FUEL SYSTEM

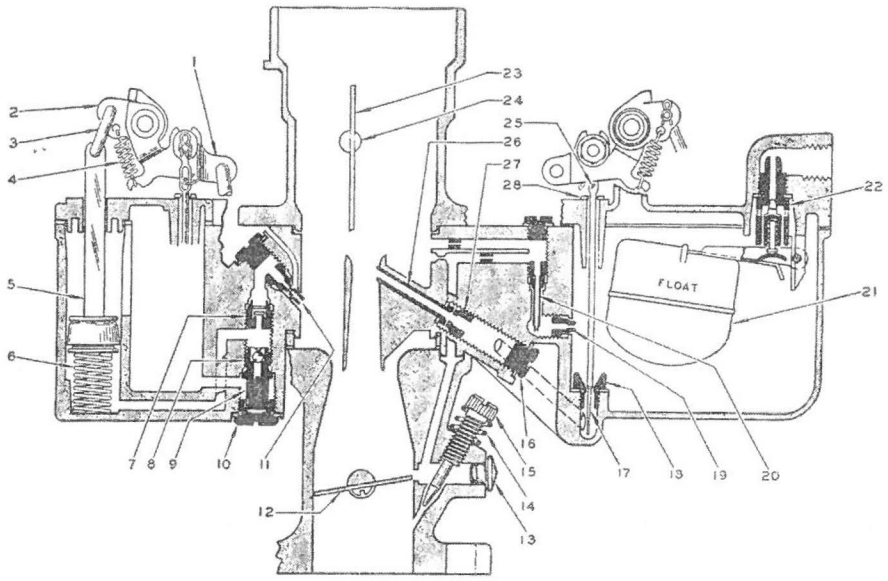


FIG. 1—CARBURETOR

No.	Willys Part No.	Ford Part No.	Name
1	116537	GPW-9529	Pump Operating Lever Assembly
2	116181	GPW-9528	Pump Arm and Collar Assembly
3	116199	GPW-9527	Pump Connecting Link
4	116187	GPW-9570	Pump Arm Spring
5	116195	GPW-9631	Pump Plunger and Rod Assembly
6	116188	GPW-9636	Pump Plunger Spring
7	116204	GPW-9594	Discharge Disc Check Assembly
8	116205	GPW-9576	Intake Ball Check Assembly
9	116175	GPW-9575	Pump Check Strainer
10	116163	GPW-9696	Pump Check Strainer Nut
11	116180	GPW-9940	Pump Jet
12	116154	GPW-9585	Throttle Valve
13	116162	GPW-9579	Idle Port Rivet Plug
14	116183	GPW-9578	Idle Adjustment Screw Spring
15	116176	GPW-9541	Idle Adjustment Screw
16	116164	GPW-9928	Pump Jet also Nozzle Passage Plug and Gasket Assembly
17	116540	GPW-9906	Metering Rod
18	116541	GPW-9914	Metering Rod Jet and Gasket Assembly
19	116179	GPW-9544	Idle Well Jet
20	116539	GPW-9533	Low Speed Jet Assembly
21	116172	GPW-9550	Float and Lever Assembly
22	116174	GPW-9567	Needle, Pin, Spring and Seat Assembly
23	116157	GPW-9549	Choke Valve Assembly
24	116545	GPW-9546	Choke Shaft and Lever Assembly
25	116538	GPW-9907	Metering Rod Spring
26	116166	GPW-9922	Nozzle
27	116161	GPW-9562	Nozzle Retainer Plug
28	116206	GPW-9905	Metering Rod Disc

The Fuel System, Fig. 2, consists of the Fuel Tank, Fuel Lines, Fuel Filter, Fuel Pump, Carburetor and Air Cleaner.

The most important attention necessary to the fuel system is to keep it clean and free of water.

It should be periodically inspected for leaks.

The fuel tank capacity is given on Page 3. The tank sets in a sump in the floor pan and two drain holes are incorporated in this sump to allow for flushing. When the vehicle leaves the factory a cap is placed over the front drain hole to keep out stones and dirt and another is placed in the glove compartment. Should maneuvers in water be necessary, install the second cap over the rear drain hole from the left side of the vehicle. After passing through the water remove cap and return it to the glove compartment.

CAUTION—Whenever the vehicle is to be stored for an extended period, the fuel system should be completely drained. The engine started and allowed to run until carburetor is emptied. This will avoid oxidation of the gasoline, resulting in the formation of gum in the units of the Fuel System.

Information pertaining to the operation and servicing of the units contained in fuel system are covered in the succeeding paragraphs.

Carburetor

The Carter Carburetor, Model WO-539S, Fig. 1, is the plain tube type with a throttle operated accelerator pump and economizing device.

Since carburetion is dependent in several ways upon both compression and ignition, it should always be checked last in an engine tune-up.

The carburetor delivers the proper fuel and air ratios for all speeds of the engine. By proper cleaning and replacing all worn parts, the carburetor will function correctly.

The carburetor can be divided into five circuits which are:

1. Float Circuit
2. Low Speed Circuit
3. High Speed Circuit
4. Pump Circuit
5. Choke Circuit

By treating each circuit separately, the study and repair of the carburetor is made much easier.

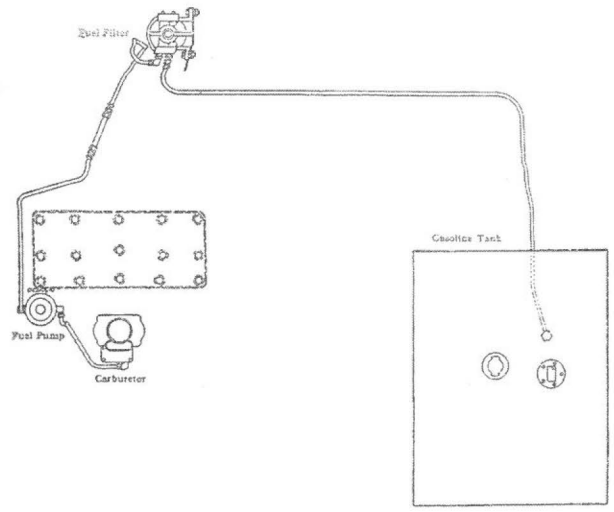


FIG. 2—FUEL SYSTEM

Float Circuit or Fuel Level

The float circuit Fig. 3, is important because it controls the height of the fuel level in the bowl and in the nozzle. If the fuel level is too high, it will cause trouble in the low and the high speed circuits.

The float bowl No. 3, acts as a reservoir to hold a supply of fuel. The level of the fuel in the bowl is controlled by a combination of parts which are: float and lever assembly No. 2, float bowl cover No. 4, needle valve and seat assembly No. 1.

Low Speed Circuit

The idle or low speed circuit, Fig. 4, controls the supply of fuel to the engine during idle and light load speeds up to approximately 20 miles per hour, and it feeds a small amount of fuel during the entire operation of the high speed circuit (gradu*ally decreasing as speed is increased, above 20* m.p.h.).

During idling and low speed operation of the engine, fuel flows from the float bowl through the idle jet No. 8, to the point where it combines with a stream of air coming in through the by-pass, No. 9. The combining of the air with the fuel atomizes or breaks up the fuel into a vapor.

This mixture of air and fuel continues on through the economizer No. 10 until it begins to pass the point where it is further combined with a stream of air coming in through the lower bleed No. 11. This mixture of fuel and air then flows downward to the idle port chamber and thence into the engine at the port No. 12 and through the idle adjusting screw seat just below. This mixture is richer than the engine requires but when mixed with the air coming past the throttle valve it forms a combustible mixture of the right proportion for idle speeds.

The idle port is slotted so that as the throttle valve is opened it will not only allow more air to come in past it, but will also uncover more of the idle port allowing a greater quantity of fuel and air mixture to enter the intake manifold.

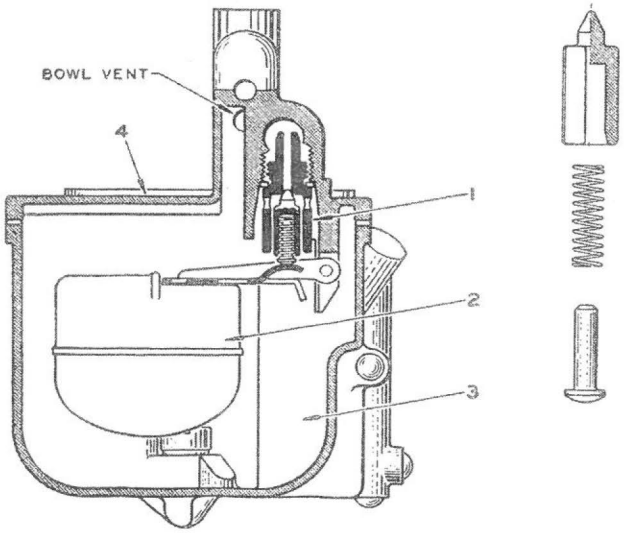


FIG. 3—FLOAT CIRCUIT

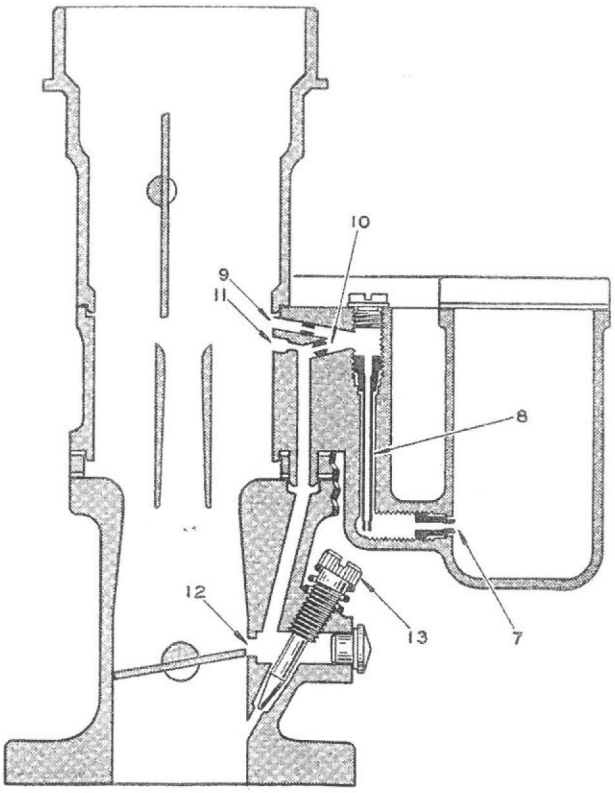


FIG. 4—LOW SPEED CIRCUIT

When the idle speed position of the throttle is fixed at an idle speed of 8 miles per hour, it leaves enough of the slotted port as reserve to cover the range in speed between idle and the time when the high speed system begins to cut in.

The idle adjusting screw No. 13 varies the quantity of the idle mixture.

High Speed Circuit

The high speed circuit, Fig. 5 cuts in as the throttle is opened wide enough for a speed of a little more than 20 miles per hour. The velocity of the air flowing down through the carburetor throat creates a pressure slightly less than atmospheric pressure at the tip of the main nozzle, No. 20.

Since the fuel in the float bowl is acted upon by atmospheric pressure, the difference in pressure between the two points causes fuel to flow from the bowl through the metering jet and out the main nozzle into the throat of the carburetor.

At higher speeds the area of the opening between the jet No. 17 and the metering rod No. 16 governs the amount of fuel going into the engine. At top speeds, the smallest section of the rod is in the jet.

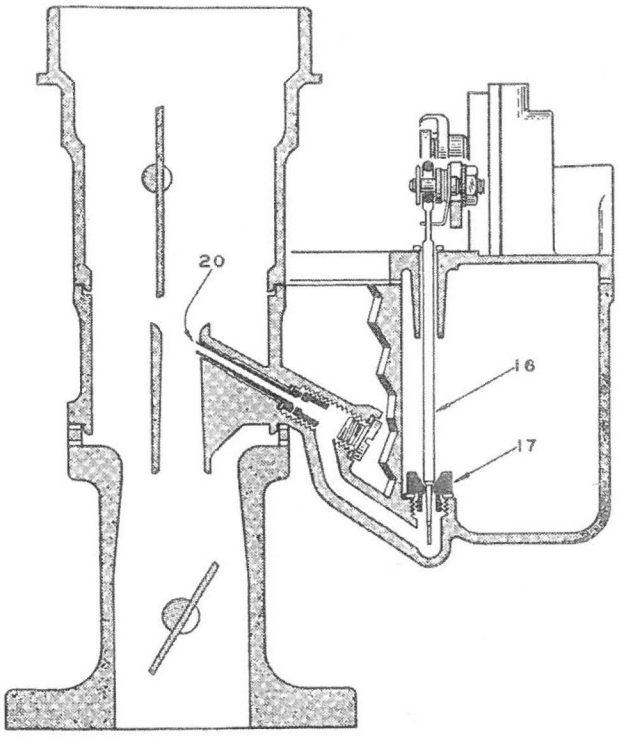


FIG. 5—HIGH SPEED CIRCUIT

Accelerating Pump Circuit

As the accelerator pedal is depressed, the pump plunger and lever are forced downward. This causes the fuel to leave the cylinder; closes the intake check valve No. 29, Fig. 6, opens the discharge check valve No. 30, and forces fuel into the throat of the carburetor at No. 33.

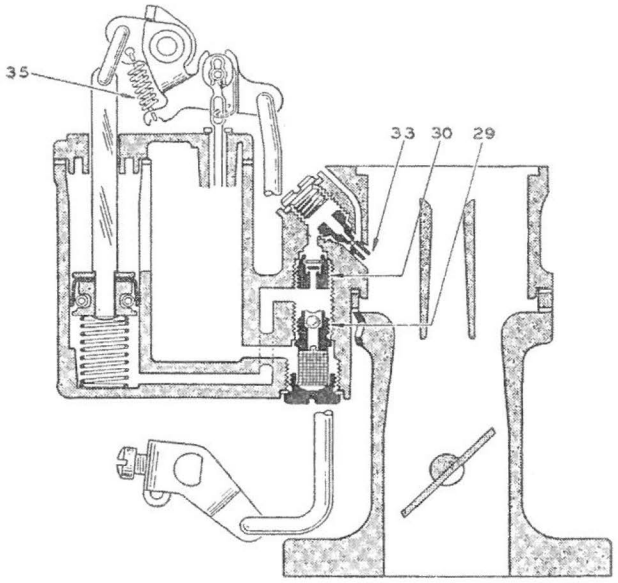


FIG. 6—PUMP CIRCUIT

The action is prolonged by the pump arm spring, No. 35, Fig. 6, since the hole in the top of the pump jet No. 33 restricts the flow of fuel so long as it is being forced out by the pump cylinder. The prolonging of the pump discharge gives the fuel in the high speed circuit sufficient time to flow fast enough to satisfy the demands of the engine.

As the accelerator pedal is allowed to return to its original position, the pump plunger is lifted upward. This creates a reduced pressure in the pump cylinder which opens the intake check valve No. 29 and closes the discharge check valve No. 30, thereby drawing in a new charge of fuel from the bowl.

Choke Circuit

This circuit, Fig. 7 is used only in starting and the warming up of the engine, by reducing the amount of air allowed to enter the carburetor and, thereby producing a richer mixture. It consists of the choke shaft and lever assembly No. 39, choke operating lever and spring No. 40, choke valve No. 37, and screws No. 38.

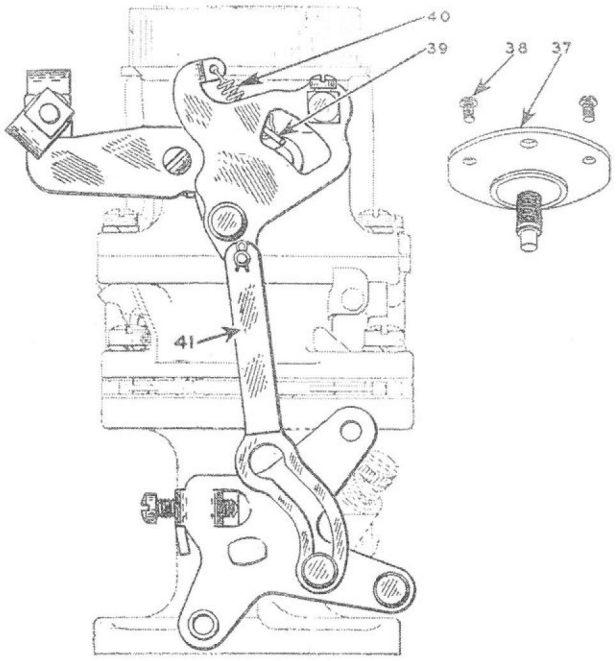


FIG. 7—CHOKE CIRCUIT

SERVICING AND ADJUSTMENT

Float Circuit

The Float Circuit is illustrated in Fig. 3.

If float is loaded with fuel or damaged, or if the holes for the pin are worn, the carburetor will flood. Poor action of float needle results if the lip of the float bracket is worn. In this event, it should be smoothed with emery cloth.

The needle and seat may leak because of wear, damage or sticking and will cause the carburetor to flood. Needles and seats are available only in matched sets. Never replace the needle without replacing the seat.

In determining the float level, Fig. 8, first turn the bowl cover gasket around and with the bowl cover in the position as shown, the float by its own weight, should rest at (3/8") as indicated by the gauge.

To make a change in the float level, it is best to press down with a screw driver on the brass lip of the float, holding up on the float while assembled to the cover of the carburetor. Bending the lip in this way allows it to retain its curvature which is necessary for the correct operation of the float valve.

Be sure the spring and pin in valve are in position and that the spring has not been stretched.

Low Speed Circuit

In the low speed circuit Fig. No. 4 it will be found that the fuel for the low speed circuit does not come through the main metering jet, but through the well jet No. 7, and the low speed jet No. 8, the openings of which are carefully calibrated, so if they are damaged or worn they should be replaced. The jets should always be tightly seated.

The by-pass and air bleed holes, No. 9 and 11, may be restricted. Carbon deposit which forms in the throat of the carburetor may restrict the air bleed holes to the extent that insufficient air will be supplied to mix the fuel before it reaches the idle port, No. 12.

This condition will generally be indicated if it is necessary to screw the idle mixture adjusting screw, No. 13, in closer than the minimum limit of ½ turn. If the condition is bad, a rolling idle may continue even after the idle mixture adjusting screw is screwed entirely in against the seat. These air bleed holes may be cleaned with a soft copper wire.

The idle port must be clean and unrestricted. If it is damaged, the engine will not perform properly at low speeds and a new casting will be necessary.

A letter "C" enclosed within a circle is stamped on the face of the throttle valve. When installed in the carburetor, this side should be toward the idle port, and facing the intake manifold as viewed from the bottom.

To properly center the valve in the throat of the carburetor, the screws should be started in the shaft, and then with the valve tightly closed, (throttle lever adjusting screw backed out), it should be lightly tapped. This will centralize the valve in the bore. Pressure should then be maintained with the fingers until the screws are tightened.

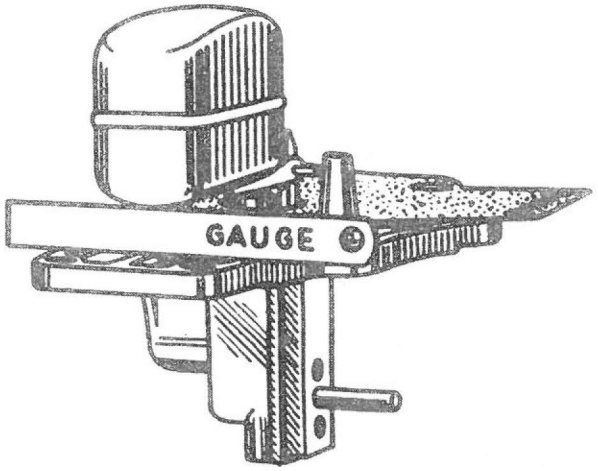


FIG. 8—FLOAT LEVEL SETTING

If the carburetor bore is restricted with carbon deposit it will be necessary to open the throttle wider than the specified opening to obtain the proper idle speed. Opening the throttle more than the specified amount in order to obtain the proper idle will then uncover more of the slotted idle port than was intended. This will result in leaving an insufficient amount of the idle port as a reserve to cover the period between idle and 20 miles per hour, where the high speed system begins to cut in. A flat spot on acceleration will result. Clean by scraping or with emery cloth.

High Speed Circuit

It is rarely necessary to remove the main nozzle No. 20, Fig. 5. It can usually be cleaned by removing plug and blowing out with compressed air. If it is damaged and requires replacing make sure, upon installation, only one gasket is between nozzle and its seat in the casting.

If the carburetor has been in service for a long time or has been tampered with, it may be found the metering rod is improperly adjusted or worn. A worn metering rod will have the effect of a rich mixture above 20 miles per hour. If the metering rod is worn, the metering rod jet will also be worn and both should be replaced.

To adjust metering rod, back out throttle lever adjusting screw "C" Fig. 9, and close throttle tight. Using gauge T-109-26, loosen nut "B" Fig. 9, and move pin until it seats in notch of gauge. Tighten nut securely. Remove gauge and install metering rod, disc, and connect spring through hole in metering rod.

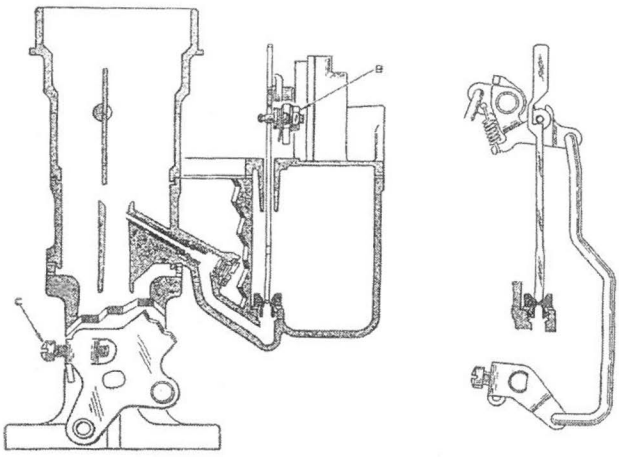


FIG. 9—METERING ROD GAUGING

Accelerating Pump Circuit

If the pump plunger is worn, sticks, or the spring under the leather has lost its tension, replace the plunger assembly No. 5, Fig. 1.

If the Accelerator Pump Intake Valve (ball check) No. 29, Fig. 6 leaks, part of the pump discharge will be forced back through the valve into the float bowl, thereby causing an insufficient amount of fuel to be discharged from the Jet No. 33. If the valve cannot be cleaned with compressed air, it must be replaced.

If the Accelerator Pump Discharge Valve (Disc check) No. 30 leaks, air will be drawn into the pump cylinder on the upstroke of the plunger. This gives an insufficient charge of fuel into the throat of the carburetor upon acceleration causing a flat spot. If the valve cannot be cleaned with compressed air so that it works properly, it must be replaced.

If the Accelerating Pump Arm Spring No. 35 is weak or damaged, it will cause poor acceleration.

If the hole in the Accelerating Pump Jet No. 33 is too large, the accelerating charge will be allowed to pass too fast and will make the mixture too rich. An enlarged jet must be replaced. A jet loose on its seat gives the same effect. A clogged jet will result in a stumble on acceleration.

To adjust the pump stroke, the pump gauge T-109-117S should be used. First back out the throttle adjusting screw "C", Fig. 9, so that it does not touch the casting. In gauging the pump stroke, place the gauge on top of the bowl cover, open the throttle wide then measure to the top of the pump rod. Close throttle tight and measure again. The difference should be $^{17}/_{64}$". To adjust the stroke, bend the throttle connector rod at "A" Fig. 10. ALWAYS SET THE PUMP BEFORE SETTING THE METERING ROD. If set afterwards the metering rod will be thrown out of adjustment.

Throttle Connector Rod and Throttle Shaft Arm Assembly may be worn, and allow the throttle valve to be opened by the accelerator pedal before the pump jet begins to discharge gasoline, resulting in a flat spot. Replace all worn parts, because the operation of the metering rod is also affected.

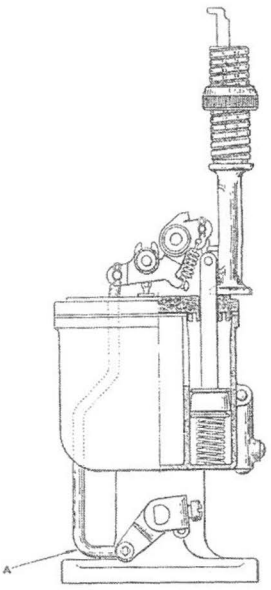
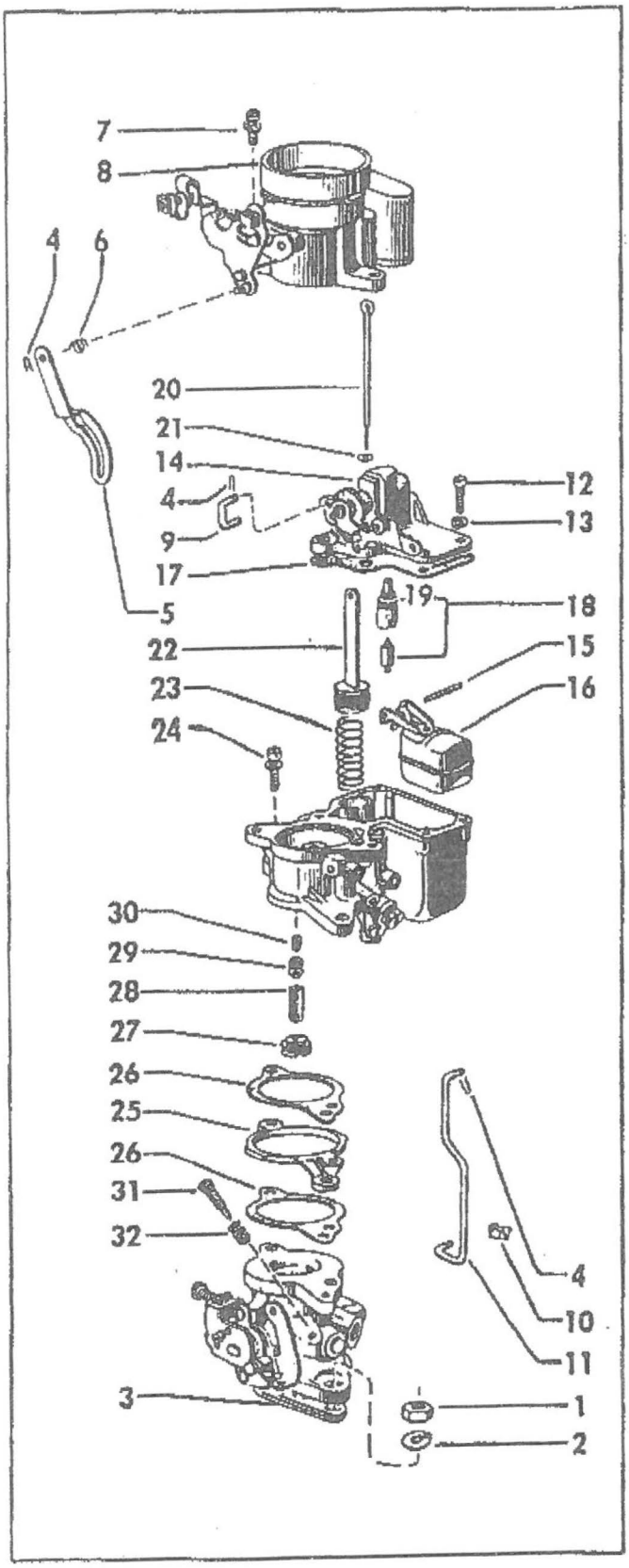


FIG. 10—PUMP TRAVEL GAUGING

PARTS LIST

CARTER WO TYPE CARBURETORS



Ref. No.	Nomenclature
1	Nut - Flange
2	Lockwasher - Flange Stud
3	Gasket & Diffuser Assembly - Flange
4	Spring - Pin
5	Link - Choke Connector
6	Spring - Connector Link
7	Screw & Washer Assembly
8	Air Horn Assembly
9	Link - Connector
10	Retainer - Spring
11	Rod - Connector
12	Screw - Bowl Cover Attaching
13	Washer - Bowl Cover Screw
14	Bowl Cover Assembly
15	Pin - Float Lever
16	Float & Lever Assembly
17	Gasket - Bowl Cover
18	Needle & Seat Assembly
19	Gasket - Needle Seat
20	Rod - Metering (Standard) (One Size Lean)
21	Disc - Metering Rod
22	Plunger & Rod Assembly
23	Spring - Pump
24	Screw & Washer Assembly
25	Insulator
26	Gasket - Body Flange
27	Plug & Gasket Assembly - Pump Check
28	Strainer - Gauze
29	Check Assembly - Intake Ball
30	Check Assembly - Discharge Disc
31	Screw - Idle Adjustment
32	Spring - Idle Adjustment Screw
	Gage - Metering Rod (Not Illustrated)