FORD CARBURETOR

The Ford type dual carburetor (formerly marked "Chandler-Groves") was first used on the 1938 Ford and Lincoln-Zephyr cars. It is a plain tube dual downdraft-type and any mechanic understanding plain tube carburetors should have no difficulty with this model.

For jet and venturi sizes for the various models, see specification section.

In this type all the main channels are carried in a removable nozzle bar (see insert Fig. 2) which carries the idle tube and an aspirating nozzle. (Aspiration means the act of breathing). The central portion of the nozzle bar forms the discharge nozzle. In this construction it is possible to locate the discharge nozzle in the center of the air stream without having attaching brackets or bosses which interfere with the flow of air into the venturis.

The discharge nozzle proper is located in the smallest part of the venturi, (see Fig. 1) is circular and of such diameter as to create a high suction at the end of the nozzle. This suction, in addition to the atomizing holes in the nozzle, helps to completely vaporize the fuel.

This dual carburetor can be considered as two carburetors built into one unit. There is a separate set of venturi, idle tubes, nozzle bars, main metering system, idle system and throttle plates, one for each side. There is one accelerating pump with the fuel being divided at the pump discharge nozzle, (shown in the insert Fig. 4, Page 47) one air chamber and one fuel chamber. There is one power valve which takes the fuel from the fuel chamber through one passage and divides the fuel evenly for each side.

In the following explanations one barrel is generally referred to unless mentioned otherwise.

CHOKE

The choke valve is mounted on a shaft located off center in the air passage as shown in Fig. 1. A torsion spring "S" tends to close the choke valve when the choke lever is moved to the choke position. There is a certain amount of free movement in the mechanism at part choke position so that if the choke is partially closed to operate at a relatively low speed, the inrushing air at a higher speed will force the valve open and compensate for the increased speed.

This, however, does not mean that the car can or should be continuously operated with the choke control in part choked position. With full choke the valve is held in locked position by the control lever. If the choke is held in full closed position after the engine fires, a poppet valve or air bleeder "T" in the choke valve will open. This supplies enough air to keep the engine running and eliminates choke sensitivity.

The opening of this poppet valve and the rush of air flowing through it makes considerable noise, which should attract the owner's attention to the fact that the choke button is out and will continue to make this noise until the choke button is pushed either all the way in, or to a part choke position.

When the carburetor is choked the throttle valve is automatically open to the correct position for starting. For this reason it is neither necessary nor desirable for the operator to pull out the throttle button, or pump the accelerator when starting.

In full choke position, everything below the choke valve is subjected to intake manifold vacuum and the bulk of the fuel is supplied by the main discharge nozzles.

Fig. 1 shows the idle speed adjusting screw and part of the choke mechanism.

IDLE FUEL SUPPLY

The fuel from the carburetor bowl passes through the main metering jet into the idle

EQUIPMENT USED

9510A—JET WRENCH
9510D—FUEL LEVEL GAUGE

ABOVE APPLIES TO MODELS:

ALL STARTING 1938

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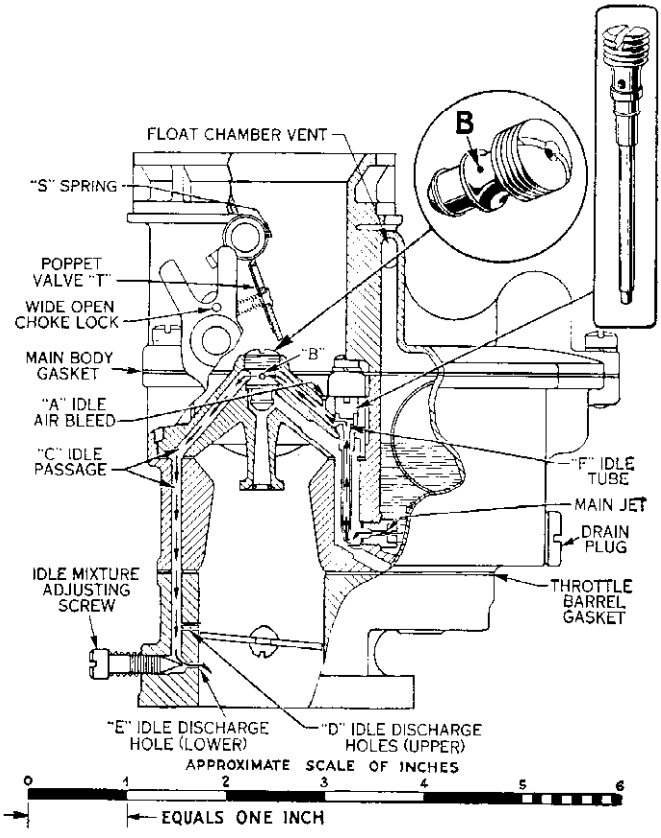
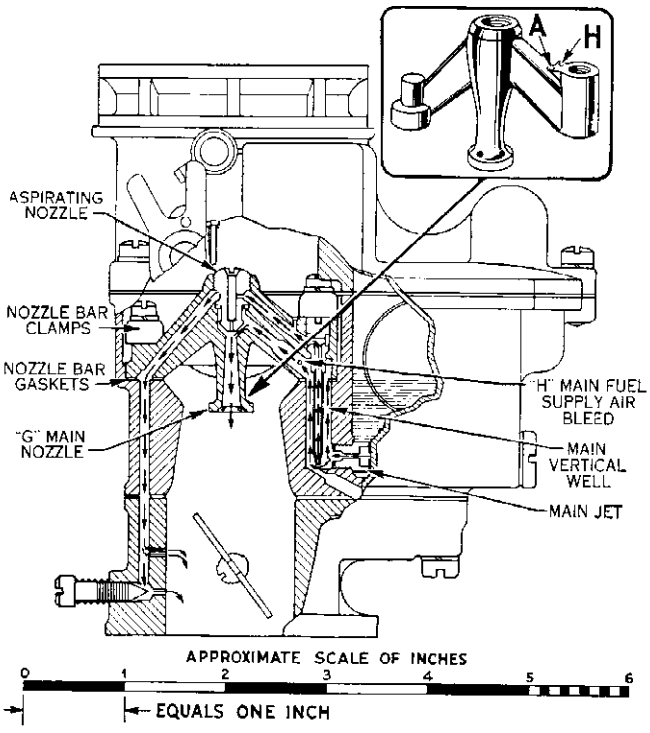
tube "F" as indicated by the arrows in Fig. 1. Air is introduced into the fuel stream by the idle air bleed "A" and a small additional amount of air is bled in by a small hole "B" in the aspirating nozzle (see insert Fig. 1). The idle mixture goes around the aspirating nozzle by means of an undercut around its outside diameter as shown. The mixture then travels down the idle passages "C" to the idle discharge holes "D" and "E".

When the engine is set to a speed of 350 RPM, the mixture is discharged out of the lower hole "E" only. As the throttle plate opens and the speed is increased, the upper holes "D" start discharging. In this carburetor the lower holes only discharge from idle to about 450 RPM. The upper holes very gradually start discharging, in addition to the lower holes, from about 450 RPM to 1250 RPM. The action and timing are such that upper discharge holes gradually start to feed, reach a maximum about 750 RPM and then gradually become less effective as the main nozzle starts.

The lower discharge holes are provided with an idle mixture adjustment. Turning the needle out gives a richer mixture and in, a leaner mixture. The idle adjustments should be set for the highest and steadiest vacuum reading as described under Operation 9510-E, Page 13. The idle adjustment should not be jammed against the seat hard enough to groove the point. If this occurs the adjusting screws will have to be replaced in order to obtain a satisfactory idle adjustment.



IDLE FUEL SUPPLY
Fig. 1



MAIN FUEL SUPPLY
Fig. 2

ABOVE APPLIES TO MODELS:

ALL

EQUIPMENT USED

9510A—JET WRENCH
9510D—FUEL LEVEL GAUGE

Nov. 25, 1938

File under Fuel (Note Both Subject and Page Nos.)

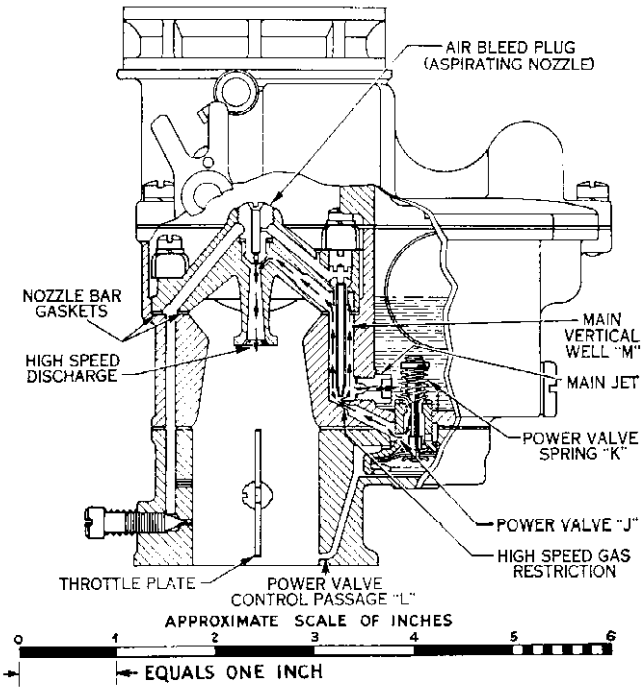
Ford Carburetor (Cont'd)

MAIN FUEL SUPPLY

As the idle system becomes less effective, the main nozzle "G" starts to deliver fuel. This occurs at about 900 RPM. Between 900 RPM and 1250 RPM there is a definite blend of the idle system and the main metering system. The power valve remains closed in this range, and approximately up to 3800 RPM except under load which cause manifold vacuum to drop. In this range all the fuel passes through the main jets, as shown in Fig. 2, up through the main vertical well, then up and around the idle tube. The main fuel is emulsified by air entering at the main fuel supply air bleed "H" which lightens the fuel and makes the mixture more responsive to throttle changes. The mixture is again aspirated by the aspirating nozzle as it starts down the main nozzle "G".

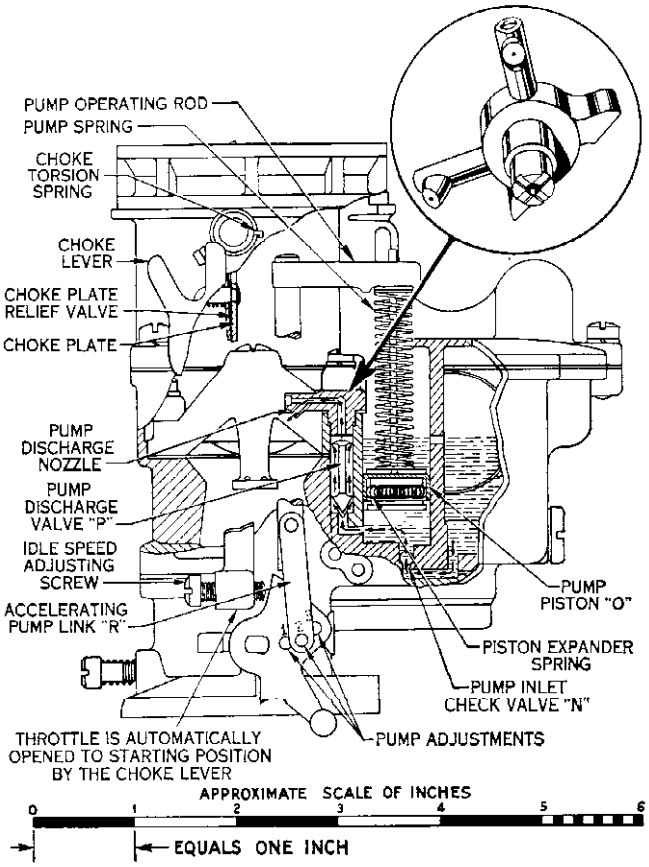
The nozzle bars are held in place by clamps and the channels sealed against leaks by the nozzle bar gaskets. In disassembling and assembling these nozzle bars, care should be taken to see that the gaskets are in place and in good condition and that the clamp screws are tight. When removing jets, be sure a screw driver which fits the slot is used. This will eliminate the danger of slipping and damaging the metering orifice.

The power valve "J" (shown in Fig. 3) is operated by the vacuum below the throttle plate through passage "L" and the power valve spring "K". At idle, the vacuum is the



Power Fuel Supply

Fig. 3



Acceleration Fuel Supply

Fig. 4

EQUIPMENT USED

9510A—JET WRENCH
9510D—FUEL LEVEL GAUGE

ABOVE APPLIES TO MODELS:

ALL STARTING 1938

highest and decreases as the load increases. The diaphragm (actuated by vacuum) holds the power valve on its seat until the vacuum drops to from 8½ to 9 inches of mercury where it is not high enough to resist the action of the spring. This point at level road running at a constant speed is approximately 3800 RPM.

Under load as in climbing hills, etc., the vacuum drops as it becomes necessary to open the throttle wider in order to maintain speed. When the vacuum drops to from 8½ to 9 inches of mercury the power valve is opened by the spring the same as when the engine speed exceeds 3800 RPM on level road and the fuel then flows into the power valve and channels and through the high speed gas restrictions into the center or main vertical well "M", as shown by the arrows in Fig. 3. This gives the additional fuel required for high speeds and for heavy loads at full throttle and low speeds.

ACCELERATING PUMP

The accelerating pump is directly connected to the throttle and its function is to slightly enrich the mixture for rapid acceleration. Referring to Fig. 4, fuel is drawn into the pump chamber through the pump inlet check valve "N" on the up-stroke of the pump piston (closing the throttle). When the throttle is opened the piston "O" moves down closing the pump inlet check valve and overcoming the weight of the pump discharge valve needle. The accelerating fuel then goes around the pump discharge valve "P" and out the pump discharge nozzle (see insert Fig. 4). Free movement against a spring load is provided in the pump piston stem and the pump operating rod to give a prolonged discharge when the throttle is opened suddenly.

The accelerating pump is provided with an adjustment for varying the quantity of the accelerating charge. This adjustment is made by changing the position of the pump link "R". The positions are marked 1, 2 and 3. Number 2 is the average setting; Number 1 the summer or hot weather setting, and Number 3 the extremely cold weather setting.

Failure of the **accelerating pump** is mostly due to dirt in the pump inlet check ball seat. This **can be checked by removing** the carburetor **air horn and operating** the **pump** with just a small amount of fuel in the bowl. **If** the **check is leaking, air or fuel will bubble back into the fuel bowl from** the **inlet hole.** When cleaning this seat care should be used in re-installing the pump piston to be sure the leather is not damaged.

ABOVE APPLIES TO MODELS:

ALL STARTING 1938

EQUIPMENT USED

9510A—JET WRENCH
9510D—FUEL LEVEL GAUGE

DUAL CARBURETOR "STROMBERG"

While different models of the dual Stromberg carburetors have been and are still being used on the various types of engines, enough similarity exists between them that the mechanic who understands the functioning of one can readily understand all of these various models.

Various jet and venturi sizes are used and the carburetors are not interchangeable as a rule.

Jet and venturi size information is given in the specifications section for all Ford V-8 (both 85 H.P. and 60 H.P.), Lincoln-Zephyr, and Lincoln carburetors.

The dual downdraft Stromberg carburetor was first adopted for the 1931 Lincoln car.

In conjunction with dual manifolding, the Stromberg dual downdraft carburetor was first used on the 1934 Ford V-8 cars.

These carburetors are of the plain tube type using an air bled main discharge tube and a double venturi (Fig. 1). The secondary venturi is located above the primary venturi, and, discharging below the point of greatest restriction in the primary venturi takes full advantage of the unbalanced pressures, or the difference in pressure at the two ends of the secondary venturi, i.e., atmospheric pressure at the upper end and the stepped-up vacuum at the lower end. In this way the rate or speed of the air flow is greatly increased.

The dual carburetor can be considered as two carburetors built into one compact unit. There is a separate set of venturi tubes, main metering system, idle system, throttle plate and pump discharge nozzle for each barrel. These are fed with fuel by one accelerating pump, one fuel chamber and air through one air passage.

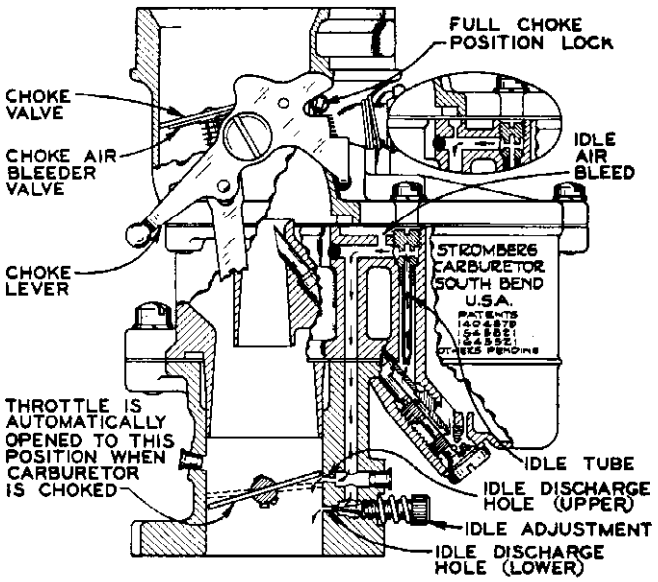
In the explanation that follows, one barrel is generally referred to unless mentioned otherwise.

Idling—Fuel Supply

The fuel from the carburetor bowl passes through the main metering jet into the idle tube as indicated by the arrows in Fig. 1. Air enters the fuel stream at the idle air bleed and the mixture of fuel and air then travels downward to the idle discharge holes.

With throttle stop screw set so that throttle plate is open to a speed equivalent of 5 to 7 miles per hour, as indicated by the dotted lines, the lower discharge only is subjected to intake manifold vacuum. As the throttle is opened to increase the engine speed the throttle plate is moved above the upper idle discharge hole and fuel mixture discharges from both idle holes.

The lower discharge hole is provided with an idle adjustment. Turning **out** the needle gives a richer mixture and turning **in** a leaner mixture. The idle adjustments should be set for the highest and steadiest vacuum reading



IDLE FUEL SYSTEM

Fig. 1

EQUIPMENT USED

KRW—V-160 JET WRENCH	$ .60
KRW—VZ-190 DISCHARGE TUBE PULLER	.60
KRW—V-134 FLOAT LEVEL GAUGE	2.00

ABOVE APPLIES TO MODELS:
Ford V-8 since 1934
Lincoln-Zephyr
All Lincolns since 1931

Printed in U.S.A.

as described under operation 9510-E, page 13. If idle adjustments have been damaged with a groove on the valve point, they should be replaced in order to obtain a satisfactory adjustment.

The idle adjustment on type DD carburetor, used on **Lincoln cars** during **1931, 1932 and 1933,** controls the air flow rather than the fuel. Turning **out** the needle valve on these carburetors gives a leaner mixture and turning **in** a richer mixture.

Main Fuel Supply

The idle system is in operation up to approximately 18 to 22 M.P.H. in which range the main metering system begins to function and furnishes fuel up to approximately 76 M.P.H. on 85 H.P. Ford V-8, Lincoln-Zephyr and Lincoln cars and approximately 70 M.P.H. on 60 H.P. At this point the power jet also cuts in.

The fuel passes through the main metering jet into the main discharge tube where air is bled from the high speed bleeder into the fuel stream (Fig. 2). The air completely surrounds the main discharge nozzle and by entering it at several places forms bubbles to create an emulsion. This makes the fuel lighter in weight and more responsive to throttle valve movement. The fuel from the idle tubes is also taken into the main nozzle.

The main discharge tube is held in position by the main metering jet. The metering jet should be assembled securely in the body, but without excessive pressure to avoid the possibility of causing the air bleed holes to close, resulting in too rich a mixture and poor low speed performance. The main nozzle was later designed to have two bleeder holes at the top instead of four holes.

On Ford V-8 and Lincoln-Zephyr carburetors When removing or assembling the metering jets use K. R. Wilson V-160 wrench.

On Lincoln carburetors When removing or assembling the metering jets use a special wrench supplied by Stromberg.

If difficulty is encountered in removing main discharge tube use K. R. Wilson remover VZ-190. Do not attempt to remove a tight tube by applying pressure on tip of nozzle.

When assembling main nozzle, place it so that the discharge opening is in vertical position as shown in Fig. 2.

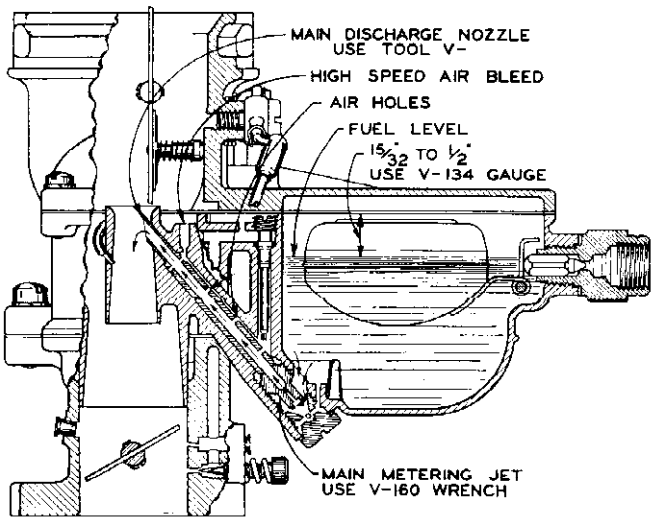


Fig. 2

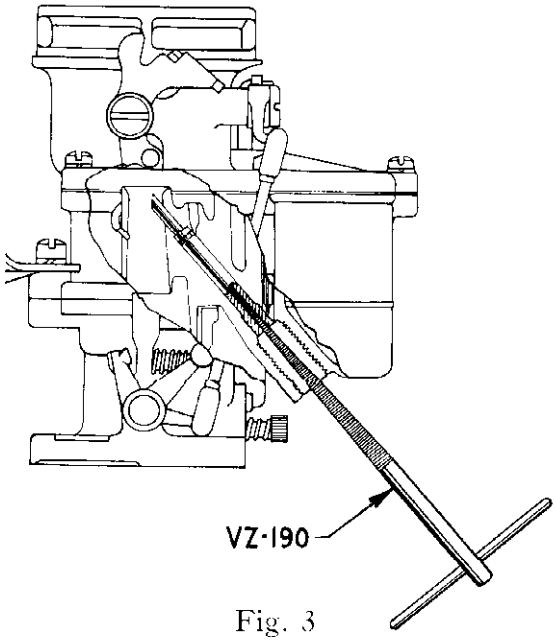


Fig. 3

ABOVE APPLIES TO MODELS:
Ford V-8 since 1934
Lincoln-Zephyrs
All Lincolns since 1931

EQUIPMENT USED

KRW—V-160 JET WRENCH	$ .60
KRW—VZ-190 DISCHARGE TUBE PULLER	.60
KRW—V-134 FLOAT LEVEL GAUGE	2.00

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Stromberg Dual Carburetor (Cont'd)

Accelerating Pump

An accelerating pump directly connected to the throttle is provided to slightly enrich the mixture for rapid acceleration.

Referring to Fig. 1, fuel is admitted to the pump cylinder through the pump inlet check valve. When the throttle is opened the pump moves downward and the pressure on the gasoline closes the inlet check valve and opens the spring loaded valve of the power jet, permitting the fuel to be forced out through the accelerating pump discharge jet and nozzle. Free movement is provided in the pump lever assembly to prolong the discharge of the fuel when suddenly accelerating from closed throttle to part open position.

Starting in 1936 on the Ford V-8 and in 1938 on the Lincoln-Zephyr and Lincoln, the accelerating pump (see Figs. 1, 2 and 3) was made adjustable and should be changed for winter and summer. In the winter a greater discharge from the pump is desirable; this can be obtained by assembling the accelerating pump rod at the position farthest from the center of the throttle stem. Assembling the pump rod in position nearest the center of throttle stem cuts down the accelerating pump discharge and is the summer adjustment.

If necessary to remove pump piston, make

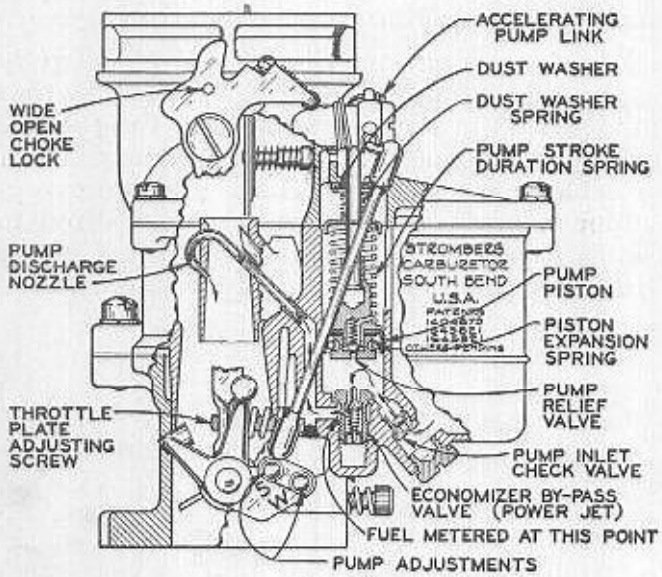
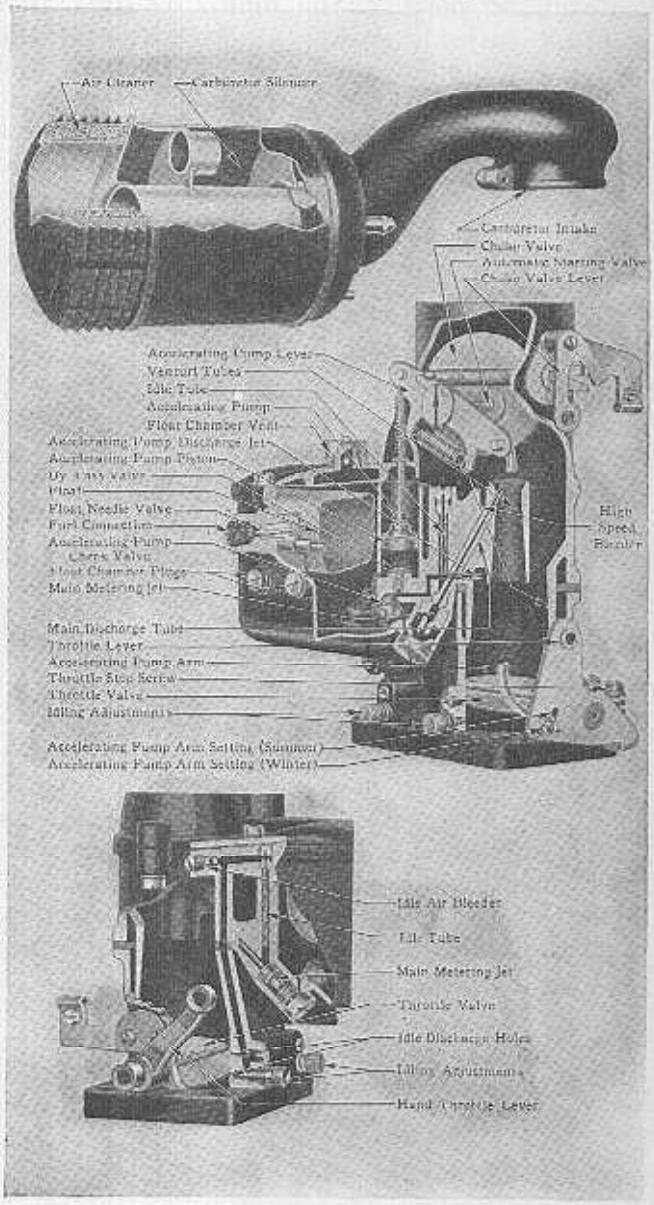


Fig. 1



1938 Lincoln Carburetor

Fig. 2

EQUIPMENT USED

ABOVE APPLIES TO MODELS:
Ford V-8 since 1934
Lincoln-Zephyr
All Lincolns since 1931

Printed in U.S.A.

certain on reassembling that piston bears evenly on the entire circumference of the cylinder.

Power Jet

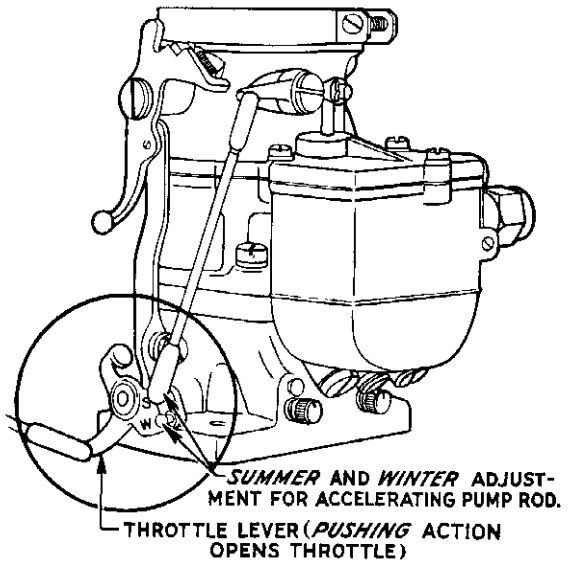
When the throttle is opened to a predetermined position the pump piston makes contact with the spring loaded valve of the power jet, holding the valve off the seat and permitting fuel to flow through the jet and the pump discharge nozzles. The additional fuel is required to richen the mixture for increased speed or operating under heavy load.

Choke

The choke valve is mounted on a floating stem that is located off-center in the air passage. A spring connects the choke control lever to the valve stem, so that, when the choke control lever is in part closed position, the inrushing air forces the choke valve open against the tension of the connecting spring.

This, however, does not mean that the car can or should be continuously operated with the choke control in part choked position. With full choke the valve is held in locked position by the control lever. If choke is held in full closed position after the engine fires, a poppet valve or air bleeder is incorporated in the choke valve to supply air to keep the engine running.

The opening of this poppet valve, and the rush of air flowing through it, make considerable noise, which should attract the owner's attention to the fact that the choke button is out, and will continue to make this noise until the choke button is pushed, either all the way in, or to a part choke position.



1938 Lincoln-Zephyr Carburetor

Fig. 3

When the carburetor is choked, the throttle valve is automatically open to the correct position for starting. For this reason it is neither necessary nor desirable for the operator to pull out the throttle button when starting.

In this position the throttle valve is directly opposite the upper idle discharge hole so that the stream of air passing around the throttle plate draws fuel for both upper and lower discharge holes. In full choke position everything below the choke valve is subjected to intake manifold vacuum and the bulk of the fuel is supplied by the main discharge tubes.

ABOVE APPLIES TO MODELS:
Ford V-8 since 1934
Lincoln-Zephyr
All Lincolns

EQUIPMENT USED

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