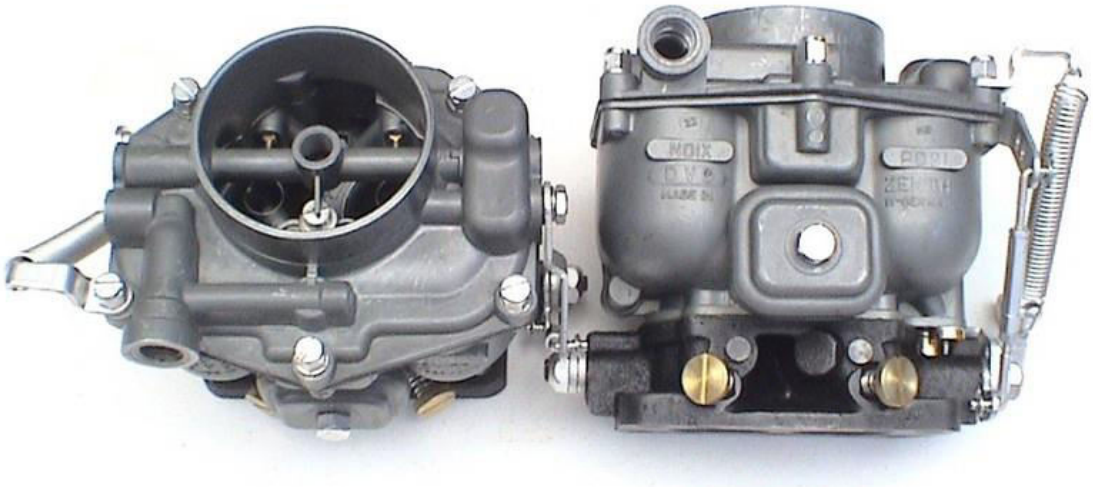
El carburador del Zunder:

Zenith 32 NDIX



DESCRIPTION OF THE DUAL DOWNDRAFT CARBURETOR ZENITH 32 NDIX

General

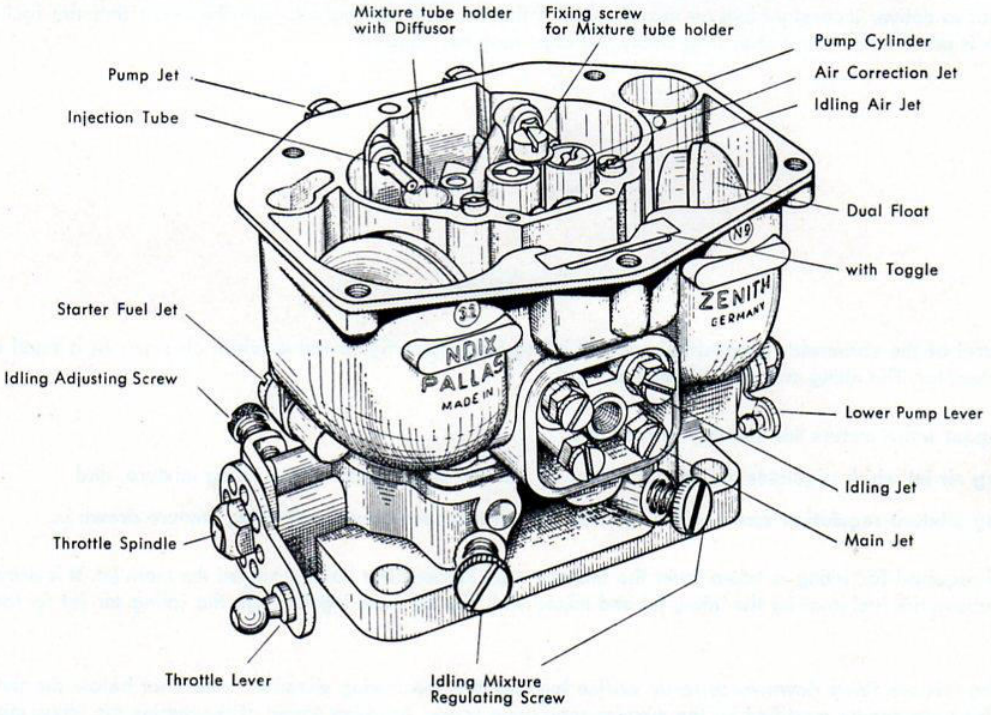
The Dual Downdraft Carburetor Zenith 32 NDIX has two barrels with a 32 mm (1.17") intake. It is provided with a central air intake and encased to make it dust- and water-proof.

Description

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

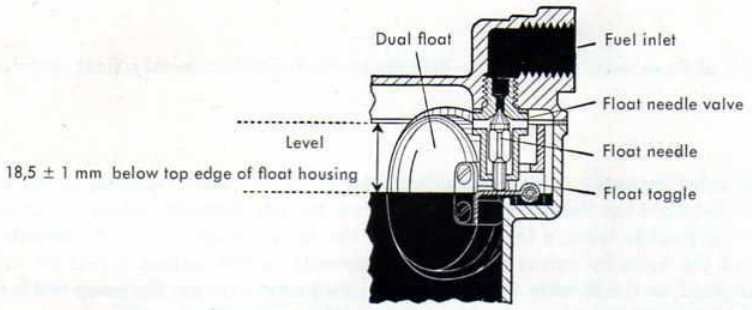
The cast iron **throttle valve assembly** is attached with its flange to the intake manifold of the engine. Above the flange across the two barrels is the **throttle shaft** with the two **throttle butterfly valves.** Attached to the ends of the throttle shaft are the throttle lever, a throttle stop 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:

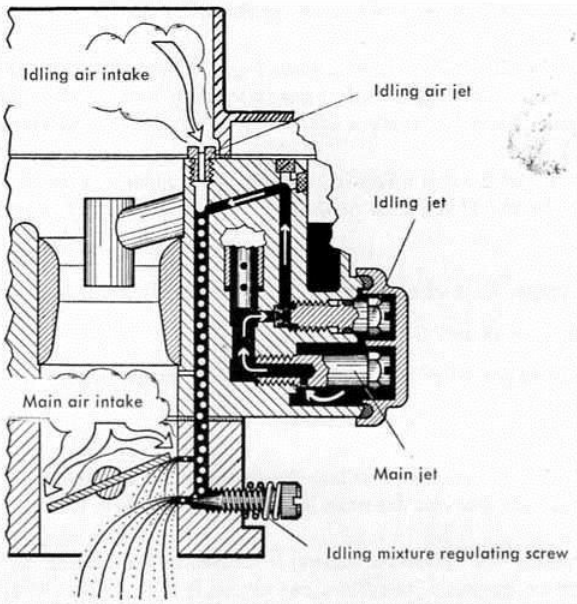
the **idling jet** which meters the quantity of fuel, and

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.

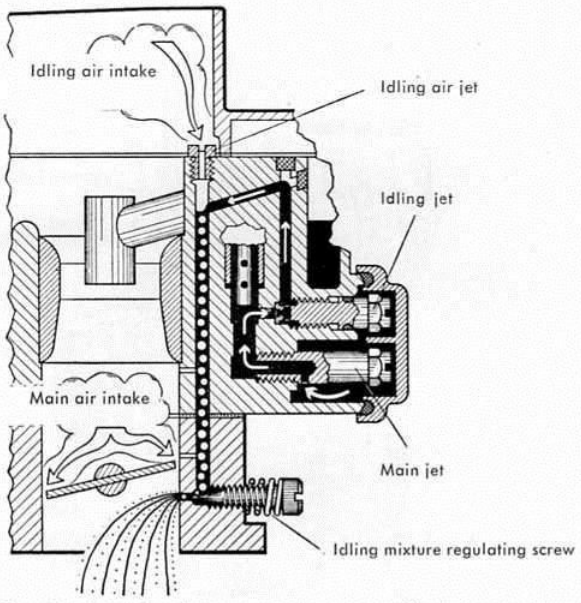
The fuel required for idling is taken from the mixture tube holder after having passed the main jet. It is drawn to a point above the fuel level by the idling jet and mixed with the air entering through the idling air jet to form a mixture.

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,

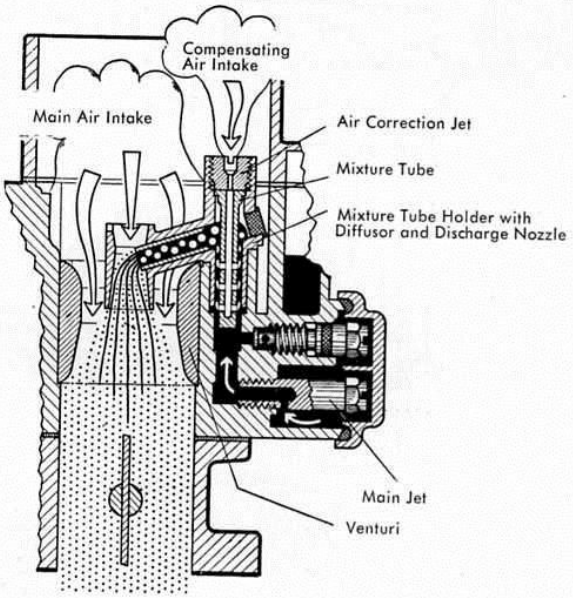
the **air correction jet** which meters correctional air as the engine speed increases, and

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.

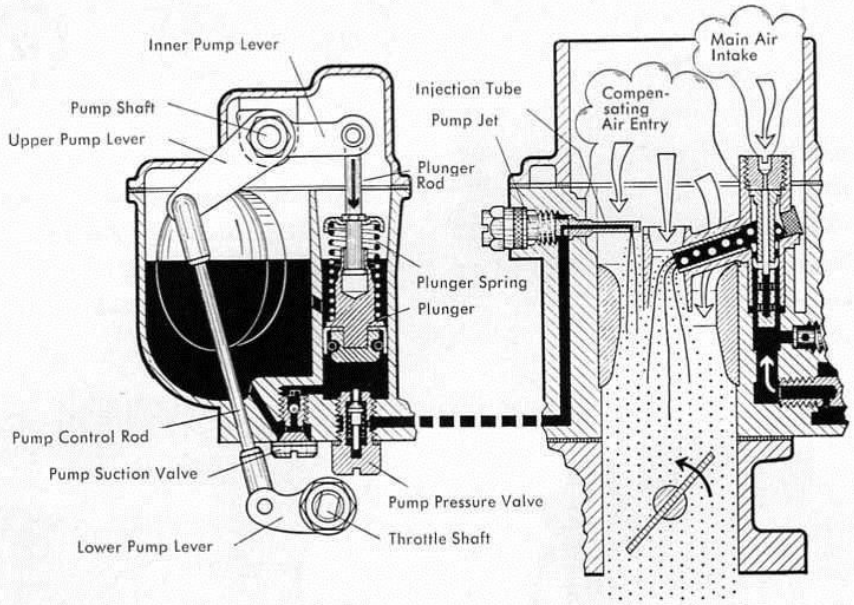
Accelerator Pump

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 32NDIX

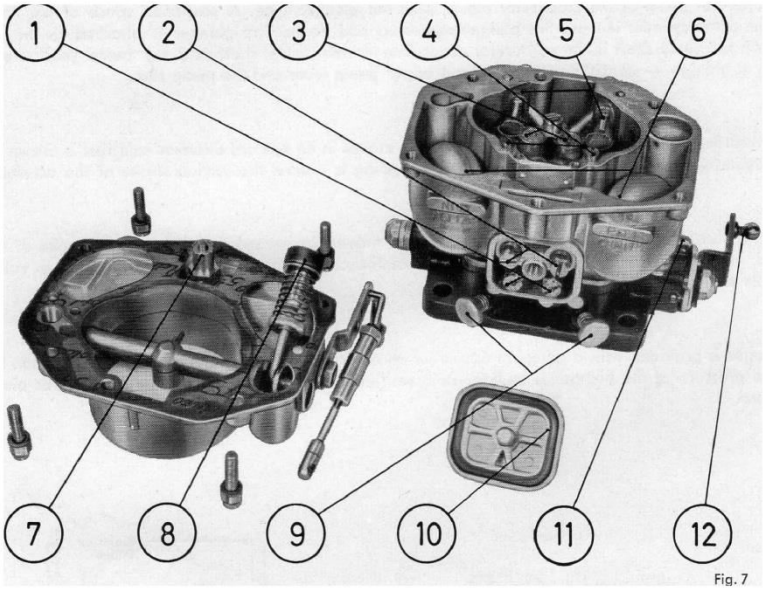
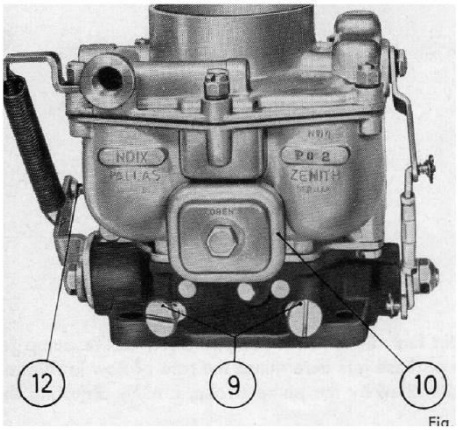
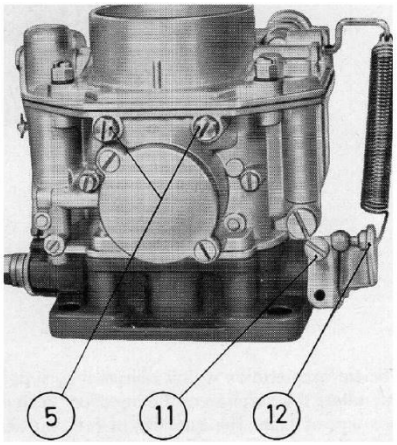


Fig. 7

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 pumpt)
9. idling mixture regulating screw
10 jet chamber cover
11. idling adjustment screw
12. carburetor lever



Fig



CARBURETOR ADJUSTMENT DATA

Engine Type	1600 (616/1)	1600 S (616/2)	Notes
Carburetor Zenith	32 NDIX	32 NDIX	2 per engine
Characteristics	dependent idling	dependent idling	——
Venturi K	24	28	2 per carburetor
Main Jet Gg	0115	0130	2 per carburetor
Air correction jet a	230	220	2 per carburetor
Idling jet g	50	50	2 per carburetor
Idling air jet u	120	140	2 per carburetor
Pump jet Gp	50	40	2 per carburetor
Injection tube	No. 8 short	No. 8 short	2 per carburetor
Float needle valve (sprung)	125	125	1 per carburetor
Float weight	per float 5.2 g	per float 5.2 g	2 per carburetor
Mixture tube	No. 1 S	No. 1 S	2 per carburetor
By-pass bore	1,4/1,4	1,4/1,4	——
Injection quantity	0,2 – 0,3 c. c. at 2 strokes per tube	0,2 – 0,3 c. c. at 2 strokes per tube	2 tubes per carb.
Float level	18,5 ± 1,0 mm .728" ± .04"	18.5 ± 1,0 mm .728" ± .04"	measured with cover closed and a test pressure of 1,8 m WC

The main jet is of particular importance with regard to differences in altitude. A good rule to go by is: for every 3300 ft (1000 metres) of difference in altitude, change the cross section of the main jet by approx. 6%. (Example: Normal adjustment at 1310 ft (400 metres) above sea level is 0110; adjustment at 4590 ft (1400 metres) above sea level is 0105).

Removing and Installing Carburetor

1 Fu

Special tools
P 75 Carburetor synchronizing unit
P 23 Carburetor wrench 12 mm

Removal

1. Close fuel cock
2. Remove air filter
3. Disconnect fuel line between fuel pump and carburetor

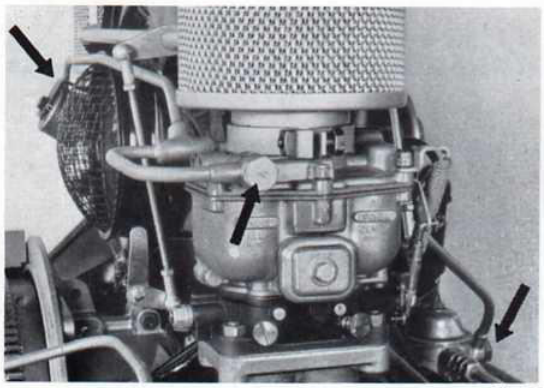


Fig. 10

4. Loosen and remove carburetor throttle lever at carburetor linkage

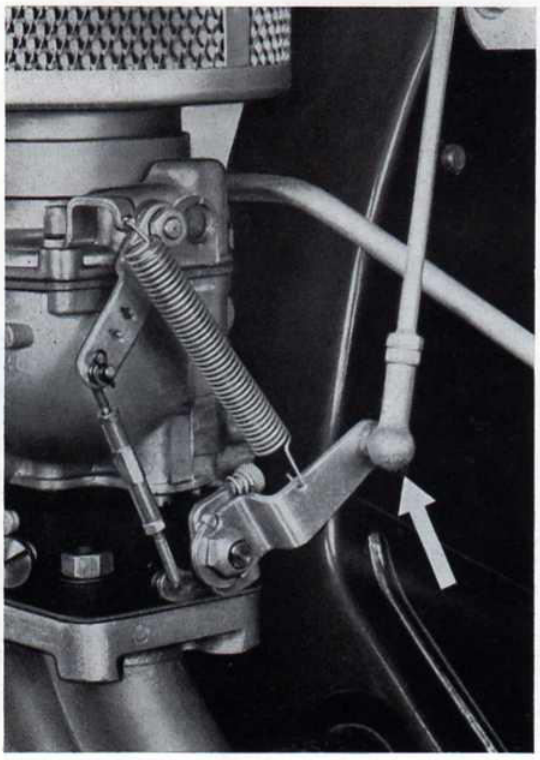


Fig. 11

5. Loosen carburetor flange nuts (special wrench P 23)

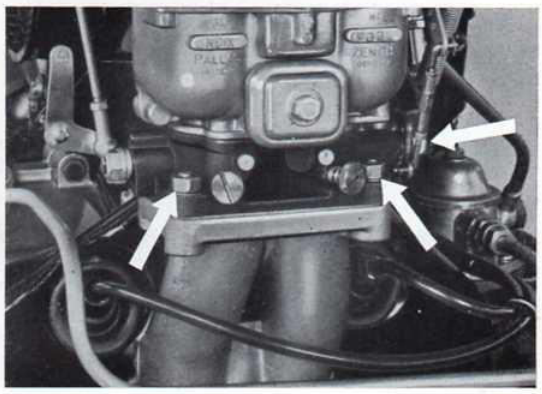


Fig. 12

6. Take off carburetor
7. Cover intake manifold

Installation:

When installing, proceed in reverse order, observing the following points:

1. Replace gasket at intake manifold flange.
2. Tighten carburetor flange nuts.
3. Adjust throttle valve position by actuating accelerator linkage, so that at full throttle opening both carburetors are in the same open position. (Must be corrected later on while engine is running).
4. Check gasket for fuel line nipple, replace if necessary.
5. If necessary, clean and oil filter.
6. Adjust idling speed. Synchronize carburetors using P 75 unit (see 4 Fu).

2 Fu

Cleaning Carburetor

Cleaning

1. Remove carburetor
2. Wash carburetor with clean gasoline.
3. Unhook pump linkage.
4. Loosen retaining screws on carburetor cover.
5. Take off carburetor cover.
6. Remove dual float.
7. Remove cover (jet chamber cover), unscrew main jets and idling jets.
8. Unscrew retaining screw for mixture tube holder, loosen air correction jets, take off both mixture tube holders, remove air correction jets, remove and clean mixture tubes.
9. Remove and clean idling air jet.
10. Remove and clean float needle valve and pump jets.
11. Carefully clean all jets and ports.
12. Re-insert jets.

It is recommended to clean the carburetor in clean gasoline. Blow compressed air through jets and lines. When cleaning the jets, do not use a needle or wire, since this will damage or widen the calibrated bores.

3 Fu

Disassembling and Assembling Carburetor

1. Remove carburetor.
2. Remove spring clip and pressure spring at pump linkage and unhook linkage.

Fig. 13

3. Loosen retaining screws and carefully take off carburetor.
4. Remove float toggle lever and take off dual float.

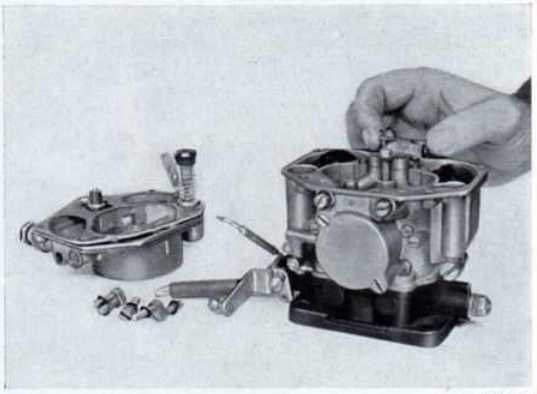


Fig. 14

5. Remove retaining screw on mixture tube holder.

6. Loosen air correction jets.

7. Pull out mixture tube holder.

8. Unscrew air correction jets and remove both mixture tubes.

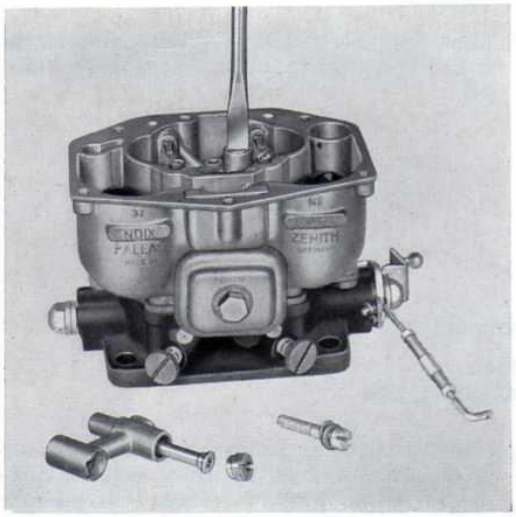


Fig. 15

9. Screw out idling air jets.

10. Screw out pump jets.

11. Remove injection tubes, if necessary by using a screw driver which should be protected by means of a protection tube to avoid damage to the injection tubes. Protect venturi by a piece of wood as illustrated below (fig. 16).

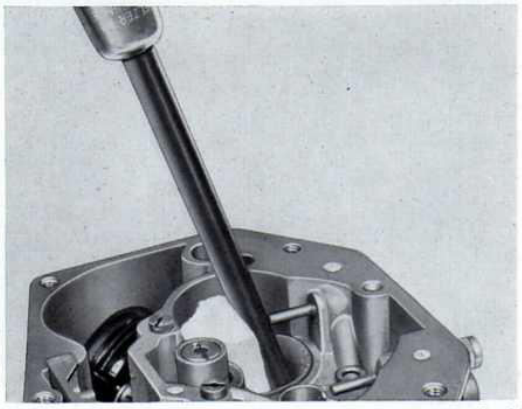


Fig. 16

12. Release venturi clamping screw and lift out venturi.

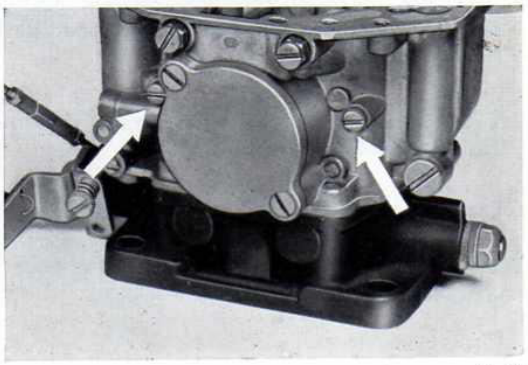


Fig. 17

13. Remove jet chamber cover.
14. Remove main jets and idling jets.
15. Remove idling mixture regulating screws.

Cleaning

1. Clean all components in fuel.
2. Blow compressed air through jets, valves, and ports. When cleaning, do not use a needle or wire, since this will damage or widen the calibrated bores.

Inspection and Assembly

When assembling, proceed in reverse order of disassembling. To check the components, the following points should be observed:

Carburetor Cover

1. Check float needle valve for leaks.
2. The sealing surface of the float needle valve must be perfectly smooth and clean.
3. Check float needle valve gasket for perfect condition and make sure that it is properly installed to prevent leakage.
4. The thread for the hollow bolt must be intact.
5. Check sealing surfaces of carburetor cover.
6. Replace gasket.

The carburetor cover gasket is held by two rivets. When replacing the gasket, the rivets may be removed by using a sturdy knife. The new gasket must be secured by two rivets.

Carburetor Bowl

1. Check pump plunger for perfect condition, if necessary replace.

2. Check float for perfect condition, replace if leaking. For float weight see „Carburetor Adjustment Data" table, page F 9.

3. Check all jets for correct size given in the „Carburetor Adjustment Data" table.

When replacing jets or valves, only genuine ZENITH parts should be used, which are available as spare parts. These parts are accurately calibrated and thus ensure proper adjustment and low fuel consumption.

4. Install venturi. Be sure that the restriction (rated diameter of venturi) faces upwards, i. e. that designations can be read from above. Do not overtighten clamping screw (fig. 17) (hold venturi).

5. Check clearance of throttle valve shaft. Excessive radial clearance allows secondary air to enter which has a detrimental effect on the starting and idling conditions.

6. Check tip of idling mixture regulating screw for perfect condition. Replace screw, if tip is bent or broken off

4 Fu

Idling Adjustment

Special Tool:
P 75 Carburetor Synchronizing Unit

1. Remove air filter while engine is at operating temperature.

2. Loosen pressure rods for actuating carburetor levers from bell cranks.

3. Tighten idling adjustment screw uniformly on both carburetors, until engine reaches approx. 1000 r.p.m.

4. Fully close idling mixture regulating screws on both carburetors (do not tighten too firmly, in order to avoid damaging the cone), then re-open by approx. 1½ turns. Now adjust by screwing in or out and leave it in the position which gives the highest r.p.m. and at which the engine runs smoothly. The regulating screws must never remain in fully closed position.

5. Loosen idling adjustment screws until an idling speed of 650 – 750 r. p. m. is reached.

6. Mount carburetor synchronizing unit P 75 on one carburetor and adjust by turning adjusting screw (varying venturi) so that the plunger in the inspection glass rises to about half-way position between two marks.

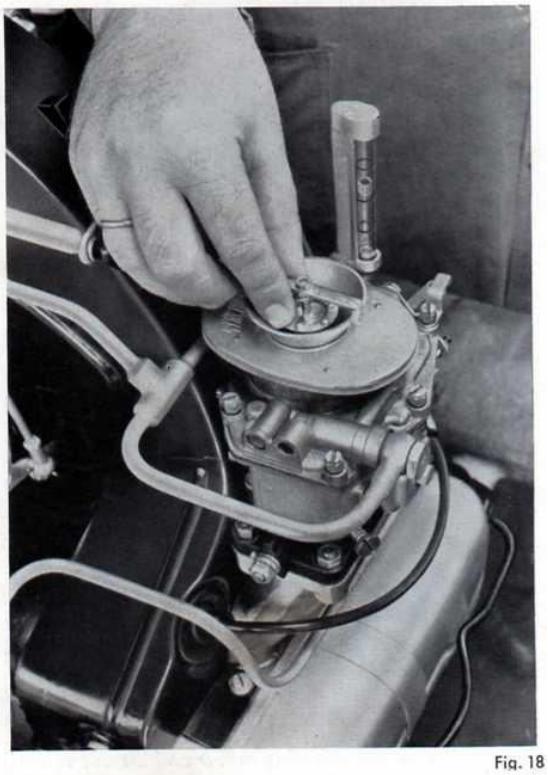


Fig. 18

7. Mount carburetor synchronizing unit on second carburetor (varying venturi) without making any alteration at the adjusting screw, until the plunger in the inspection glass is in the same position as described in point 7.

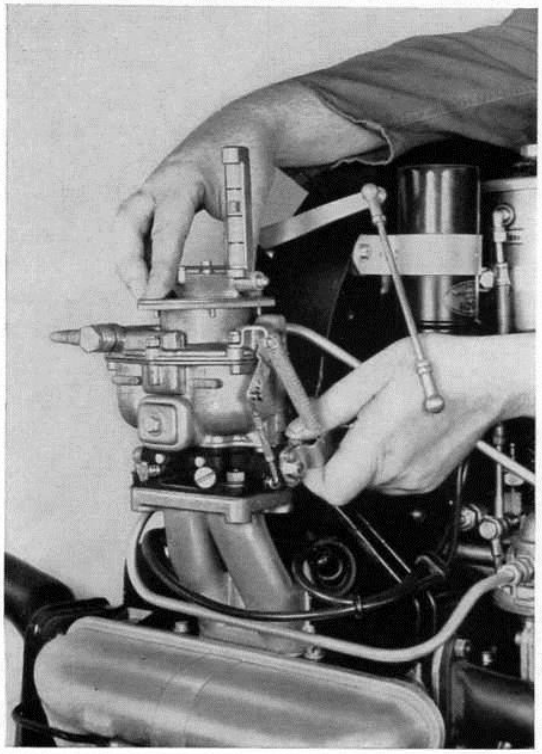


Fig. 19

8. Adjust idling mixture regulating screws of both carburetors, so that the plunger in the inspection glass shows hardly any discrepancies.

9. Attach pressure rods to bell cranks.

Note: Adjust pressure rods so that at idling position the pressure rods may be attached without tension.

10. Adjust engine speed to 1200 — 1300 r. p. m. by means of the hand gas knob and check uniform throttle butterfly valve position using synchronizing unit P 75 (see point 7 and 8). If the carburetor synchronizing unit does not give the same value for both carburetors, the throttle valve position must be adjusted by adjusting the pressure rods.

11. Re-check idling speed.

12. Check injection quantity (0.2—0.3 c.c with 2 strokes at one tube)

13. Check and, if necessary, adjust stop screw at accelerator pedal. When the accelerator pedal is fully depressed, there must be a clearance of approx. .04" (1 mm) between stop point of throttle valve shaft and stop point at carburetor housing.

14. Mount air filter or intake silencer resp.

Note: If a correct idling cannot be obtained, the throttle valve part must be checked as described in section 8 Fu. For checking, the carburetors must be removed.

Adjusting Injection Ratio

5 Fu

Special Tools

P 76 Carburetor wrench 5.5 mm

P 25 a Gauge glass

1. Adjust idling speed.
2. Fill float housing with fuel (while the engine is running)
3. Stop engine and remove air filter from carburetor.
4. Actuate throttle lever, until bubbles on the injection tube disappear.
5. Hold gauge glass (P 25 a) toward injection tube opening and press throttle lever twice from stop to stop.
6. Check fuel quantity, fully empty gauge glass and repeat measuring process.

7. Injection ratio should be 0.2 — 0.3 c.c. per injection tube at two strokes.

8. Repeat measuring process on second carburetor.

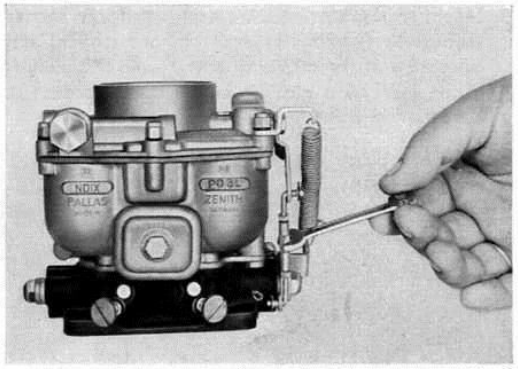


Fig. 20

9. If necessary, adjust the injection quantity by adjusting the pump pressure rods with carburetor wrench.

Note:

The pump jet has no influence on the injection ratio. Injection time and ratio must be uniform for both carburetors.

6 Fu

Checking Fuel Level in Float Housing

Special Tool:
P 77 Fuel Level Measuring Glass

1. Place carburetor horizontally.

2. Connect level measuring glass P 77 to fuel outlet at float housing.

3. Pour fuel into float housing in the normal manner. Use a 2.3 m high fuel column (corresponding to approx. 1.8 m WC) to obtain the correct pressure.

4. Close fuel supply and read fuel level. The correct level should be 18.5 ± 1.0 mm (.728" ± .04") measured from the edge of the carburetor housing to the fuel surface.

Note:

Usually it is not necessary to adjust the fuel level, provided the correct method of checking has been applied. In case an incorrect fuel level is obtained, the float and float needle valve should be checked for perfect condition. Only then the fuel level may be adjusted by using a thicker or thinner gasket.

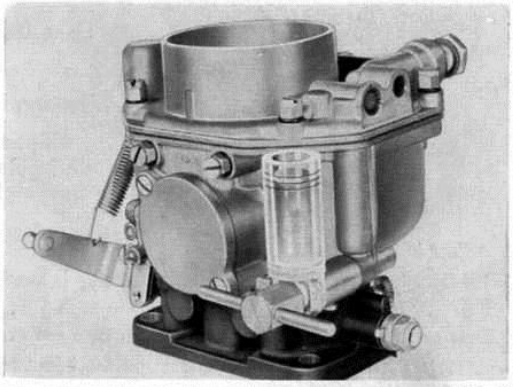


Fig. 21

Checking Float

7 Fu

General Information

Flowing over of the carburetor or excessive fuel consumption and poor engine performance may be a result of incorrectly adjusted floats or floats touching the float housing.

Checking

1. Remove float.
2. As shown in fig. 22, place floats on a plane plate and check to see whether both floats and the float brackets touch. If necessary, rebend floats carefully.

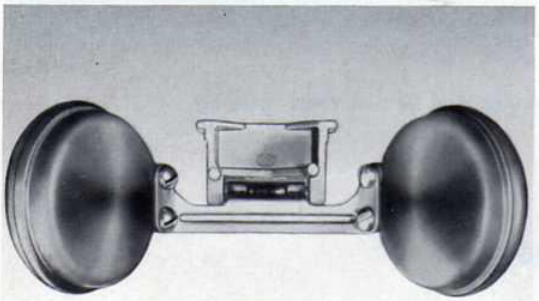


Fig. 22

3. Insert float into float housing. Allow float to oscillate (see fig. 23), then check whether floats touch float housing. If necessary, rebend floats carefully.

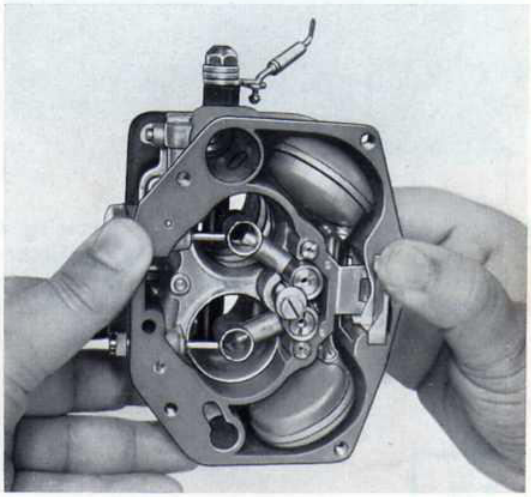


Fig. 23

4. Reinstall floats.
5. Check fuel level in float housing (6 Fu).

Checking Throttle Valve Assembly

8 Fu

General

Poor idling and flat spots are not always caused by clogged idling jets, but may be attributed to the throttle valve assembly.

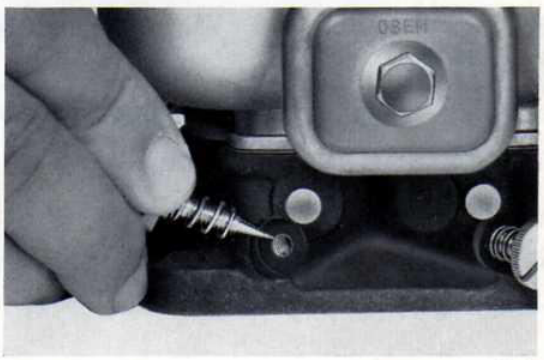


Fig. 24

Checking:

1. Unscrew mixture regulating screws and check whether cone is intact, i.e. make sure that no dents nor pressure points can be found. Cone should neither be bent (see fig. 24). In case of doubt, use new mixture regulating screws.
2. Subject throttle valves to a light scanning test. Both throttle valves must close uniformly (see fig. 25). Should this not be the case, turn throttle valve shaft carefully until both throttle valves close uniformly.

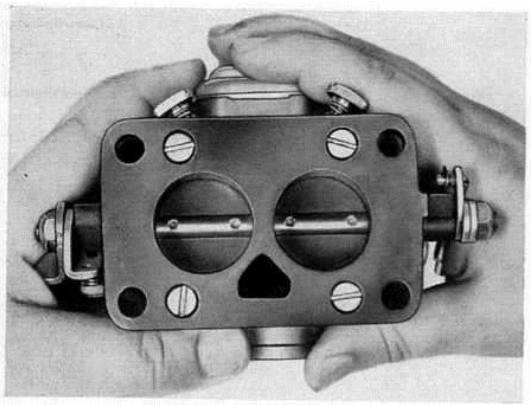


Fig. 25

3. Remove throttle valve assembly by loosening 4 fastening screws, check to see whether gasket between float housing and throttle valve assembly covers idling bores correctly or whether a foreign body has entered. It is hardly possible to remove foreign bodies at this point of the carburetor without removing the throttle valve assembly.

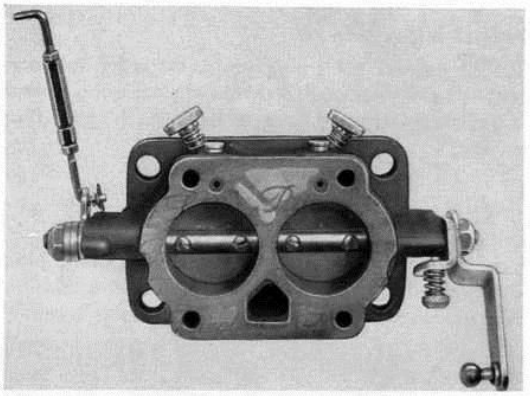


Fig. 26

4. Remount throttle valve assembly.

9 Fu — Cleaning Air Filter

The metal air filter, moistened with oil, serves to clean the intake air from entering dirt and dust. Frequency of cleaning the oil filter depends more or less on the local conditions prevailing.

1. Loosen clamp screws on fastening clips.
2. Remove air filter.
3. Clean air filter in clean washing gasoline.
4. Blow through with compressed air.
5. Slightly oil air filter.
6. Mount air filter.

10 Fu — Replacing Micronic Elements

The engines of type 1600 S are equipped with two intake silencers. They contain micronic elements, which should be replaced by new ones whenever they are dirty, at the latest, however, after 20 000 km (12 000 miles). (Fig. 27).

The micronic elements must not be washed nor oiled! If necessary, they may be slightly beaten or blown through with compressed air.

Fig. 27

Removing and Installing Intake Manifold

11 Fu

Removal

1. Remove carburetor.
2. Take off spark plug connectors.
3. Remove vertical side duct plate.
4. Loosen intake manifold nuts and screws and take off intake manifold.
5. Cover suction port of cylinder head.

Installation

Follow reverse order, observing the following details:

1. Replace intake manifold gasket. Care should be taken that the punched gasket holes correspond to the size of the cylinder head suction ports.
2. Install graphite-treated side of gasket toward cylinder head.
3. Check intake manifold for cracks.
4. Tighten intake manifold nuts and screws carefully and uniformly.
5. Replace carburetor gasket.

Removing and Installing Accelerator Linkage

12 Fu

Removal

1. Unhook ball pan on accelerator pedal.
2. Remove accelerator pedal.
3. Remove left half of floor board.
4. Loosen ball pan of long accelerator rod from ball joint on bell crank.
5. Unscrew ball pan and lock nut from accelerator rod, as otherwise the accelerator rod cannot be pulled backward.
6. Open rear hood.
7. Detach ball pan of short accelerator rod from bell crank at blower housing.

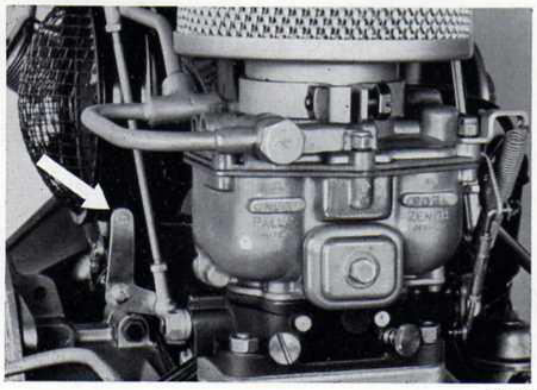


Fig. 28

8. Jack up rear end of car.
9. Loosen long accelerator rod from bell crank on transmission and pull out of the frame, moving backward.

Pull out short accelerator rod from engine compartment and unhook it on bell crank.

Installation

When installing proceed in reverse order. Carefully grease the ball pans and all bell crank axles. Tighten lock nuts of ball pans.

13 Fu

Adjusting Carburetor Linkage

The carburetor linkage must be adjusted so that all throttle valves are operated uniformly. Care must be taken that the full travel of the throttle valves from idling position to full throttle opening is not obstructed by incorrect adjustment of the pressure rod at the front bell crank. Final adjustment is effected by using the carburetor synchronizing unit P 75, see page F 14.

Caution!

Correct and uniform closing of the throttle valves is only obtained, if all ball joints of the acellerator linkage are moving smoothly. If necessary apply some grease to ball pans.

Carburetor Troubles and their Cure

The carburetor troubles as mentioned below presuppose the specified carburetor settings (see table on page F 9).

Trouble	Cause	Remedy
1. Engine will not start (with fuel in tank and ignition in order	a) No fuel in system	a) Clean main jet. Check fuel supply. Detach line to fuel pump and actuate starter without ignition. If fuel escapes pump, float needle valve is clogged. If no fuel comes out, pump valves may stick, pump mechanism may be damaged, or fuel cock is dirty
	b) Carburetor flows over	b) Check and clean float needle valve. Check gasket. Check float, if nec. replace
2. Flat spot at idling speed	a) Idling adjustment incorrect	a) Readjust idling speed
	b) Idling jet or idling air jet clogged	b) Clean idling jet or idling air jet
	c) Intake manifold leaking	c) Check intake manifold, flanges, gaskets and compensation line
	d) Idling mixture regulating screw damaged	d) Replace idling mixture regulating screw
3. Poor acceleration	a) Idling mixture too lean	a) Readjust idling speed (check jet)
	b) Fuel level incorrect	b) Adjust fuel level
	c) Incorrect injection ratio	c) Check injection ratio
	d) Intake manifold leaking	d) Check intake manifold, flanges and gaskets and compensation line
4. Engine stalls when accelerator pedal is suddenly released	Incorrect idling adjustment	Readjust idling speed
5. Engine runs uneven, misfires and cuts out	a) Fuel surplus	a) Check pump pressure. Check float needle valve. Check float. Check fuel level.
	b) Lack of fuel	b) Clean main jet Check fuel lines Check fuel level
	c) Intake manifold leaking	c) Check intake manifold, flanges, gaskets and compensation line
6. Fuel consumption too high	a) Float needle valve flooded	a) Check pump pressure
	b) Float leaking	b) Replace float
	c) Float needle valve does not close	c) Check float needle valve

FUEL PUMP

General

Fuel is fed to the carburetors by a diaphragm pump which is flange-mounted to the crankcase. It is operated mechanically from a cam on the distributor drive shaft over an actuating rod. The quantity of fuel delivered by the pump is automatically controlled as the fuel is consumed by the float bowls.

The fuel pump consists of the pump cover, containig suction valve, delivery valve and a fuel strainer, and a fuel pump housing, incorperating the rocker mechanism. The diaphragm and spring are situated between the cover and the housing. The diaphragm consists of several layers of special flexible, clothlike material which is not affected by the fuel and two protecting discs which are riveted to the diaphragm actuating rod.

Operation

As the distributor drive shaft revolves, the cam causes the actuating rod to move against the rocker arm which pushes the diaphragm downward against the diaphragm spring. This movement creates a vacuum above the diaphragm which lifts the suction valve off its seat so that fuel can be drawn in. When the actuating rod moves backward, the loaded diaphragm spring pushes the diaphragm upward, forcing the fuel in the pump through the delivery valve and into the carburetors. This process is repeated at every turn of the cam (once every two revolutions of the engine).

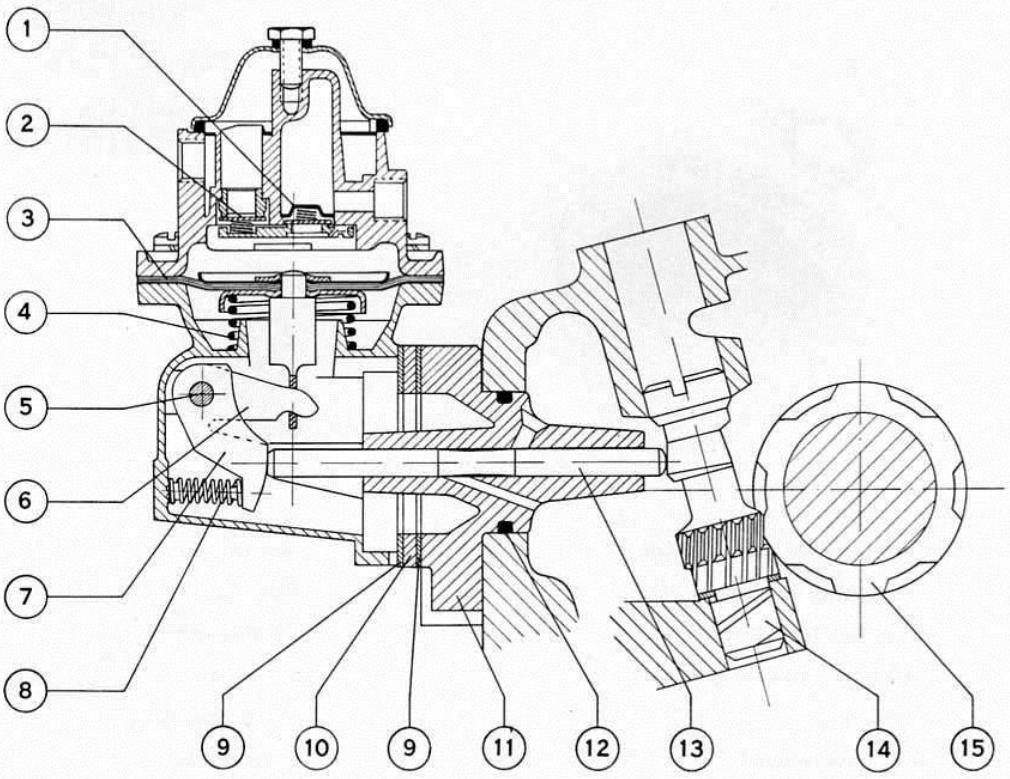


Fig. 29

Fuel Pump (Cutaway)

① **Delivery valve**
② **Suction valve**
③ **Diaphragm**
④ **Diaphragm spring**
⑤ **Rocker arm pin**
⑥ **Rocker arm link**
⑦ **Rocker arm**
⑧ **Rocker arm spring**
⑨ **Gasket**
⑩ **Fibre flange**
⑪ **Intermediate flange (light alloy)**
⑫ **O-ring**
⑬ **Actuating rod**
⑭ **Distributor drive shaft**
⑮ **Distributor drive gear**

Fuel Pump Components

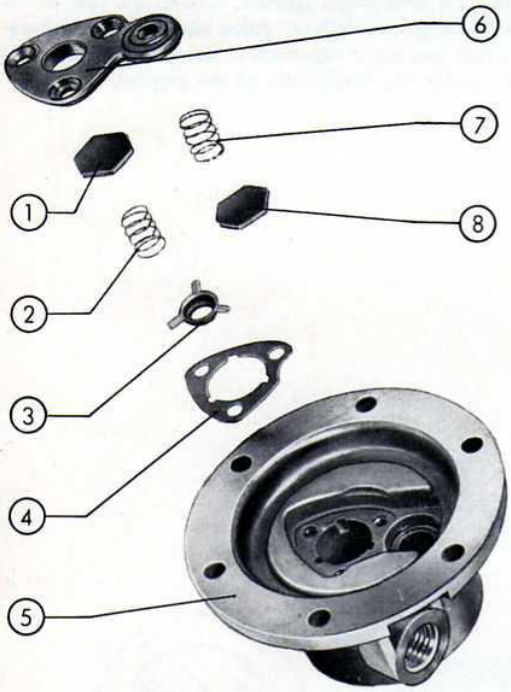


Fig. 30

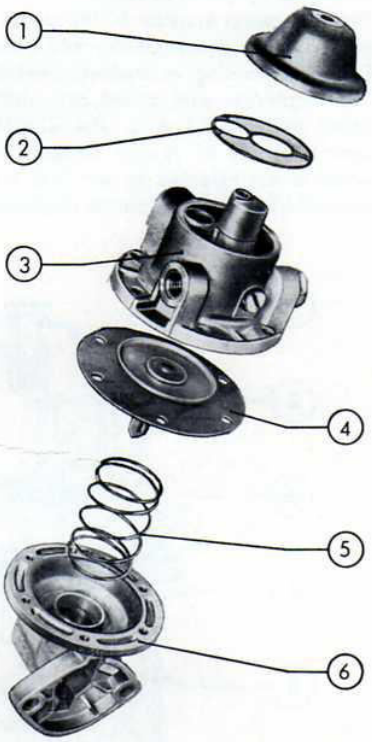


Fig. 31

① Valve plate for exhaust valve
② Valve spring for exhaust valve
③ Spring seat for exhaust valve
④ Gasket for valve retainer plate
⑤ Pump Cover
⑥ Valve retainer plate
⑦ Valve spring for intake valve
⑧ Valve plate for intake valve

① Housing cover top
② Filter
③ Housing cover
④ Diaphragm
⑤ Diaphragm spring
⑥ Pump housing

Checking Pump Pressure

14 Fu

General

The pump pressure depends on how much the spring is compressed during the pump suction stroke. The spring is so balanced that fuel is forced to the carburetor via the pressure valve only if the float needle valve is open. In case the float needle valve closes with rising float, the pressure in the fuel line and pump housing increases while the pump working stroke decreases. Under normal conditions the diaphragm is moved only some fractions of an inch (approx. 2/100").
A hole is provided for venting the chamber below the diaphragm. This hole also permits draining of fuel which might have entered the lower chamber.

Checking

The pump pressure should amount to .13 to .18 atü with the float needle valve closed and the engine running at 1000 to 3000 r.p.m. The minimum amount of fuel delivery is 18 ltrs/h = 300 c.c. per minute at 4500 r.p.m.

To check the pump pressure use a pressure gauge which is connected to a fuel line between the pump and the carburetor by means of a T-fitting. The fuel line is fitted with a fuel shut-off cock behind the pressure gauge.
The specified pump pressure ist determined by the correct adjustment of the actuating rod stroke and the diaphragm spring tension.

Adjustment of the pump stroke is effected by fitting corresponding flange gaskets.

If the stroke adjustment does not give the desired result, replace the diaphragm spring. If the pump pressure is too low, the intermediate coils of the spring may be stretched apart, should this be necessary.

Too high a pump pressure will result in overflow of the carburetor and, consequently, in dilution of the engine oil. If it is too low, insufficient fuel will be delivered and an uneven running and missing of the engine at high speed as well as a decrease in performance will be the result.

Removing and Installing Fuel Pump

15 Fu

Special Tools:
VW 126 a Fuel Pump Wrench
VW 328 a Fuel Pump Push Rod Gauge

Removal

1. Disconnect fuel lines from carburetors and fuel pump.
2. Remove retaining screws on pump flange (using fuel pump wrench VW 126 a).
3. Take off pump.

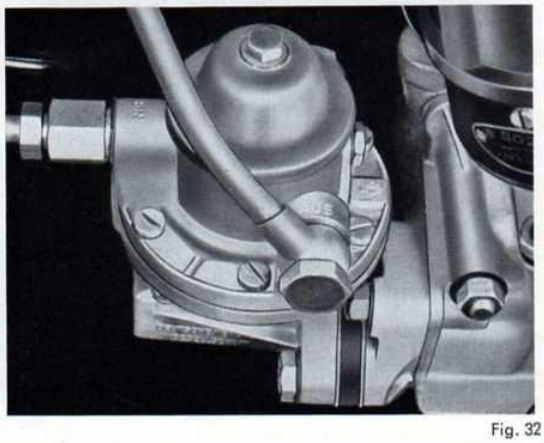


Fig. 32

4. Remove actuating rod, fibre flange and gaskets.

Adjusting Stroke of Fuel Pump

1. Place intermediate flange, actuating rod, and a gasket, which should be in perfect condition, on crankcase. The oil hole in the intermediate flange must face upwards. The convex end of the actuating rod must face toward the cam of the distributor drive shaft.
2. Attach gauge VW 328 a to the flange and tighten it to the same torque as for the fuel pump in order to compress the gaskets to their usual thickness. The actuating rod stroke of about .16" (4 mm) is determined by the cam on the distributor drive shaft. The stroke should move within a range of 2" (5 mm) which is marked on the gauge. The marks correspond to a length of 1.14" (29 mm) and 1.34" (34 mm) measured from the fuel pump contact flange (including gaskets) to the projecting actuating rod end. Crank the engine to check the pump stroke. The specified stroke can be adjusted by fitting an appro-

of gaskets to the intermediate flange. gaskets than required, as this would have a detrimental effect on the diaphragm and the drive mechanism.

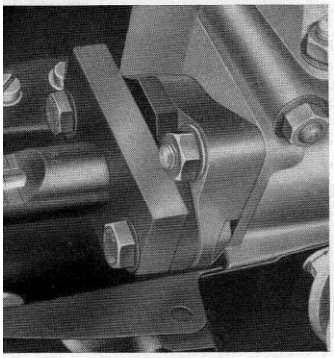


Fig. 33

Installation

1. Fill fuel pump housing with special grease before installing it.
2. Fit fuel pump.
3. Connect fuel lines.
   See to it that the fuel line rubber grommet is correctly seated in the engine front cover plate!

Reconditioning Fuel Pump

Special Tool: VW 328 b Fuel pump diaphragm gauge

d. retaining screws on pump cover.

cover and fuel strainer.

3. Unscrew the six slotted screws and take off pump cover.

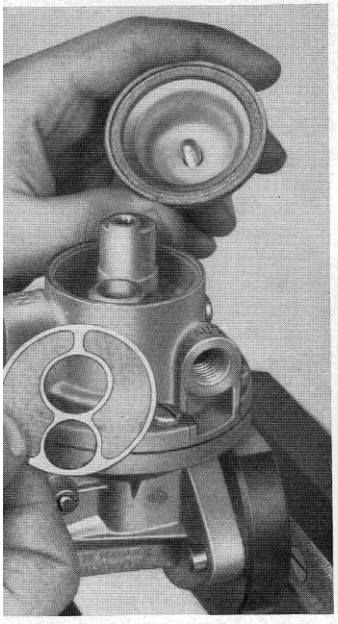


Fig. 34

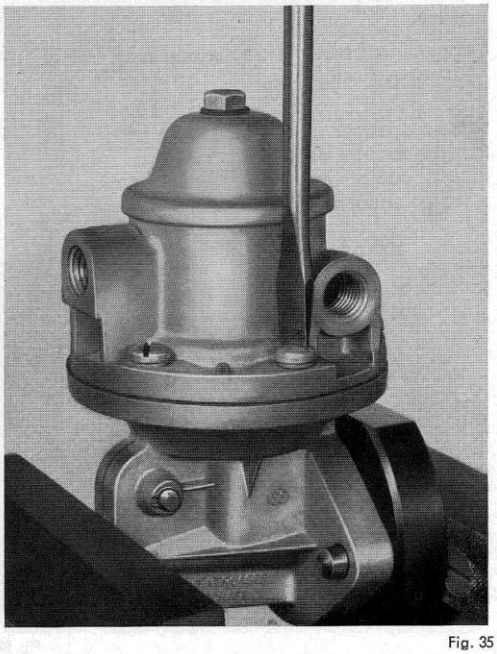


Fig. 35

4. Press down diaphragm and disconnect it from the pump rocker arm link. Remove diaphragm with spring.

5. Force out rocker arm link pin. Remove rocker arm link, rocker arm and spring.

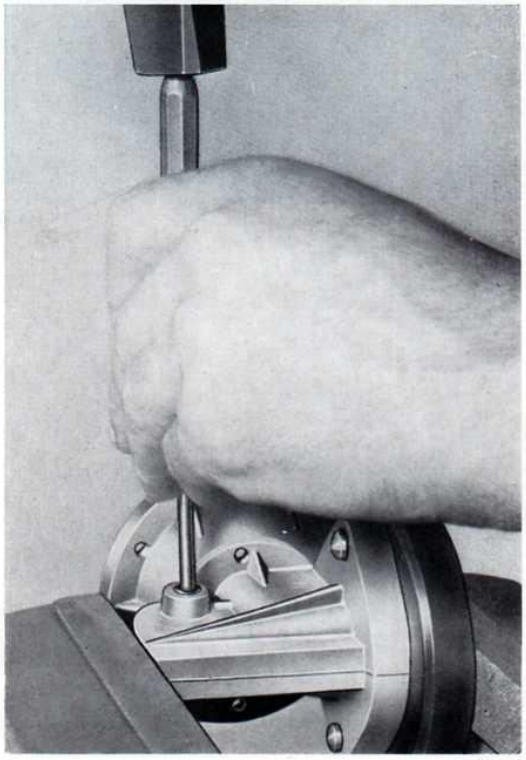


Fig. 36

6. Unscrew valve retainer plate from pump cover by pressing down valve retainer plate until the three screws have been screwed out. Carefully take off the plate to avoid the components jumping off.

Fig. 37

7. Thoroughly clean all pump components in fuel.

Assembly

1. Check valve seat in pump cover for perfect condition.

2. Check valve seat at valve retainer plate.

3. Replace valve plates, valve springs and valve retainer plate gasket. Place valve plates in position taking care that their sides with red coated face contact with the valve seat.

4. Place and hold valve retainer plate in position until the screws are tightened uniformly.

5. After installation of the valves check to see whether opening and closing is perfect.

6. Install rocker arm link, rocker arm and spring in pump housing. Check rocker arm pin for wear. Install pin and secure.

7. Place spring and diaphragm in position. Engage the diaphragm actuating rod in the rocker arm link. Replace diaphragm if it shows traces of hardening or wear.

8. Place fuel pump housing in a vice with the gauge VW 328 b inserted. Thus the rocker arm is pressed 1.4" (35 mm) inwards (measured from flange joining face), bringing the diaphragm to the required assembling position.

9. Fit pump cover, taking care that the diaphragm is perfectly even. Securely tighten cover screws diagonally and uniformly.

10. Check pump cover gasket, if necessary replace.

11. Place fuel filter in position and tighten cover screws.

12. Fill fuel pump housing with special grease (anti-freeze). At operating temperature the grease assumes a liquid condition, thus lubricating all moving parts. Lubrication is improved by engine oil which is fed into the pump housing through the bore in the light alloy flange. Another grease packing is therefore not necessary. Rocker arms and actuating rods which are lacking grease indicate a leaking diaphragm.

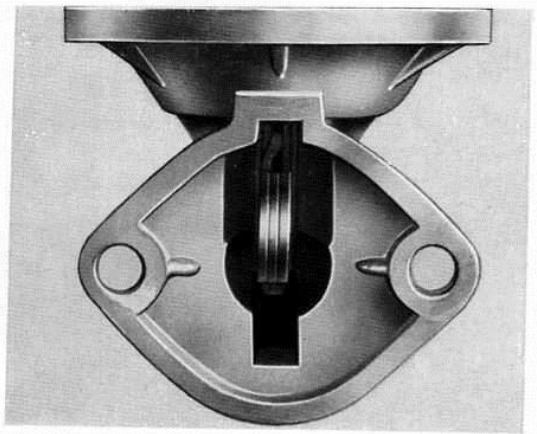


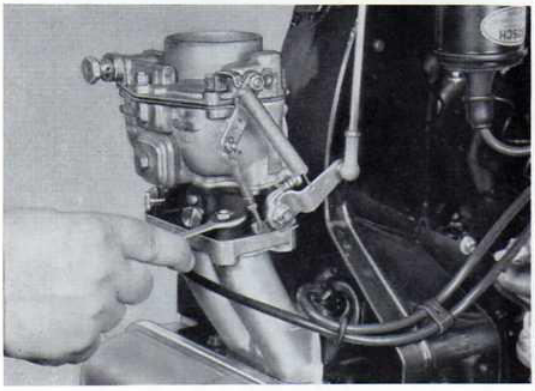
Fig. 38

Fuel Pump Troubles and Their Cure

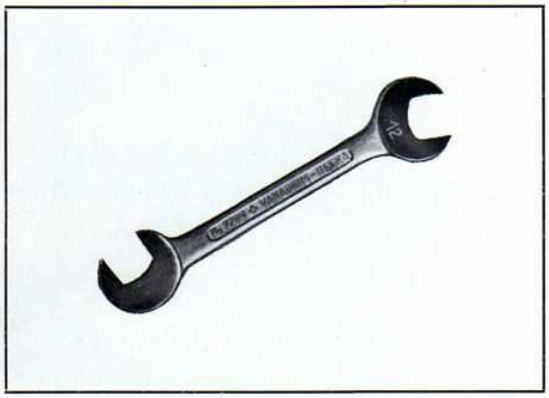
Trouble	Cause	Remedy
1. Pump leaking between housing and cover: loss of fuel	a) Slotted screws loose b) Diaphragm cracked	a) Tighten screws b) Replace diaphragm
2. Diaphragm leaks at rivets; loss of fuel	Diaphragm damaged by inexpert installation	Replace diaphragm acc. to specification
3. Diaphragm material leaking; loss of fuel	Diaphragm material damaged by solvent ingredients in fuel	Replace diaphragm
4. Excessive pump stroke: overstraining of the diaphragm	Pump incorrectly installed, gasket too thin	Install pump correctly, if necessary check diaphragm
5. Pump pressure too low	a) Pump incorrectly installed, gasket too thick b) Spring tension too low	a) Install pump correctly b) Replace spring, or if necessary stretch it apart
6. Pump pressure too high; float needle valve forced down	a) Pump incorrectly installed, gasket too thin b) Spring tension too high	a) Install pump correctly b) Replace pring, or if necessary bring intermediate coils closer together
7. Fuel pump inoperative or insufficient fuel delivery	Valves leaking or sticking	Check valves, if necessary replace valve plates and valve seats

Carburetor Wrench

P 23



Application



Tool

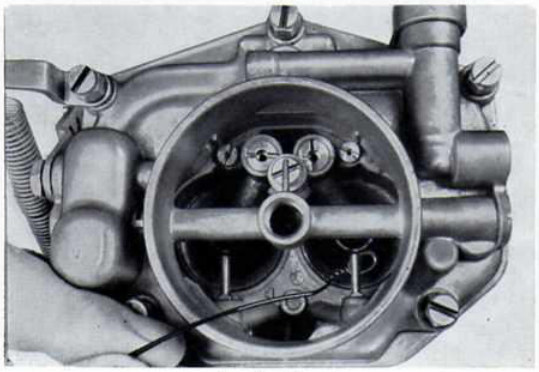
Use: To tighten and loosen carburetor retaining nuts
Engine Type 1600, 1600 S

See Supplements to Workshop Manual, Group F; Procedure: Fu 11

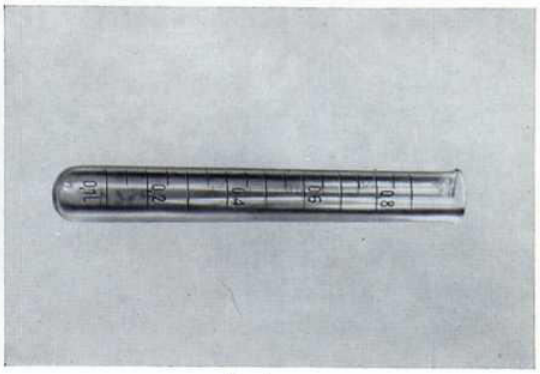
Subject to Modification

Measuring Glass

P 25a



Application



Tool

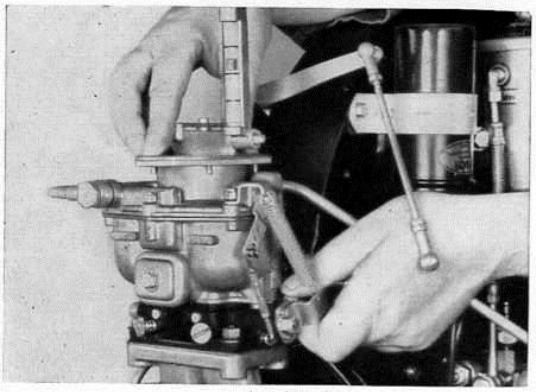
Use: To measure injection ratio

See Supplements to Workshop Manual, Group F; Procedure: Fu 15

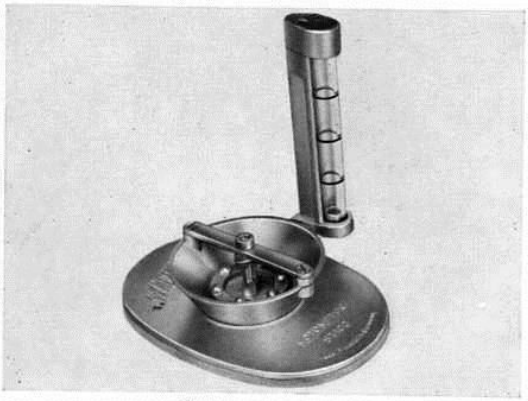
Subject to Modification

Carburetor Synchronizing Unit

P 75



Application



Tool

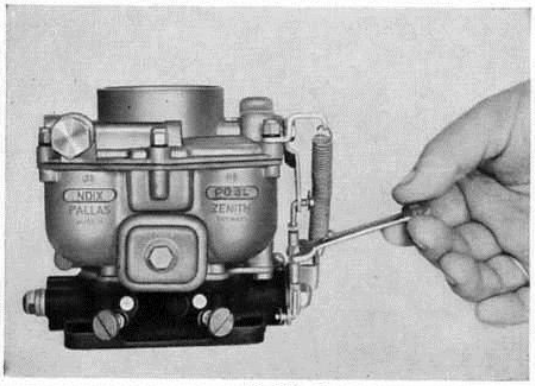
Use: To synchronize both carburetors

See Supplements to Workshop Manual, Group F; Procedure: Fu 16

Subject to Modification

Carburetor Wrench 5,5 mm

P 76



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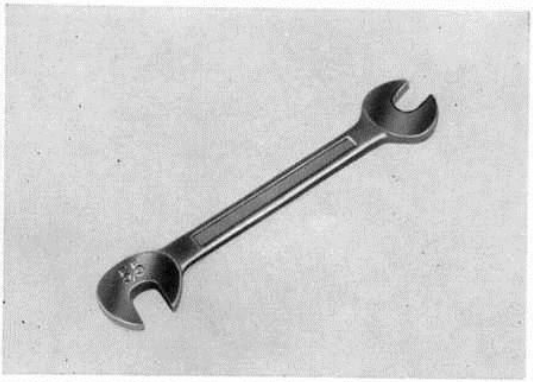


Tool

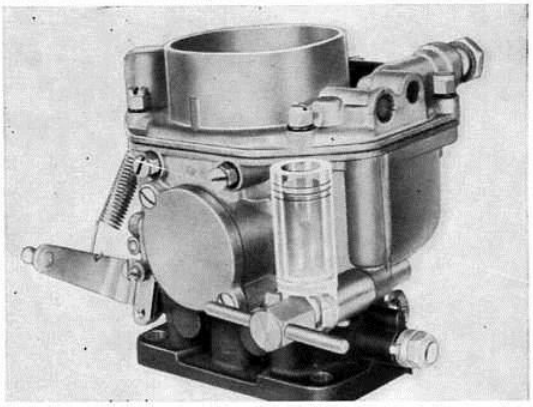
Use: To readjust pump linkage when adjusting injection ratio
Carburetor Zenith 32 NDIX

See Supplements to Workshop Manual, Group F; Procedure: Fu 16

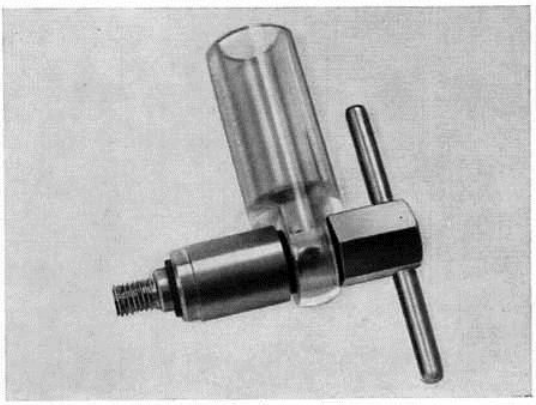
Subject to Modification

Fuel Level Measuring Glass

P 77



Application



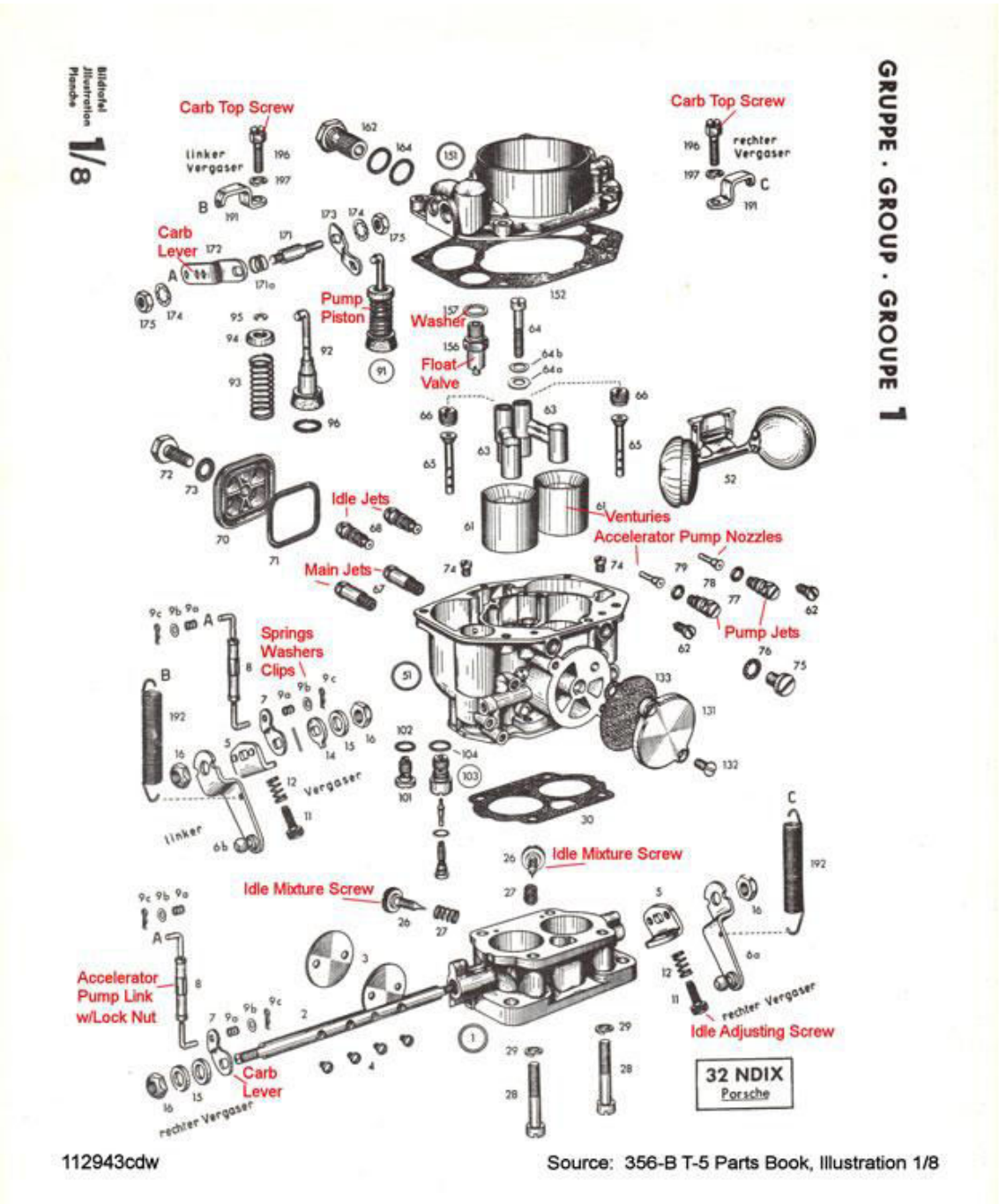
Tool

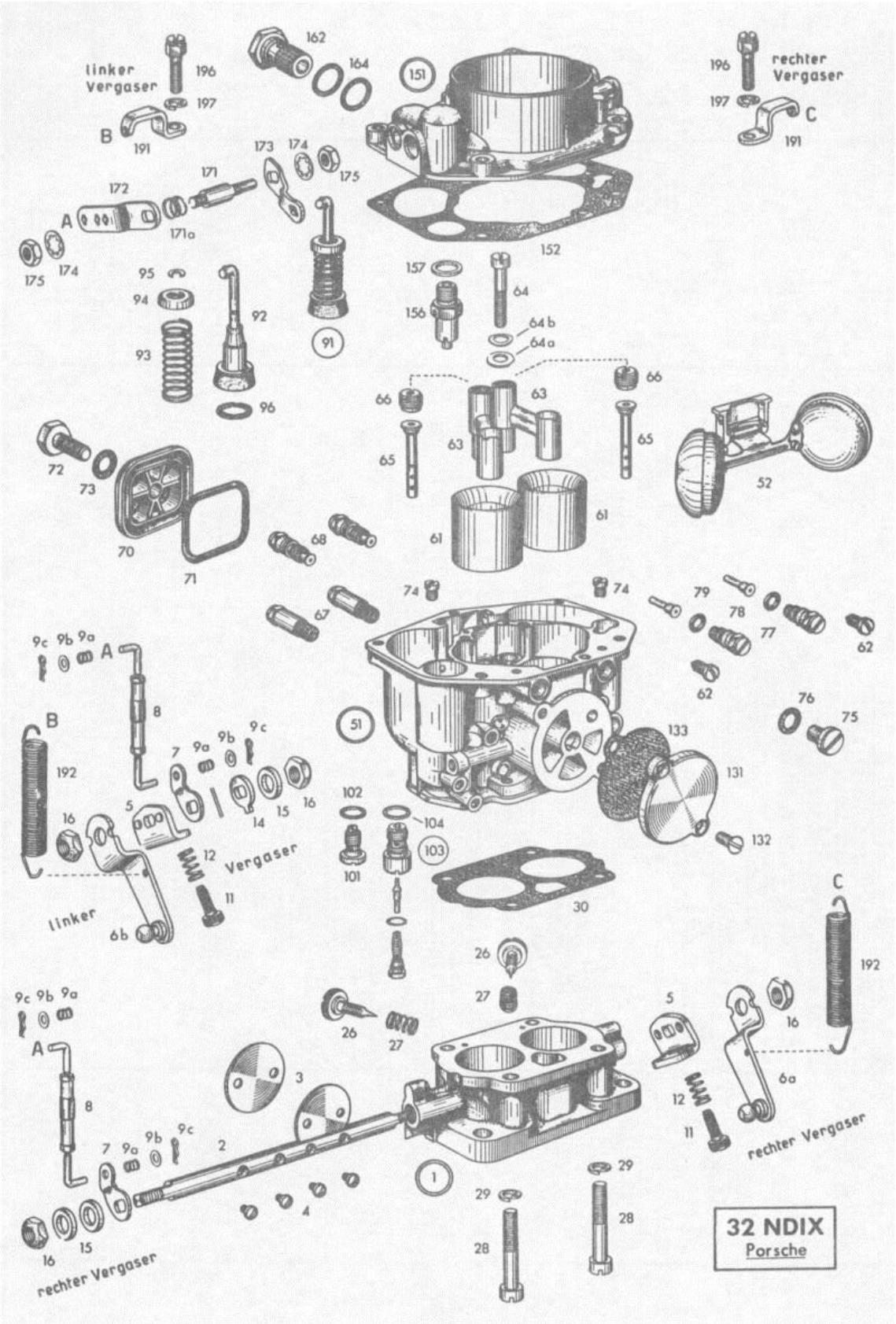
Use: To check fuel level with closed carburetor cover.
Carburetor Zenith 32 NDIX

See Supplements to Workshop Manual, Group F; Procedure: Fu 14

Subject to Modification

Dibujos técnicos

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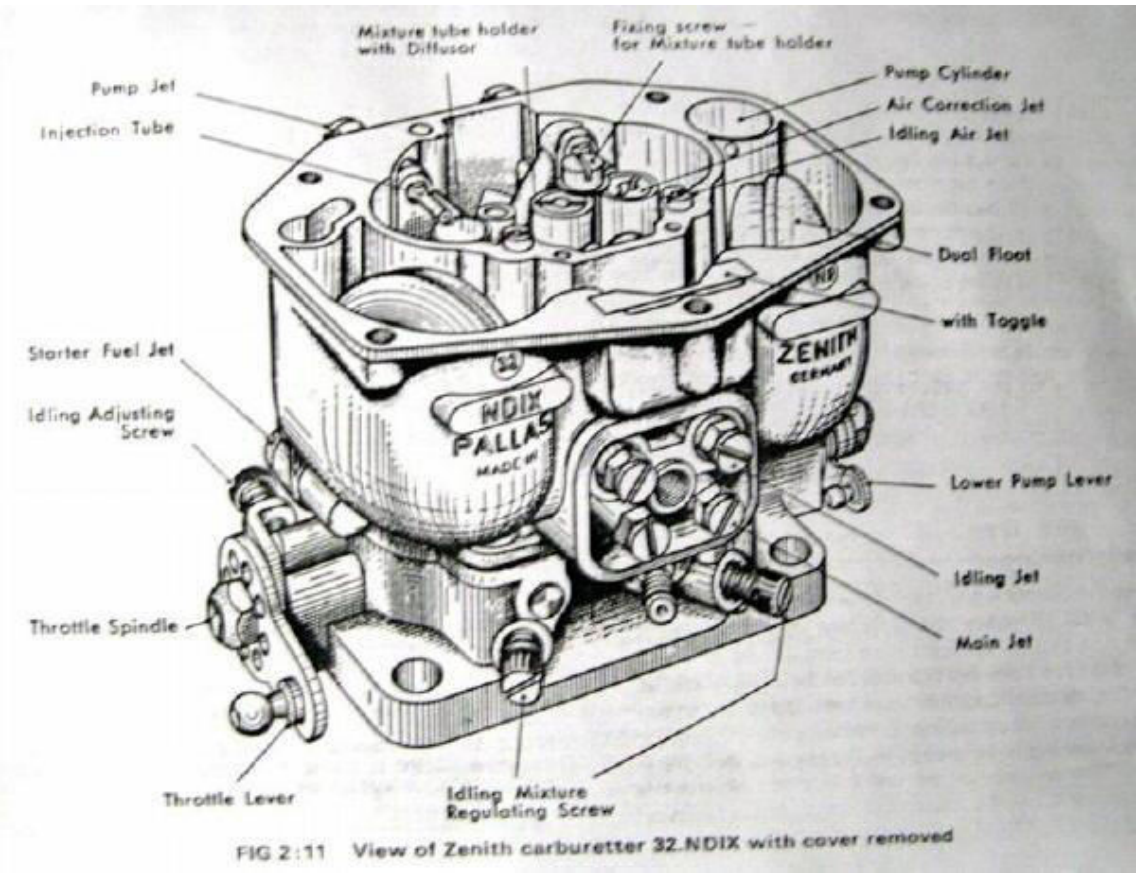

FIG 2:11 View of Zenith carburetter 32 NDIX with cover removed