SECTION INDEX

Group F: Fuel System

DESCRIPTION OF THE FUEL SYSTEM

The fuel system consists of:

1. Fuel tank with fuel cock and fuel filter
2. Fuel lines
3. Mechanically operated fuel pump with additional filter
4. Dual downdraft carburetors with air filter

The fuel tank has a capacity of appr. 13⅔ US gals., appr. 1⅓ of these are reserve (52 ltrs., 5 reserve) and is under the front hood.

The fuel cock, located on the lowest part of the tank, is accessible from the front seat. The fuel cock is directly connected to a filter which prevents dirt, dust and other abrasive particles from entering the fuel lines.

The fuel line is connected with the fuel cock by a short flexible tube and leads through the frame tunnel to the fuel pump.

The fuel pump is mechanically operated by an eccentric on the distributor shaft over a push rod.

Carburetors. Two cylinders each have one common dual downdraft carburetor with accelerating pump.

The air filters or intake silencers resp. clean the intake air from dust and dirt.

DESCRIPTION OF THE DUAL DOWNDRAFT CARBURETOR ZENITH 32 NDIX

General

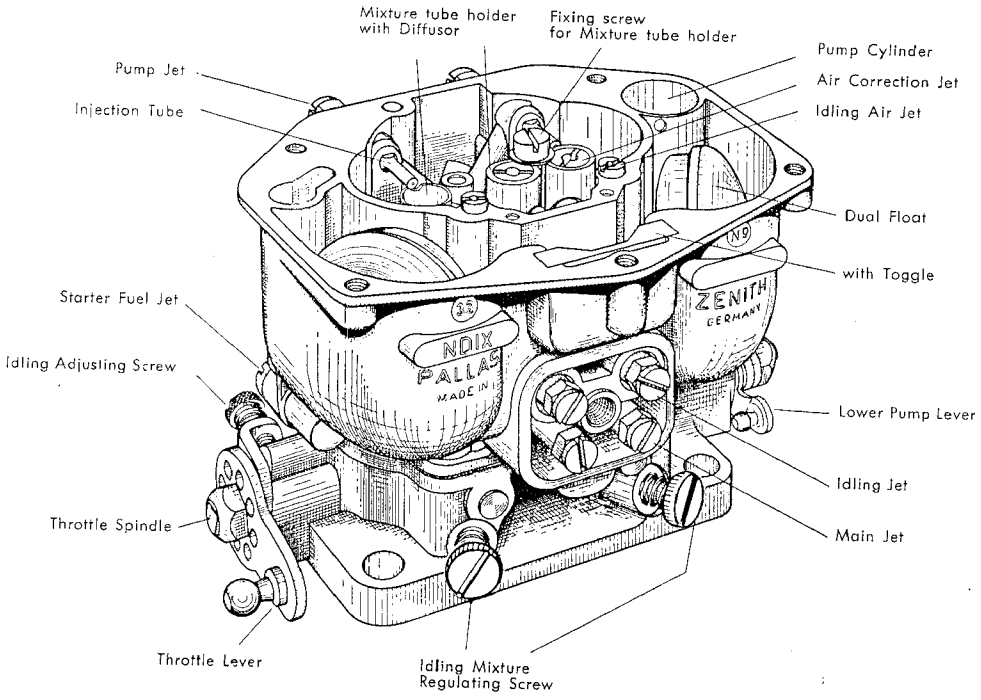
The Dual Downdraft Carburetor Zenith 32 NDIX has two barrels with a 32 mm (1.17") intake. It is provided with a central air intake and encased to make it dust- and water-proof.

Description

The carburetor consists of three main components: Throttle butterfly valve assembly, float chamber and carburetor cover.

The cast iron **throttle valve assembly** is attached with its flange to the intake manifold of the engine. Above the flange across the two barrels is the **throttle shaft** with the two **throttle butterfly valves.** Attached to the ends of the throttle shaft are the throttle lever, a throttle stop and the lower pump lever. The **throttle lever** allows to control the position of the butterfly valves and thus the quantity of the sucked-in fuel air mixture. The idling **adjusting screw** is mounted on the **throttle stop.** The lower **pump lever** actuates the **pump rod** for the accelereator pump. On the throttle assembly there are also two **idling mixture regulating screws.**

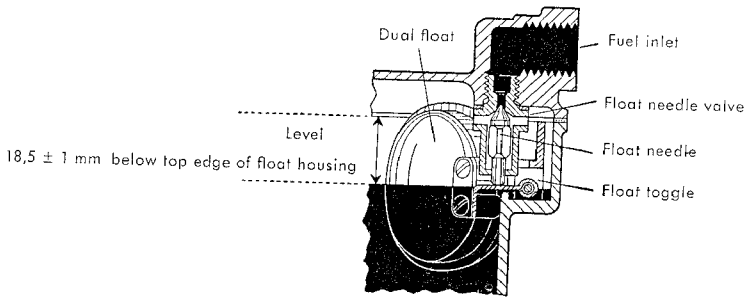
The die-cast **float housing** combines the two mixing chambers and the dual float chamber. It contains all parts necessary for the preparation of the fuel air mixture for normal operation and idling, the float assembly and the accelerator pump. The main body and the throttle body are bolted on to the carburetor housing with the aid of a gasket and need normally not be removed.



Zenith Carburetor Type NDIX – Cover removed

Fig. 1

The **carburetor cover** – also made of die-cast – is mounted on the float chamber with the aid of a gasket and may be removed after loosening five retaining screws to give access to the inside of the carburetor. It is connected to the fuel pipe. The **float needle valve** controlling the fuel supply is screwed to the inside of the carburetor cover. Inside the air intake nipple of the carburetor cover, the vent pipe for the float chamber is situated. The air intake nipple serves to mount the air filter.



Float system

Fig. 2

The **float system** consists of a **dual plastic float** which is mounted in the float housing by means of a float toggle. The float system maintains a constant fuel level in the carburetor. When the fuel has reached the required level, the rising float forces the needle valve on to its seat and shuts off the fuel supply. The dual float chamber and two floats provide the correct quantity of fuel even while the car is inclined („cross-country" type carburetor).

The **central air intake** serves to clean the air for the mixture preparation for all operational conditions of the engine (starting, idling, normal operation) and at the same time ventilates the float chamber. Internal ventilation of the float chamber not only prevents particles of dirt from getting into the carburetor, but it also enables the carburetor to deliver a constant fuel air mixture even if the air filter is clogged, with the result that the fuel consumption is not affected no matter how badly the filter may be clogged.

Idling Circuit

Each barrel of the carburetor is provided with an idling circuit (see fig. 3 and 4) which also acts as a small auxiliary carburetor. The idling mixture is determined by:

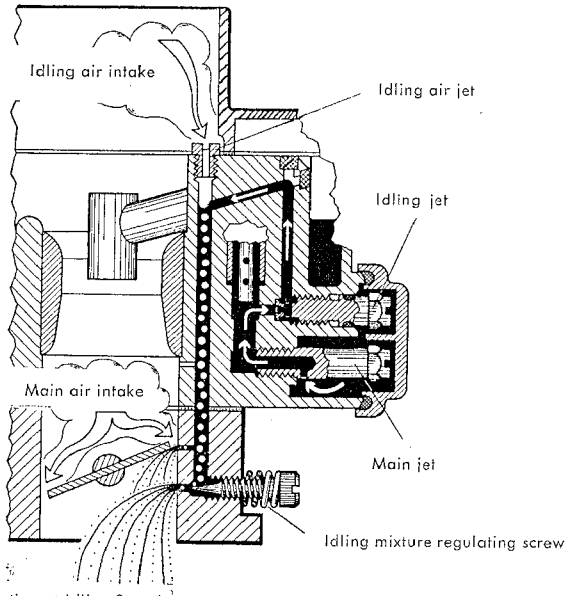
the **idling jet** which meters the quantity of fuel, and

the **idling air jet** which regulates the proportion of air for the preparation of the idling mixture, and

the **idling mixture regulation screw** which reduces or increases the quantity of idling mixture drawn in.

The fuel required for idling is taken from the mixture tube holder after having passed the main jet. It is drawn to a point above the fuel level by the idling jet and mixed with the air entering through the idling air jet to form a mixture.

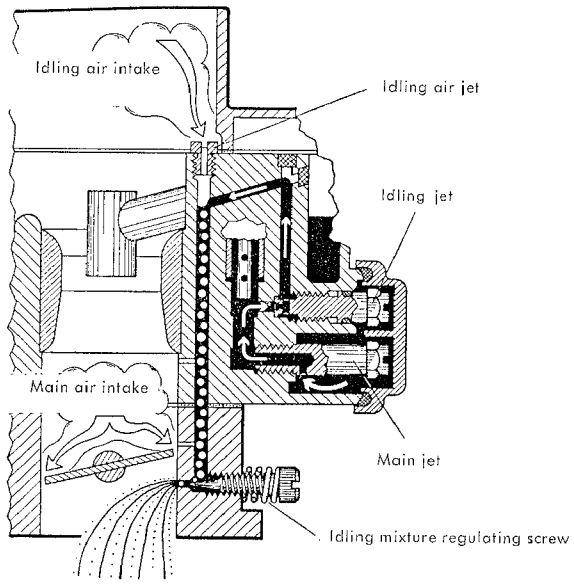
The idling mixture flows downwards to an orifice leading into the mixing chamber somewhat below the throttle valve. This bore can be modified by the mixture regulating screw. At idling speed of the engine the idling mixture is discharged through this orifice into the mixing chamber and then mixed with air entering through the throttle butterfly opening.



Operation at Idling Speed

Fig. 3

Just above the throttle valve there are in addition two further orifices subjected to the depression. When the throttle valve is opened they also deliver idling mixture, thereby ensuring a flawless transition from idling to main jet circuit.



Operation during Transit

Fig. 4

With the aid of the **idling mixture regulating screw** the quantity of fuel in the idling mixture can be increased or reduced. Adjustment of this screw reduces or increases the quantity of the idling mixture dran in. Screwing it in provides an idling mixture a low fuel content, unscrewing it gives a richer fuel air mixture.
The **idling adjustment screw** which is attached to a stop on the throttle shaft can be used to regulate the idling speed of the engine by increasing or reducing the throttle valve opening. The idling speed is increased by screwing it in and is reduced by unscrewing it.

Main carburation takes place in the two mixing chambers (fig. 5).

Each mixing chamber is provided with a **venturi** and in front of it is a **diffusor** which is combined with the **mixture tube holder.** The two mixture tube holders are secured by one common fixing screw in the float chamber. In each mixture tube holder there is a **mixture tube** which is clamped by the screwed-on air **correction jet.**

The two **main jets** and the two idling jets are situated under a cover plate at the side of the carburetor. The cover is mounted with the aid of a gasket as the chamber covered by it is in connection with the float chamber and filled with fuel.

For normal operation the fuel air mixture in the main carburetor is determined by:

the **main jet** which meters the quantity of fuel,

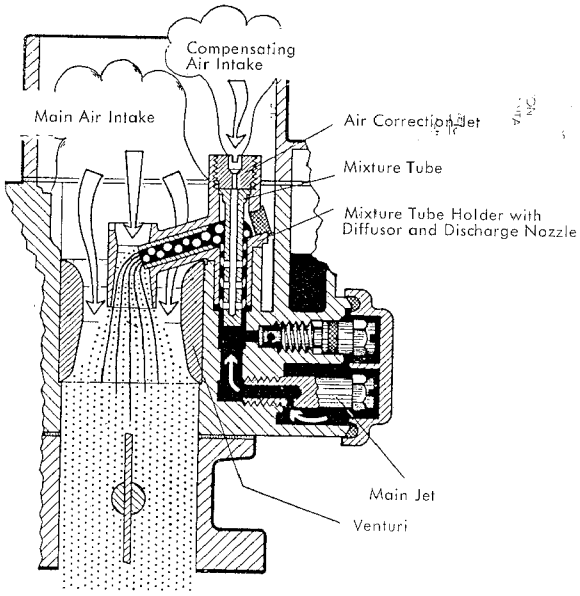
the **air correction jet** which meters correctional air as the engine speed increases, and

the **venturi** which controls the air volume.

The fuel flows from the float chamber into the space under the cover. From here it flows through the calibrated orifice of the two main jets into the main jet holders filling them to the general level of the fuel.

As the throttle valves are opened a vacuum is formed in the mixing chambers, which is greatest in the venturi. This vacuum acts on the main jet system and draws fuel from the outlet orifices of the main jet assembly. First the fuel is mixed in the small diffusors with the incoming air and then in the large venturis with the air entering there, and thus the fuel air mixture ist formed.

As the vacuum increases, the fuel level in the mixture tube holder decreases and compensating air enters through the air correction jets which mixes via the small orifices in the mixture tubes



Operation at Full Throttle

Fig. 5

with the fuel from the main jets. With increasing speed more compensating air is drawn in, preventing the otherwise occuring enrichening of the fuel-air mixture and ensuring its approximately equal composition throughout the entire range of engine operation.

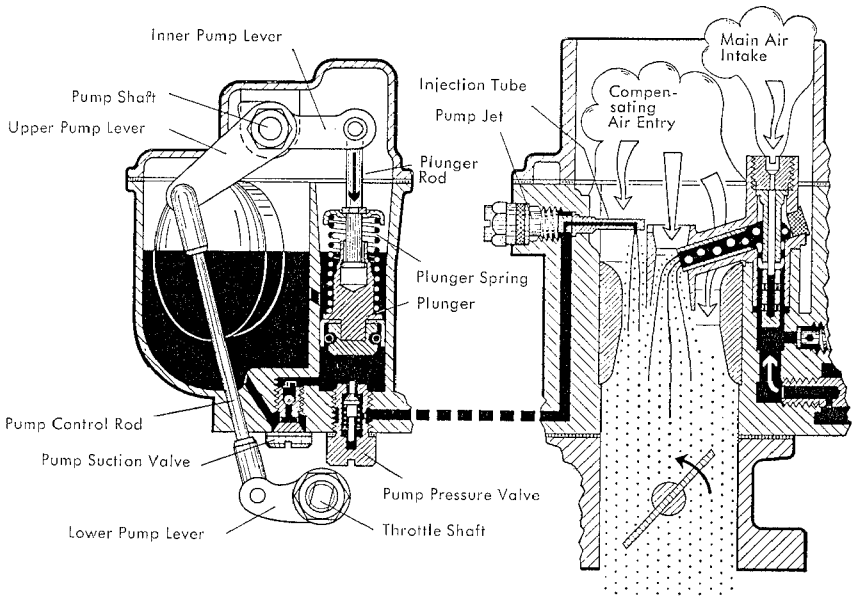
Accelerator Pump

The **accelerator pump** of the carburetor (fig. 6) is of the plunger type. A partioned space of the float chamber forms the pump cylinder in which the **plunger** moves up and down. The plunger is attached to the **pump lever** seated on the **pump shaft** in the carburetor cover. The throttle valve shaft and the pump shaft are connected through a linkage — consisting of lower and upper **pump lever** and the **pump rod.**

As the throttle valves are closed, the pump plunger moves in an upward direction and fuel is drawn through the **pump suction valve** into the **pump cylinder.** The foregoing is termed the suction stroke of the accelerator pump.

When the throttle valves are opened, the plunger moves downward and the pressure stroke of the pump is effected. The fuel is forced into mixing chambers of the carburetor through the **pump pressure valve** and two pump jets with injection tubes.

The plunger is provided with a damping device which enters into operation when a sudden actuation takes place. Then the pressure of the plunger is built up as a resilient force and according to the fuel flow the plunger moves downward.



Operation of accelerator pump

Fig. 6

Efficient acceleration is thus obtained by supplementing the main fuel air mixture. An alteration of the pump jet only alters the duration of the injection, because the calibration of these jets determines the rate of flow in relation to a unit of time. The quantity of fuel injected can only be controlled by the pump stroke, i. e. by abjusting the pump linkage.

Dual Downdraft Carburetor Zenith 32 NDIX

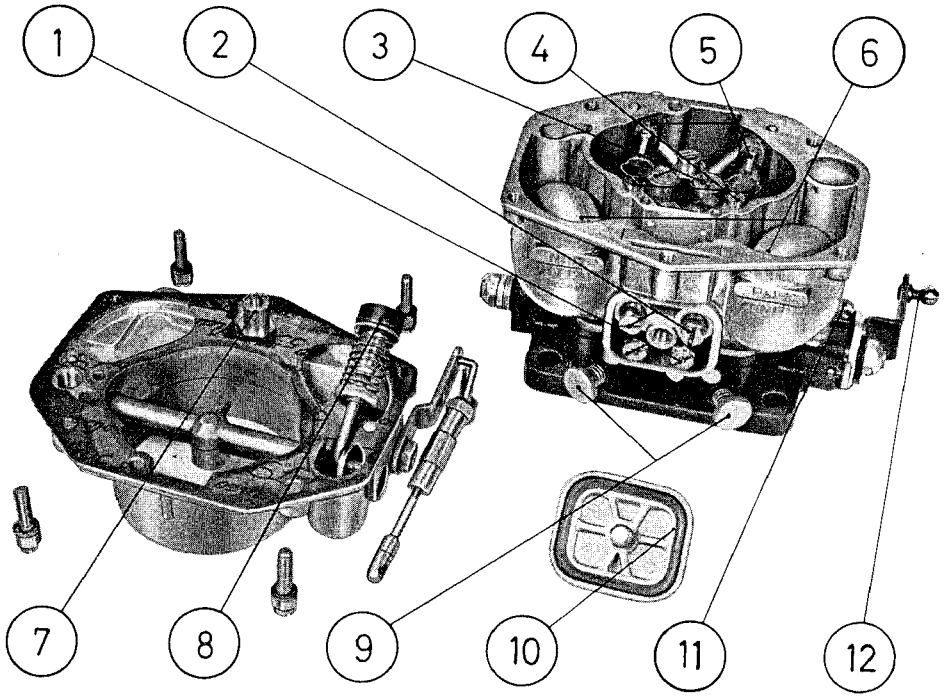


Fig. 7

① Main jets
② Idling jets
③ Air correction jets
④ Idling air jets
⑤ Injection tube pump jets
⑥ Dual float
⑦ Float needle valve
⑧ Pump plunger (accelerator pump)
⑨ Idling mixture regulating screw
⑩ Jet chamber cover
⑪ Idling adjustment screw
⑫ Carburetor lever

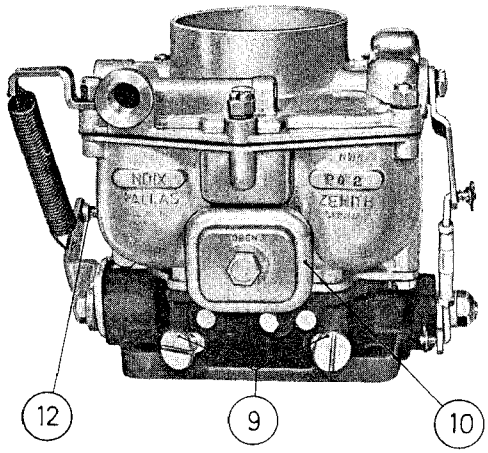


Fig. 8

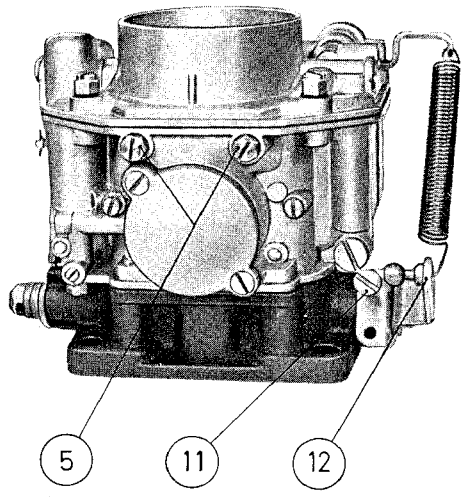


Fig. 9