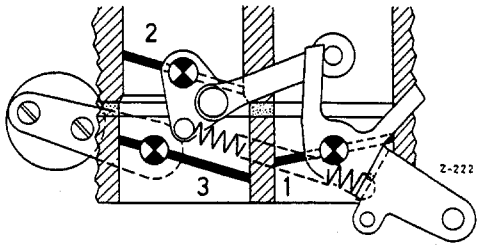

Fig. M 31 S/03

Idle

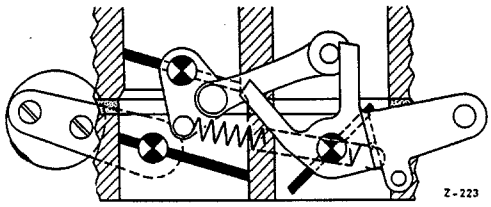

Fig. M 31 S/04

Partial Load

1 Throttle valve of Stage 1
2 Throttle valve of Stage 2
3 Vacuum valve

Only when this valve is rather more than half opened, does throttle valve (2) of Stage 2 begin to open by virtue of the linkage. The vacuum valve (3) is still closed. When the throttle valve of Stage 1 is further opened, the linkage opens the throttle valve of Stage 2 still further (Fig. M 31 S/05). The increasing pressure in Stage 2 now overcomes the effect of the weight on the vacuum valve and opens it until at the corresponding full load speed, all three throttle valves are completely open (Fig. M 31 S/06).

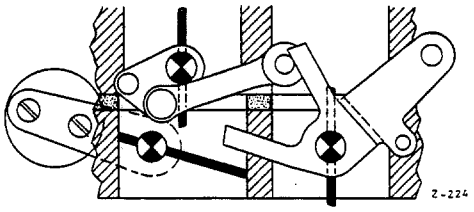

Fig. M 31 S/05

Full load at low engine speed

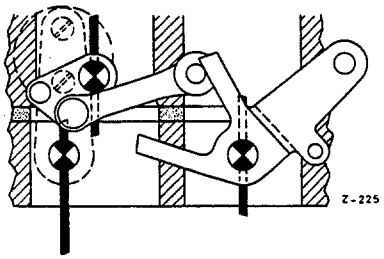

Fig. M 31 S/06

Full load at high engine speed

The special function of the vacuum valve is seen when the accelerator pedal is depressed for acceleration or is depressed through the whole of its travel at low r. p. m. The throttle valves of Stages 1 and 2 are automatically opened via the linkage. But at low engine r. p. m. Stage 2 should still be inoperative at this point. This condition is achieved by the vacuum valve which, by virtue of the weight attached to it, remains closed (see Fig. M 31 S/05). Not until the engine r. p. m. have increased (approx. 2000 r. p. m. at full load) is the effect of the decreased pressure sufficiently great to open the vacuum valve and thus gradually bring Stage 2 into operation.