# FUEL SYSTEM GROUP

## INDEX



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# FUEL SYSTEM GROUP—Cont'd

## INDEX

## SECTION "D"



## SECTION "E"

## SPECIFICATIONS COVERING HOLLEY CARBURETOR MODEL 1904-FS USED ON SD-220,240 AND BD-269 ENGINES

### FUEL SYSTEM SPECIFICATIONS

| ENGINE MODELS | SD-220 | SD-240 | BD-269 |
|---|---|---|---|
| CARBURETOR (HOLLEY) MODEL NUMBER | 1904FS | 1904FS | 1904FS |
| Float Level | Use gauge (SE-1772-9-MC-145) | Use gauge (SE-1772-9-MC-145) | Use gauge (SE-1772-9-MC-145) |
| Venturi | 1-5/16" | 1-5/16" | 1-5/16" |
| Main Jet | #69 (Std. Alt.) #73 (High Alt.) | #70 (Std. Alt.) #73 (High Alt.) | #70 (Std. Alt.) #73 (High Alt.) |
| Power Jet | .052-#55 DR. | .043-#57 DR. | .0595-#53 DR. |
| High Speed Bleed | .031-#68 DR. | .031-#68 DR. | .028-#70 DR. |
| Main Well Bleed-Upper | .025-#72 DR. | .025-#72 DR. | .025-#72 DR. |
| Main Well Bleed-Lower | .025-#72 DR. | .025-#72 DR. | .025-#72 DR. |
| Idle Well Restriction | .028-#70 DR. | .028-#70 DR. | .032-#67 DR. |
| Idle Air Bleed | .055-#54 DR. | .055-#54 DR. | .0595-#53 DR. |
| Idle Transfer Hole | .0465-#56 DR. | .0465-#56 DR. | .0465-#56 DR. |
| Idle Adjusting Screw | Adjust Screw to Obtain 350 to 400 R.P.M. | Adjust Screw to Obtain 350 to 400 R.P.M. | Adjust Screw to Obtain 350 to 400 R.P.M. |
| Accelerator Pump Spring | 38R-452 (.035 Wire) | 38R-452 (Wire) | 38R-452 (Wire) |
| Accelerator Pump Link | 33R-207 | 33R-207 | 33R-207 |
| Accelerator Jet | .0293-#69 DR. | .0293-#69 DR. | .0293-#69 DR. |
| Fuel Seat | .082 | .082 | .082 |
| Used With Governor | Yes | Yes | Yes |

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# SPECIFICATIONS COVERING HOLLEY CARBURETOR MODEL 1904-H USED ON BD-282 ENGINE

## FUEL SYSTEM SPECIFICATIONS

| ENGINE MODELS | BD-282 (Not RC-Trucks) |
|---|---|
| CARBURETOR (HOLLEY) MODEL NUMBER | 1904H |
| Float Level | Use Gauge (SE-1772-9-MC-145) |
| Venturi | 1-3/8" |
| Main Jet | #72 (Std. Alt.)<br>#73 (High Alt.) |
| Power Jet | .050" |
| High Speed Bleed | .035-#65 DR. |
| Main Well Bleed - Upper | .025-#72 DR. |
| Main Well Bleed - Lower | .025-#72 DR. |
| Idle Well Restriction | .031-#68 DR. |
| Idle Air Bleed | .055-#54 DR. |
| Idle Transfer Hole | .0465-#56 DR. |
| Idle Discharge Hole | .0465-#56 DR. |
| Idle Adjusting Screw | Adjust Screw to Obtain 350 to 400 R.P.M. |
| Accelerator Pump Spring | 38R-452 (.035 Wire) |
| Accelerator Pump Link | 33R-207 |
| Accelerator Jet | .033" |
| Fuel Seat | .082" |
| Used With Governor | Yes |

## SPECIFICATIONS COVERING HOLLEY CARBURETOR MODEL 885 FFG USED ON RD-406 AND RD-450 ENGINES
## FUEL SYSTEM SPECIFICATIONS

| ENGINE MODELS | RD-406 | RD-450 |
|---|---|---|
| CARBURETOR (HOLLEY) MODEL NUMBER | 885 FFG | 885 FFG |
| Float Level | 1/2" Below Top of Fuel Bowl | 1/2" Below Top of Fuel Bowl |
| Venturi | 1-7/32" | 1-1/4" |
| Main Jets | #60 (Std. Alt.)<br>#58 (High Alt.) | #61 (Std. Alt.)<br>#59 (High Alt.) |
| Idle Tubes | 54 C.C. Per Min. (.025") | 54 C.C. Per Min. (.025") |
| Fuel Inlet Needle Seat | .098" | .098" |
| Accelerator Pump Plunger Stroke | Adjustable | Adjustable |
| Power Jet Economizer Valve | *No. 25R-80A-43 | *No. 25R-80A-58 |
| Flange | 1-1/4 SAE (Dual) | 1-1/4 SAE (Dual) |
| Idle Adjusting Screws | 3/4 to 1-1/4 Turn Open | 3/4 to 1-1/4 Turn Open |
| Main Well Bleed | .025" | .031" |
| Aspirating Hole | .043" | .067" |
| Accelerating Jet | .033" | .033" |
| Idle Air Bleed | .0465" | .0465" |
| Well Tubes | 3/32" O.D. 4 Holes .028" | 3/32" O.D. 6 Holes .040" |
| Idle Progression Hole | #56 DR. - .0465" | #56 DR. - .0465" |
| Idle Adjusting Hole | #56 DR. - .0465" | #56 DR. - .0465" |
| Accelerator Pump Spring | .040" Wire | .040" Wire |
| Secondary Venturi | 3/8" I.D. | 3/8" I.D. |
| Bowl Cover Plate Vent Holes | 2 #18 DR. - .1695" | 2 #18 DR. - .1695 |

* Only last two digits of number appear on power jet.

(Continued)

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## SPECIFICATIONS COVERING HOLLEY CARBURETOR MODEL 885 FFG USED ON RD-406 AND RD-450 ENGINES

### FUEL SYSTEM SPECIFICATIONS - Continued

| ENGINE MODELS | RD-406 | RD-450 |
|---|---|---|
| GOVERNOR (HOLLEY) . . . . . | 885 FFG | 885 FFG |
| Governor Spring Color Marking . . . . . | Yellow | Plain |
| Governor Spring Position in Housing . . | #3 Perch Position | #3 Perch Position |
| Governor By-Pass Jet (Hole "A") . . . . | .028" | .028" |
| Governor By-Pass Jet (Hole "B") . . . . | .052" | .052" |
| Maximum No-Load Speed. . . . . | 2950 R.P.M. | 2800 R.P.M. |
| Governor Rotor Valve and Housing Assembly - IH Part Number. . . . . | 114510-R91 | 114510-R91 |

**Air Cleaner Oil Capacity Specifications covering the "Hat" type air cleaner used in conjunction with the Holley 1904 Carburetor.**

| SD-220 ENGINE | SD-240 ENGINE | BD-269 ENGINE | BD-282 ENGINE |
|---|---|---|---|
| 2 pints | 2 pints | 2 pints | 2 pints |

## FUEL SYSTEM SPECIFICATIONS

| ENGINE MODELS | SD-220 | SD-240 | BD-269 | RD-372 | RD-406 | RD-450 | Cont. R-6602 |
|---|---|---|---|---|---|---|---|
| FUEL PUMP (AC) | | | | | | | |
| Model number | 1539537 | 1539537 | 1539501 | 1539513 | 1539513 | 1539513 | 1538259 |
| Type | AF | AF | AT | ..... | ..... | ..... | ..... |
| Operating pressure | 3 to 4-1/2 lbs. at 3500 engine r.p.m. | 3 to 4-1/2 lbs. at 3500 engine r.p.m. | 3 to 4-1/2 lbs. at 3500 engine r.p.m. | 4 to 5-1/4 lbs. at 3600 engine r.p.m. | 4 to 5-1/4 lbs. at 3600 engine r.p.m. | 4 to 5-1/4 lbs. at 3600 engine r.p.m. | 4 to 5-1/4 lbs. at 3600 engine r.p.m. |
| FUEL PUMP (CARTER) | | | | | | | |
| Model number | M-737S | M-737S | EX112-78 | ..... | ..... | ..... | ..... |
| Operating pressure | 3 to 4-1/2 lbs. at 3500 engine r.p.m. | 3 to 4-1/2 lbs. at 3500 engine r.p.m. | 3 to 4-1/2 lbs. at 3500 engine r.p.m. | ..... | ..... | ..... | ..... |

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## FUEL SYSTEM SPECIFICATIONS

| ENGINE MODELS | SD-220 | SD-240 |
|---|---|---|
| CARBURETOR (CARTER) | | |
| Model number | YF-735-S | YS-736-S |
| Float level | 25/64" (± 1/64") | 7/16" (± 1/64") |
| Flange | 1-1/4 SAE | 1-1/4 SAE |
| Venturi | 1-5/16" | 1-5/16" |
| Main jet | .104 | .1015 |
| Idle jet | .0276 | .0292 |
| Accelerating jet | .025 | .025 |
| Main air bleed | .034 | .034 |
| Fuel valve seat | .076 | .081 |
| Metering rod | No. 75-693 | No. 75-688 |
| Idle adjustment | 3/4 to 1-3/4 turns open | 3/4 to 1-3/4 turns open |
| Used with governor | yes | yes |

## FUEL SYSTEM SPECIFICATIONS

| ENGINE MODEL | BD-269 |
|---|---|
| CARBURETOR (CARTER) | |
| Model number | BBR1-617SA |
| Float level | 5/64" (± 1/64") |
| Flange | 1-1/4 SAE |
| Venturi | 1-5/16" |
| Main jet | 298 C.C. |
| Idle tube | .031 |
| Accelerating pump jet | .0315 |
| Step-up jet | .0374 |
| Fuel valve seat | .086 |
| Idle adjustment | 1/2 to 1-1/2 turns open |
| Used with governor | yes |

## FUEL SYSTEM SPECIFICATIONS

| ENGINE MODELS | RD-372 | RD-406 | RD-450 |
|---|---|---|---|
| CARBURETOR (HOLLEY) | | | |
| Model number | AA-1G | 852FFG | 852FFG |
| Float level | 1-1/4" | 1-1/4" | 1-1/4" |
| Venturi | 1-1/16" | 1-3/16" | 1-3/16" |
| Main jets | .059 | .063 | .061 |
| Idle tubes | 88 C.C. per min. | 64 C.C. per min. | 64 C.C. per min. |
| Bleeder plug or button (in nozzle bar) | .175 | .234 | .234 |
| Fuel inlet needle seat | .098 | .098 | .098 |
| Accelerator pump plunger stroke | adjustable | adjustable | adjustable |
| Power jet economizer valve | No. 25R-67A | *No. 25R-72A-49 | *No. 25R-72A-66 |
| Flange | 1-1/4 SAE | 1-1/4 SAE (dual) | 1-1/4 SAE (dual) |
| Idle adjusting screws | 3/4 to 1 turn open | 3/4 to 1 turn open | 3/4 to 1 turn open |
| GOVERNOR (HOLLEY) | | | |
| Governor spring color marking | brown | ..... | ..... |
| Governor spring position in housing | ..... | ..... | ..... |
| Governor by-pass jet (hole "A") | .025 | ..... | ..... |
| Governor by-pass jet (hole "B") | .047 | ..... | ..... |
| Maximum no-load speed | 2950 r.p.m. | 2925 r.p.m. | 2750 r.p.m. |
| Governor rotor valve and housing assembly-IH part number | 54 784-R91 | 54 784-R91 | 54 784-R91 |

* Only last two digits of number appear on power jet.

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# FUEL SYSTEM—GENERAL

## VAPOR LOCK

The Service Parts Department has available an electric fuel pump for use on trucks which have given trouble with vapor lock, but they cannot furnish material other than shown in Fig. 1, because the installation will have to conform to individual requirements.

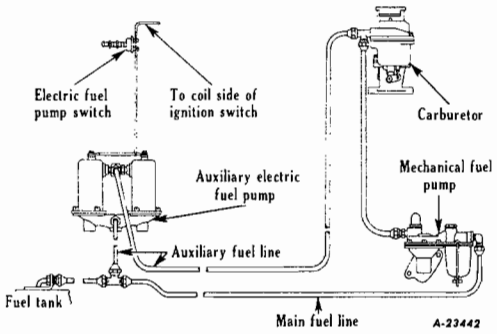


Fig. 1

## INSTALLATION - ELECTRIC FUEL PUMP

Fig. 1 illustrates a hook-up that is adaptable to any type of fuel system.

The location of the fuel line from the electric pump should be on the outside of the frame rail opposite the exhaust system and if necessary carried across the front cross member to the carburetor.

Considerable freedom can be exercised in locating the lines, always keeping in mind that they should be away from the exhaust system and not exposed to hazards that will result in their being damaged. The use of loom is recommended where protection from radiated heat is required.

Should the electric pump be located where it may be damaged from stones, etc., a simple shield can be readily installed to supply the necessary protection.

The following discussion on vapor lock is for the purpose of providing necessary information to diagnose and get a solution to the problem:-

## WHAT IS VAPOR LOCK?

When a section of the fuel system becomes filled with gasoline vapor causing either partial or total disruption of fuel service to the carburetor, it is said to be vapor-locked.

## PRINCIPAL SOURCES OF HEAT - VAPOR LOCK

The fuel pump is generally the part of the fuel system where the greatest rise in fuel temperature occurs because of heat derived from the following sources:

(a) Heat conducted from crankcase and camshaft.
(b) Heat received from hot oil splashed into pump body for lubricating purposes.
(c) Radiated heat from exhaust manifold.
(d) Heat received from under hood air.

It is for these reasons that the electric fuel pump is mounted on the outside of the frame rail.

The fuel line from the fuel tank to the regular mechanical pump is under a depression or more commonly known as suction which lowers the vaporizing or boiling point of a liquid. This makes it particularly bad to have it located close to the exhaust system. By locating the electric fuel pump close to the fuel tank a greater percentage of the system is under pressure, which increases the vaporizing or boiling temperature of the gasoline.

## WHEN AND WHY OF VAPOR LOCK

Vapor lock occurs in hot weather with a hot engine when the fuel requirements are at minimum, such as idling after a hard run. When the maximum amount of fuel is again required, the fuel pump must first expell the vapor during which time the following cycle is being established:

(a) Reduced engine speed because of lack of fuel.
(b) Reduced fuel pump speed with proportional loss of pumping ability.
(c) Increased fuel temperatures and resultant increase in vapor formation resulting in reduced fuel delivery and further reduction of engine speed.

The continuation of the cycle will ultimately result in the complete cessation of gasoline delivery.

## TYPE OF FUEL - VAPOR LOCK

The use of a highly volatile gasoline such as furnished in "Winter" weather will produce vapor lock under conditions where a less volatile or "Summer" gasoline would be satisfactory.

## HOW TO DIAGNOSE VAPOR LOCK

A vapor lock in the system permits the gasoline level in the float bowl to become low or even dry, causing a lean mixture, which is evidenced by the following operating characteristics:

(a) Lack of power on full throttle or softness and flat spots on part throttle operation.
(b) Stalling on idle when engine is hot.
(c) Inability to start a hot engine.

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## PROPER USE OF ELECTRIC FUEL PUMP FOR VAPOR LOCK

When the first indications of vapor lock are observed, the electric pump should be brought into operation and upon regaining the lost engine speed, should be shut off, thus giving the standard mechanical pump an opportunity to rid the regular fuel system of vapor. This method of operation may have to be repeated several times before the mechanical pump will supply sufficient fuel, after which the use of the electric pump is not required; however, in stubborn cases continous operation may be necessary. It should be noted that "shut off" valves are not shown on the sketch as it is desired to make the auxiliary system as flexible as possible to accomodate either continous or intermittent operation, making it unnecessary to stop the engine.

NOTE: If the electric pump is not required regularly, it should be operated every few days to prevent the stagnant gasoline from forming gum.

## TRUCK STORAGE - PREPARATION OF FUEL SYSTEM

When placing trucks in storage remove all fuel from the fuel system. If fuel is not entirely removed, a gumlike substance will be deposited on all parts contacted by the fuel, and will seriously affect operation of the carburetor and fuel pump.

All standard grades of gasoline have a small gum content, which is not sufficient to cause any trouble under ordinary conditions. However, when allowed to stand for a period of two or more weeks, the gum will increase to a point where a deposit is formed on the surfaces which it contacts. This deposit, when dry, has a hard, varnishlike appearance.

Gum deposits may completely alter calibration of the carburetor for it will partially or completely plug the jets or cause the power jet valve and the accelerating pump to stick. Gum deposits in the fuel pump will cause the fuel filter to become clogged or the check valves to stick.

IMPORTANT: It is well to emphasize the possibilities that can develop because of gum film in carburetor jets. A thin film of gum (assume .002" thick) is transparent and would escape casual inspection; but this thickness of film represents a .004" reducation in orifice size, and should one or all jets be affected there would be a lean-mixture ratio that would be detrimental to the engine as well as performance - for it would contribute to sticking and burning of valves because of gum accumulation on the stems. The condition would also be a contributing cause of premature spark plug failures. Gum is not soluble in gasoline, therefore any reduction in the capacity of the jets will be perpetuated almost indefinitely.

The best known means of preventing gum formation in trucks that are to be placed in storage or allowed to stand idle for a period of two or more weeks is to thoroughly condition the fuel system as follows:

1. Completely drain the fuel tank.
2. Run engine until all fuel is consumed in carburetor.
3. Remove plug from carburetor under main jet assembly to complete draining.
4. Empty sediment bowl at fuel pump.

The possible affected parts in the fuel pump are the check valves and the filtering screen or filtering element. To determine the condition of the check valves, remove the caps from over the valves and test for freedom of action.

The filtering screen, if in a gummed condition, should be replaced and the sediment bowl cleaned.

If there is doubt as to the condition of the carburetor, it is suggested that a one-quart mixture of 50-50 CP acetone and gasoline be burned through the carburetor at fast idle from a closed container attached direct to the carburetor - not through the fuel pump because of the detrimental effect of acetone on fuel pump diaphragms. This will serve to remove a large amount of the gum providing that it has not become hard and varnishlike. If the results are not satisfactory the carburetor must be removed and all jets and carburetor valves replaced.

## FUEL PUMPS

### DESCRIPTION

The fuel pump is installed on the engine between the fuel tank and the carburetor. The suction side of the pump is connected to the fuel tank and the discharge side to the carburetor by tubing designed to carry the fuel. The purpose of the pump is to suck fuel from the supply tank and push it into the carburetor float bowl as it is required by the engine.

### OPERATION

The pumping operation is accomplished through a rockerarm on the pump, contacting an eccentric on the engine camshaft.

The link is hinged to the rockerarm so that it can be moved down, but cannot be raised by the rockerarm. The only function of the rockerarm spring is to make the rockerarm follow the cam. The link and diaphragm are moved by the diaphragm spring. The pump, therefore, delivers fuel to the carburetor only when the fuel pressure in the outlet line is less than the pressure maintained by the diaphragm spring. This condition arises when the float needle valve is not seated and the fuel passage from the pump into the carburetor float chamber is open. When the needle valve in the carburetor float chamber is closed, and held in place by the pressure of the fuel on the float, the pump builds up pressure until it overcomes the diaphragm spring. This pressure results in almost a complete stoppage of diaphragm movement until further fuel is needed.

## HOW TO DIAGNOSE FUEL PUMP TROUBLE

Fuel pump trouble is of only two kinds. Either the pump is supplying too little gas - or, in rare cases, too much.

If the pump is supplying too little gas, the engine either will not run at all, or will cough and falter.

If the pump is supplying too much gas, you will be able to see gasoline dripping from the carburetor; or the engine will not run smoothly when idling. Engines are hard to start when getting too much gas.

## LOCATING FUEL PUMP TROUBLE

ALWAYS CHECK WHILE THE PUMP IS INSTALLED ON THE ENGINE. DON'T TAKE IT OFF TO CHECK IT.

## ENGINE NOT GETTING ENOUGH GAS:

If the engine is getting too little gas, the trouble may be in the pump, the fuel line; or the gas tank.

First, be sure that there is gas in the tank.

Disconnect the outlet line from the pump, or the carburetor, whichever is easier to reach. Then, turn the engine over a few times, using the starting motor. It is best to turn off the ignition switch.

If gas spurts from the pump or the outline line, the pump, gas line, and tank are OK.

If no gas flows at all, or if only a little gas flows, do the following:

1. Look for a leaky bowl gasket seat. Install a new gasket if you are not sure.
2. Remove and clean the gas strainer which is inside the pump bowl.
3. Look for loose line connections. Check all the way back to the gas tank. Tighten all connections.
4. Look for a clogged fuel line. Blow out with compressed air.
5. Make sure that all cover screws on the pump are tight. Make sure that the external plugs over pump valves are tight.
6. Inspect the flexible fuel line for breaks or porous condition.

If correction of the above six items does not place the pump in operating condition, it should be removed for replacement or overhaul.

## ENGINE GETTING TOO MUCH GAS:

More often than not, an oversupply of gasoline is caused by trouble somewhere else - not in the pump. So, first check the following:

1. Defective automatic choke.
2. Excessive use of hand choke.
3. Punctured carburetor float.
4. Defective carburetor needle valve.
5. Loosely connected fuel line, or loose carburetor assembly screws.
6. Improper carburetor adjustment.

NOTE: If none of these is the cause of flooding or poor gasoline mileage, then the pump needs overhauling.

## FINAL CHECK:

After overhauling, a simple check of the suction and pressure should be made before installing the pump on the engine. This can be done by holding the fingers over the inlet and outlet openings of the pump and manipulating the rockerarm by hand. The pump may then be reinstalled on the engine and tested. (See installation instructions below). It should prime itself, that is, fill the filter bowl, in about 30 seconds with the starter button depressed. If it fails to provide sufficient pressure, the diaphragm has been incorrectly installed, preventing the full stroke of the push rod, or the springs do not have sufficient tension; and it will be necessary to disassemble the pump to reinstall the diaphragm correctly or to replace the linkage springs if this has not been done.

## INSTALLATION OF FUEL PUMP

Use a new gasket between fuel pump mounting flange and pad on crankcase and tighten capscrews securely.

Connect fuel lines, first making sure that there is no dirt on the fittings which might be drawn into the system.

If carburetor has not been removed there will usually be sufficient fuel in it to run the engine long enough to fill the fuel pump filter bowl. If there is an air leak between filter bowl and gasket, the pump cannot draw fuel into the bowl. To remedy this, install a new gasket and see that bowl seats squarely. Tighten clamp screw securely with the fingers only.

If fuel pump bowl still does not fill, the trouble may be due to an air-bound condition. In this case the bowl should be loosened slightly so that air can escape and, by blowing in the gasoline tank filler neck, fuel will be forced into the pump. Then tighten bowl securely and start engine.

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# CARTER MODEL-YF CARBURETOR

## Description

The Carter carburetor model YF for the 220 and 240 Silver Diamond engines is essentially the same as conventional carburetors in that it has a high-speed fuel circuit, low-speed circuit, and accelerating pump circuit.

There is, however, a departure in the method of controlling the fuel flow on part-throttle, wide-open-throttle and through the accelerating pump circuit as compared to carburetors previously used. A calibrated metering rod (Fig. 4) fits into the main jet. It becomes effective at low-part-throttle speeds and automatically positions itself according to the throttle opening thus producing proper fuel flow throughout part-throttle and wide-open-throttle.

The heart of the carburetor is the diaphragm (Fig. 4) which actuates the accelerating pump and the step-up action for wide-open-throttle fuel mixtures.

The underside of the diaphragm is subjected to manifold vacuum by means of a channel down to the carburetor flange. This channel is restricted by a bushing in the flange in order to obtain consistent and smooth performance and to promote extra long diaphragm life.

Any movement of the diaphragm results in a corresponding movement of the metering rod. When the throttle is wide open the manifold vacuum drops sufficiently to allow the diaphragm to move upward thus shifting the metering rod to the wide open throttle step.

A chamber above the top of the diaphragm supplies fuel for the accelerating pump circuit. The diaphragm acts as a pump and the quantity of fuel discharged by the pump is controlled by the size of the pump jet or nozzle calibration (Fig. 2) and also the size of the fuel inlet hole to the chamber. There is no check valve on the inlet. There is a check valve in the outlet channel near the pump jet to allow fuel to pass in an outward direction only and also to prevent air from being sucked back into the chamber under certain conditions. The pump jet is free to flow at all times generally starting at a part-throttle engine speed of 1500 r.p.m. and continuing throughout wide-open-throttle.

This carburetor has a unique feature in that no change in setting is required when it is used in conjunction with a sandwich type governor, regardless of whether or not a vacuum by-pass is used around the governor.

Illustrations (Figs. 1 to 8) show the location of the various parts, and will aid in correctly identifying the various assemblies when dismantling the YF model carburetor for complete reconditioning, as outlined in the following step-by-step instructions.

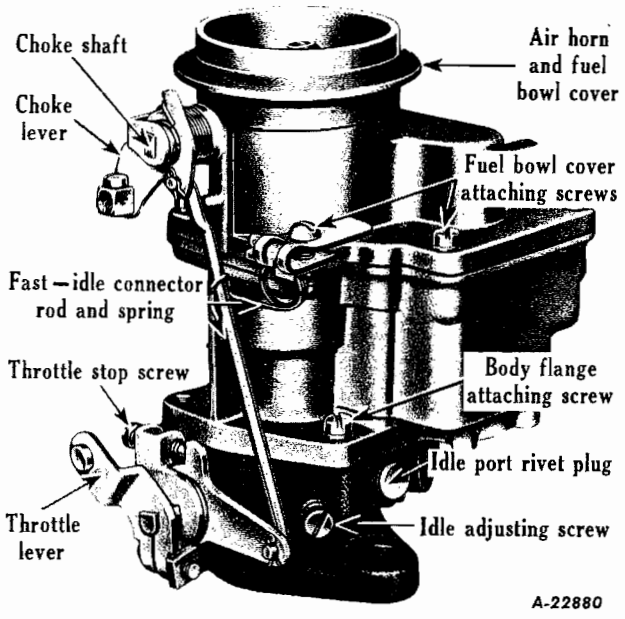


Fig. 1 - Carter (Model YF) Carburetor

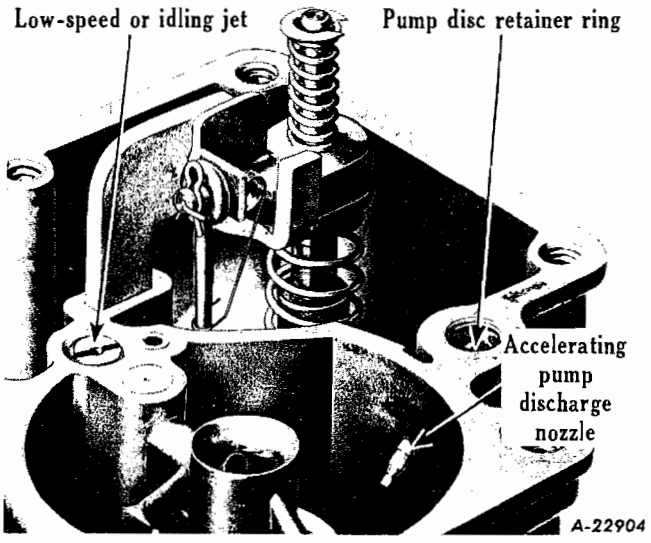


Fig. 2

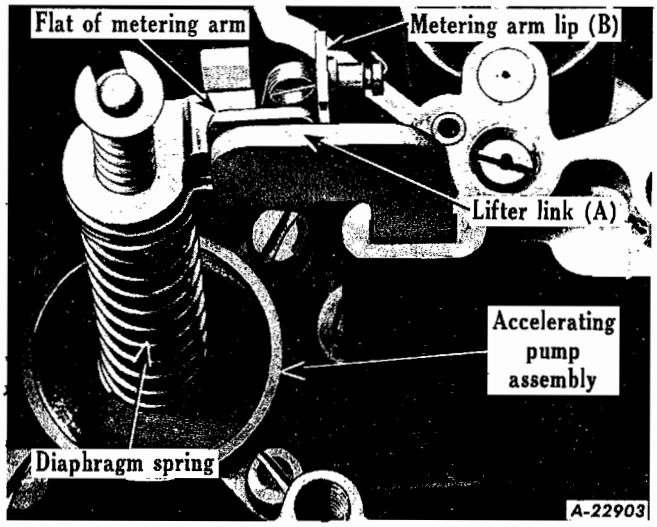


Fig. 3

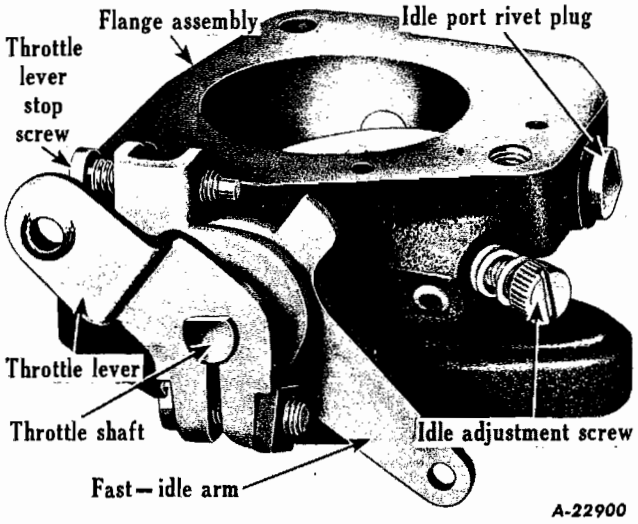


Fig. 6

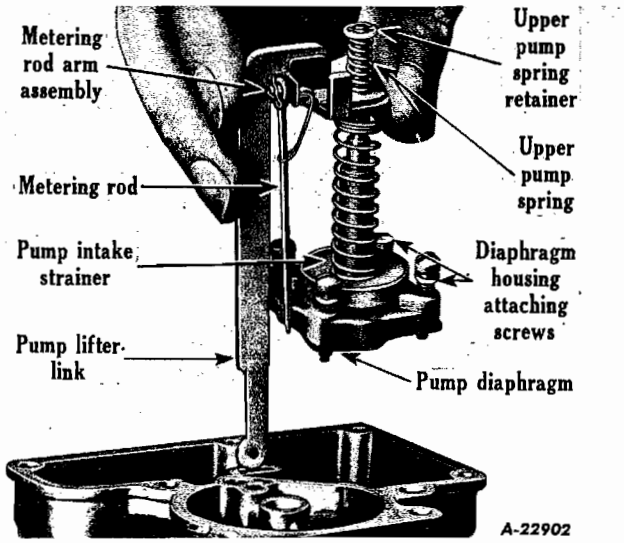


Fig. 4

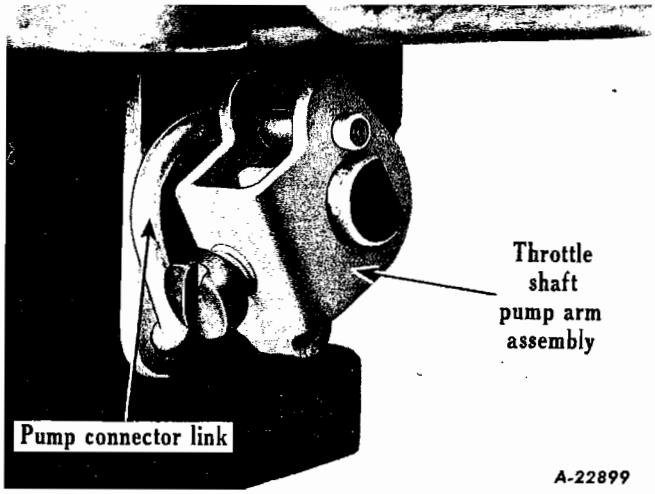


Fig. 7

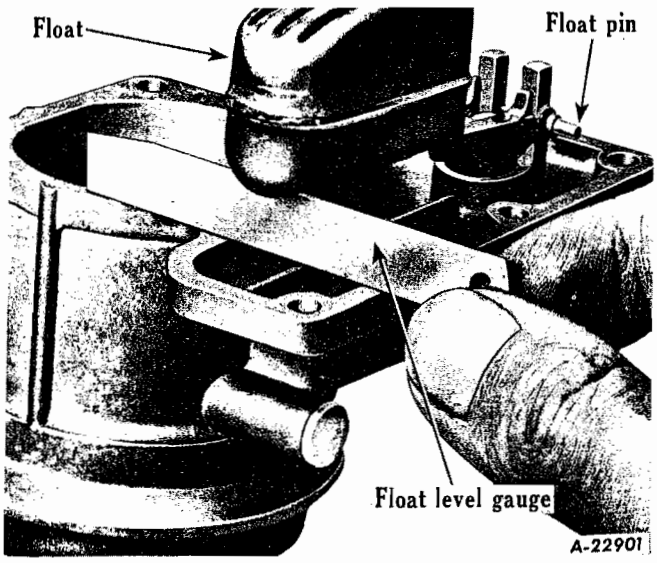


Fig. 5

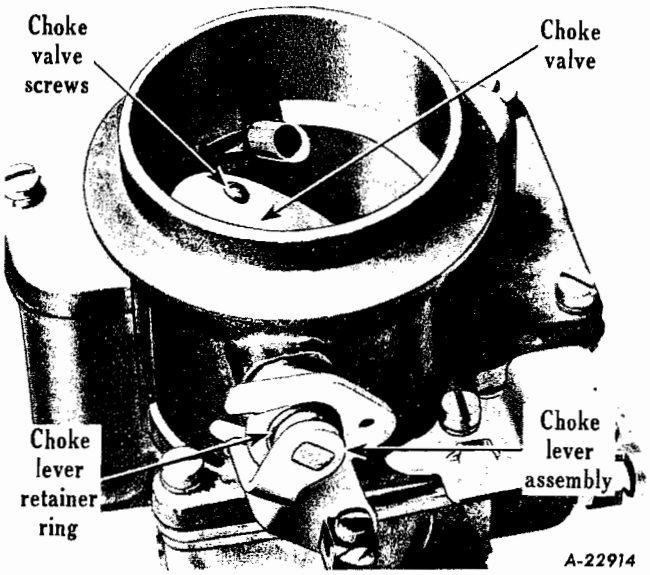


Fig. 8

## MODEL YF - SERVICE PROCEDURE

### To Disassemble

1. Remove pin springs, fast idle connector rod spring, and rod (Fig. 1).
2. Remove air horn and bowl cover attaching screws (7), and choke tube clamp assembly (Fig. 1).
3. Remove air horn assembly, and gasket.
4. Remove pump disc retainer ring (using knife tip), retainer, and pump check disc (Fig. 2).
5. Remove throttle shaft arm assembly, pump connector link, shaft seal spring, dust seal washer, and felt dust seal (Fig. 7).
6. Loosen diaphragm housing attaching screw, and washer assemblies (4) and lift out entire pump and metering rod assembly (Figs. 3 and 4).
7. Remove diaphragm housing attaching screws, pin spring, metering rod upper pump spring retainer, upper pump spring, metering rod arm assembly, and pump lifter link (Fig. 4).
8. Remove diaphragm spring retainer, spring, and pump diaphragm assembly (Fig. 4).
9. Carefully remove pump intake strainer from housing, using tip of knife blade.
10. Remove metering rod jet.
11. Remove low-speed (idle) jet assembly. Do not remove pressed in parts such as nozzle, pump jet or anti-percolator air bleed. (Fig. 2).
12. Remove body flange attaching screw (3), body flange assembly, and gasket (Fig. 1).
13. Remove idle adjustment screw, spring, idle port rivet plug, throttle lever assembly, washer, fast-idle arm, valve attaching screws (2), and throttle shaft. Then remove throttle shaft seal by prying out seal retainer. Do not remove vacuum passage orifice (pressed in).
14. Remove float pin, float, and needle and seat assembly from air horn casting (Fig. 5).
15. Remove choke valve screws and choke valve. Unhook choke spring and slide shaft from housing. Do not remove balance vent tube. NOTE: In normal service, choke lever assembly will not require replacing. However, if it has been bent or otherwise damaged requiring replacement, proceed as follows: Pry off choke lever retainer ring and remove lever assembly (Fig. 8).
16. Wash all parts in carburetor cleaning solution and blow out passages with compressed air. Do not immerse diaphragm assembly, pump check disc or seals in cleaning solution. Inspect all parts for wear or damage and replace if necessary. Always use new gaskets.

### To Reassemble

17. Group all parts, controlling the float circuit: float, float pin, needle and seat assembly, air horn gasket.
18. Group all parts, controlling the low-speed circuit: throttle shaft seals (2), and retainers (2), throttle shaft, throttle valve and screws, fast-idle arm, throttle shaft washer, throttle lever, idle port rivet plug, idle adjusting screw and spring, gasket, attaching screws (3), low-speed jet, throttle shaft seal spring.
19. Group all parts, controlling the high-speed circuit: Metering rod, metering rod jet, pin spring.
20. Group all parts, controlling the pump circuit: pump lifter link, pump connector link, throttle shaft arm assembly, metering rod arm assembly, pump diaphragm housing, pump diaphragm assembly, pump diaphragm spring, diaphragm spring retainer, pump intake strainer, upper pump spring, upper pump spring retainer, pump disc check, pump disc retainer, pump disc retainer ring, diaphragm housing screw and washer assembly (4).
21. Group all parts, controlling the choke circuit: choke valve and screws (2), choke shaft and lever assembly, fast-idle connector rod and spring, choke tube clamp assembly, air horn attaching screw and washer assembly (7), pin spring (2).
22. Install throttle shaft seal and retainer in flange casting.
23. Install fast-idle arm, washer and lever assembly on throttle shaft; slide shaft into place and install throttle valve. Carter trademark should go toward the idle port when viewed from manifold side of flange. Tap valve and hold in place with finger before tightening screws.
24. Install idle port rivet plug and idle adjusting screw and spring.
25. Attach flange assembly to body casting. Use new gasket.
26. Install low-speed jet assembly.

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27. Install pump intake strainer in pump diaphragm housing and carefully press into recess. CAUTION: If strainer is even slightly damaged, a new one must be used.

28. Install pump diaphragm assembly in diaphragm housing, then install pump diaphragm spring (lower) and retainer.

29. Install pump lifter link, metering rod arm, upper pump spring and retainer.

30. Install metering rod jet; no gasket is used with this jet.

31. Install diaphragm housing attaching screws (4) in the diaphragm housing, making sure the edges of diaphragm are not wrinkled. Lower into place and tighten screws evenly and securely.

32. Install throttle shaft seal, dust seal washer, and shaft seal spring.

33. Install pump connector link in the throttle shaft arm assembly. Install throttle shaft arm assembly on throttle shaft, guiding connector link into pump lifter link hole. CAUTION: Linkage must not bind in any throttle position. If binding occurs, loosen clamp screw in throttle arm, adjust slightly and retighten screw.

34. Install pump check disc, disc retainer, and lock ring.

35. Install metering rod, and pin spring. Connect metering rod spring.

36. Metering Rod Adjustment: Be sure flat of metering rod arm is parallel to flat of pump connector link before proceeding with metering rod adjustment. With throttle valve seated, press down on upper end of diaphragm shaft. Metering rod should be seated in casting and metering rod arm (Fig. 3) flat against pump lifter link (A). If metering rod does not seat in body casting (check by pressing downward on metering rod) or seats before the metering rod arm makes flat contact with pump lifter link, raise or lower by bending lip (B) on metering rod arm. Adjust float level as shown in Fig. 3. Width of gauge is 25/64" for YF-735S carburetor and 7/16" for YF-736S carburetor. A tolerance of plus or minus 1/64" is permissable in each float level setting.

37. Install needle seat and gasket assembly, needle, float and float pin. NOTE: Stop shoulder on float pin must be on side away from bore of carburetor.

38. Set float level to catalog page specifications. Measure from machined surface of casting (gasket removed). Adjust by bending lip which contacts needle.

39. Install air horn gasket and air horn assembly. Install attaching screws and lockwashers (7) and choke tube clamp assembly. (Tighten center screws first.)

40. Slide choke shaft and lever assembly into place and connect choke lever spring. Install choke valve. Center valves by tapping lightly and hold in place with fingers when tightening screws.

41. Install fast-idle connector rod with offset portion of the rod to top of pin spring to the outside. Install fast-idle connecting rod spring.

# CARTER MODEL BBR-1 CARBURETOR

## (FOR DETAILED DISASSEMBLY INSTRUCTIONS SEE SHOP TALK NO. 35)

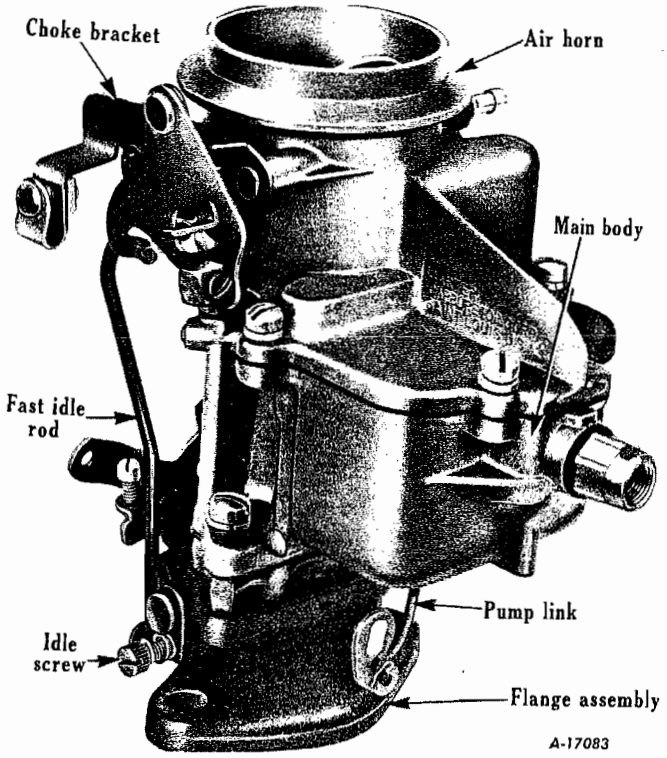


Fig. 1

### Description

The Carter Model BBR-1-617SA carburetor (Fig. 1) is a downdraft carburetor, divided into five circuits which consist of the following:

FLOAT CIRCUIT

The float circuit controls the height of the gasoline level in the bowl (Fig. 2). A gasoline level too high or too low may cause trouble in other circuits, and make complaints hard to trace.

The float circuit consists of a needle valve, seat and gasket, float, float bowl, float bowl cover, float lever, pin retainer, float pin, gasket and vent hole.

LOW-SPEED CIRCUIT

The idle or low-speed circuit controls the supply of gasoline to the engine during idle and no-load up to a speed of approximately 15 to 20 m.p.h. and it partially controls the supply of fuel for no-load or light loads at higher speeds (Fig. 3).

The low-speed circuit consists of the idle orifice tube and plug assembly, air bleed, idle port, idle mixture adjusting screw, throttle valve, carburetor bore, and economizer.

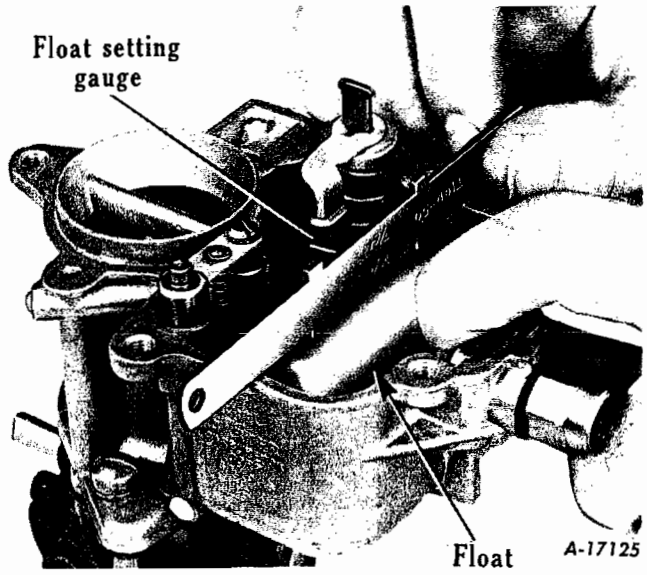


Fig. 2 - Before adjusting float level, be sure float lever pin is firmly seated and that the float pin retainer is in position. Reset float level by bending lip of float lever away from needle to raise level, or toward needle to lower float level. Bend vertical lip of float only. Use float gauge (SE-1639-10) and check level as shown. Setting is 5/64" plus 1/64" below top surface of carburetor body casting and without the body gasket.

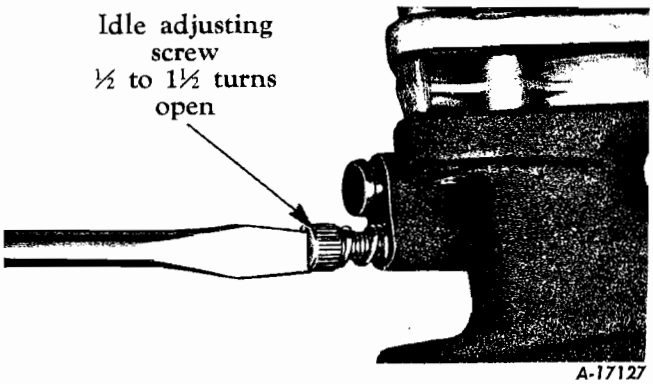


Fig. 3 - Idle adjustment is ½ to 1½ turns open. For richer mixture, turn the idle screw out.

HIGH-SPEED CIRCUIT

The intermediate and high-speed circuit consists of the step-up jet, step-up piston and rod assembly, main metering jet, main vent tube, diffuser holes, and air passage.

PUMP CIRCUIT

The acceleration circuit consists of the

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accelerating pump spring, pump plunger and rod assembly, pump leather, inlet valve, outlet valve, pump jet air bleed, and pump jet.

The accelerating pump is provided with an adjustable stroke setting. Set the accelerator link in the inner hole in the throttle shaft lever for summer operation. For winter setting, use the outer hole.

## CHOKE CIRCUIT

This circuit is used only in starting and warming a motor, its purpose being to supply a rich mixture temporarily. It consists of a choke shaft and lever assembly, a choke valve, choke breather valve and spring, and a means of controlling the position of the valve. It incorporates a fast idle cam connected to the choke shaft by a rod. When the choke is closed the throttle valve is forced open slightly by the cam to make starting easier and prevent stalling.

The choke breather valve allows sufficient air to enter so that the motor will start and not flood even though the choke valve is fully closed.

## Carburetor Overhaul

(See Shop Talk No. 35 for complete instructions and details).

When disassembling the carburetor keep the various groups of circuit parts together so that each group can be inspected and replaced completely before proceeding to the next group. Use a sectionalized pan or muffin tin to separate each group of parts.

Reassembly of the carburetor is practically the reverse of disassembly. A complete set of servicing tools is provided to facilitate overhauling of the Carter carburetors. These tools are available under SE-1639, and are shown in Fig. 4.

Proper selection of carburetor flange gasket is necessary when installing the carburetor on the manifold, see Fig. 5. If the carburetor is used in conjunction with a sandwich governor (governor mounted between carburetor flange and manifold), the gasket having four small holes is used. Where no governor is used the slotted gasket is used. The slots in the gasket provide leads to the vacuum passage leading to the step-up piston cylinder. Either gasket can be used between the governor and manifold.

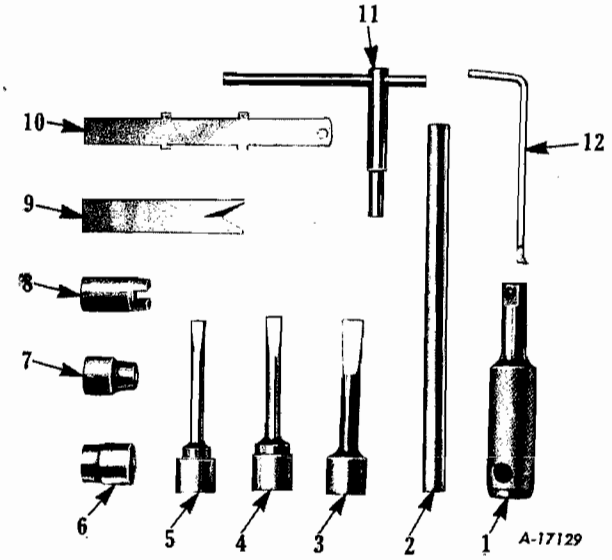


Fig. 4 - Service Tools (See list below)

## Service Tools

A special set of tools is provided to facilitate overhauling of the Carter carburetors, (see Fig. 4). These tools are as follows:

SE-1639 Carter Carburetor Service Tools. Set consists of SE-1639-1 to 1639-13 inclusive:-
SE-1639-1 Grip handle for sockets (No. T 109-51)
SE-1639-2 Handle bar for grip handle (No. T109-53)
SE-1639-3 Screw driver bit 5/16" (No. T 109-57)
SE-1639-4 Screw driver bit 1/4" (No. T109-58)
SE-1639-5 Screw driver bit 3/16" (No. T 109-59)
SE-1639-6 Socket, double hex, 9/16" (No. T109-69)
SE-1639-7 Socket, double hex, 5/16" (No. T109-64)
SE-1639-8 Ball retaining ring inserter tool (No. T109-75)
SE-1639-9 Rivet extractor tool (No. T109-43)
SE-1639-10 Float level gauge (No. T109-50)
SE-1639-11 Main vent tube tool (No. T109-195)
SE-1639-12 Ball retaining ring removing tool (No. T109-56)
SE-1639-13 Metal box for SE-1639 tools.

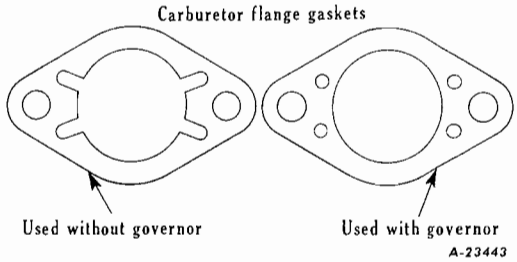


Fig. 5

# HOLLY MODEL 852-FFG CARBURETOR

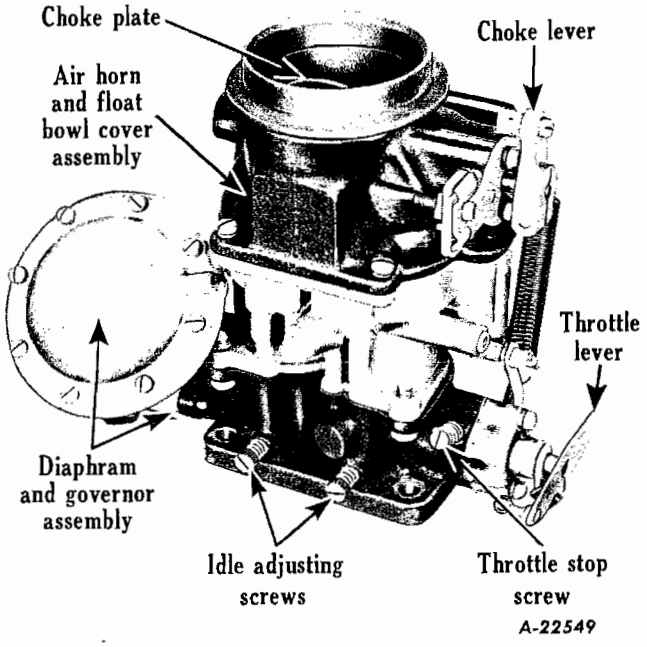


Fig. 1

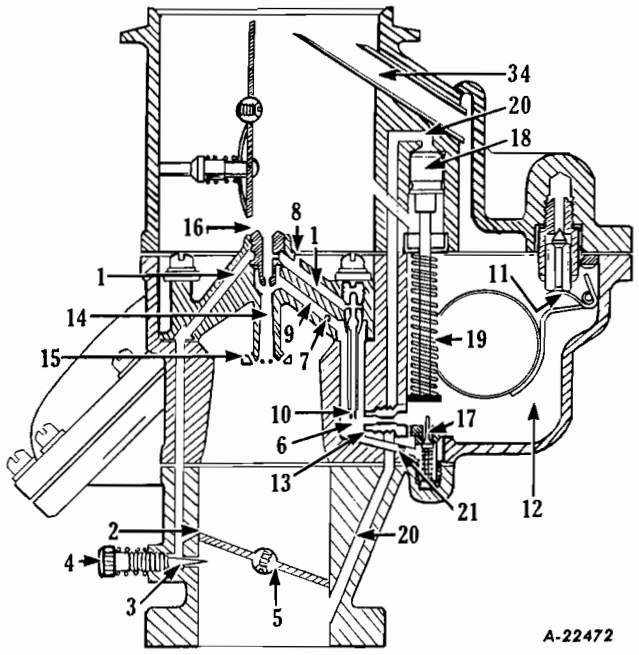


Fig. 2

## Description

The Holley Model 852-FFG carburetor is a dual downdraft carburetor of the plain tube type, designed for use on engines of approximately 260 to 390 cubic inch displacement. All of the metering jets and passages are located in the center of the main body, which provides for correct metering of fuel and air at all practical operating angles. The carburetor fuel system is fully balanced and sealed, the air for all vents and bleeds being taken from the main air entrance of the carburetor, thus, only air which has passed through the air cleaner is admitted to the carburetor.

The governor actuated throttle mechanism is an integral part of the carburetor, designed to provide the needed power required for moving the throttle to governing speeds and is controlled by a separately driven governor rotor. The combination of these two units has been engineered to give instant response and accurate governing.

A power valve provides additional fuel for high power operation, and a throttle actuated accelerating pump provides the necessary fuel for fast engine pick-up.

A throttle lever which is self-locking and self-positioning is incorporated in this carburetor.

This dual carburetor can be considered as two carburetors built into one unit. There are separate venturi tubes, idle tubes and throttle plates and a separate main metering system and idle system, one for each side.

NOTE: In the following explanations, one side is generally referred to, unless mentioned otherwise.

## Idle Fuel System

The fuel from the carburetor bowl (12) passes through the main metering jet (13) into the idle tube (10) as shown in Fig. 2. Air is introduced into the fuel stream by idle air bleed (8). This fuel and air mixture then travels through the idle passage (1) through the chamber around the bleeder plug (16) and to the continuation of passage (1) then discharges at idle transfer hole (2) and idle discharge hole (3).

When the engine is set to idle at a speed of approximately 350 r.p.m. the mixture is discharged out of the lower hole (3) only. As the throttle plate (5) is opened and the engine speed and air flow increases, the upper idle transfer hole (2) starts discharging in addition to the lower hole at about 450 r.p.m. The action and timing are such that the discharge from the upper hole reaches a maximum at approximately 750 r.p.m. and then gradually becomes less effective as the main nozzle (15) begins to flow.

The lower discharge hole (3) is provided with an idle adjusting needle (4). Turning this needle out (to the left) gives a richer mixture and turning in (to the right) a leaner mixture. The idle adjustment should be set with a vacuum gauge for the highest and steadiest vacuum reading or

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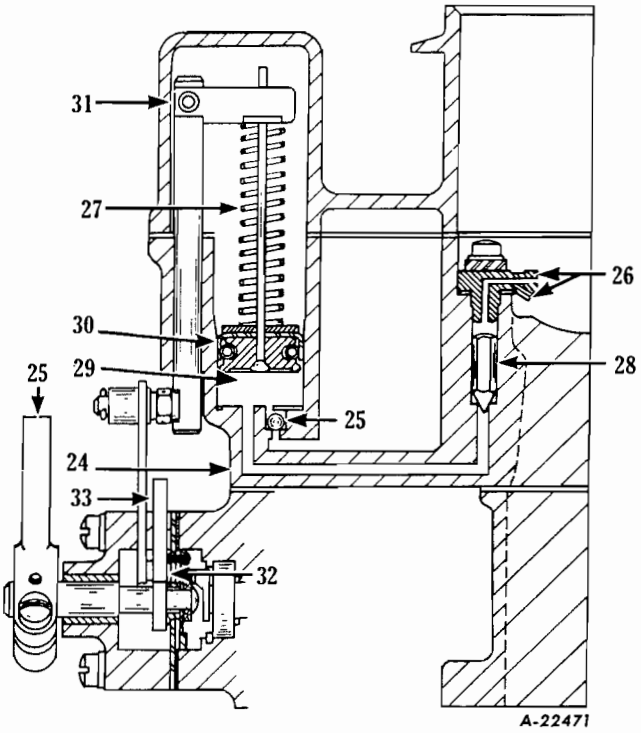


Fig. 3

the smoothest running and maximum idle r.p.m. When seating the idle adjustment needle (4), excessive force should never be used as this may cause a groove to form on the needle point. If this occurs, the adjusting needle will have to be replaced in order to obtain a satisfactory idle adjustment.

### Main Fuel System

As the throttle is opened and the idle system becomes less effective, the main discharge nozzle (15) in Fig. 2 starts to deliver fuel.

This occurs at approximately 900 r.p.m. road load. Between 900 and 1200 r.p.m., there is a definite blending of the idle and main fuel system. In the above range all the fuel passes through the main jet (13) up through the main well (6) to angle channel (9). Here the fuel is atomized by the high speed bleed (7), and an additional supply of air is introduced to this mixture by the bleeder plug (16) before being discharged through the vertical passage (14) into the venturi.

The float bowl (12), Fig. 2, is vented to the atmosphere through a balance tube (34). This system, besides correcting float chamber air pressure for atmospheric changes, keeps dirt out of the fuel system and reduces air cleaner clogging effects to a minimum.

## POWER MIXTURE SUPPLY

The power valve vacuum piston (18) and the spring (19) shown in Fig. 2 are actuated by the vacuum below the throttle plate (5) which communicates with the top of the piston (18) through passage (20).

At idle the vacuum is the highest, and it decreases as the load of the engine increases. The piston (18) (actuated by vacuum) and the spring (19) are held in the "up" position which allows the valve (17) to remain closed until the vacuum drops to approximately 7.5 to 6.5 inches of mercury. Below this vacuum the piston force is not great enough to resist the compressed load of the spring (19) and thus opens the power valve (17).

Under load, as in climbing hills, etc., the vacuum drops because it becomes necessary to open the throttle wider in order to maintain speed. When the vacuum drops below 7.5 inches of mercury, the power valve is opened by the piston stem. The fuel then flows into the power valve chamber and through the restriction (21) into the main well (6), and is discharged together with fuel from the main metering system. This gives the additional fuel required for high speeds for heavy loads and low speeds at full throttle.

### Accelerating Pump

The accelerating pump shown in Fig. 3 is connected to the throttle shaft by means of link (33) and operating lever (32). The function of the accelerating assembly is to temporarily enrich the mixture for rapid acceleration. The fuel is drawn into the pump chamber (29) through pump inlet check valve (25) on the upward stroke of pump piston (30) when closing the throttle. When the throttle is opened, the pump piston (30) moves downward, closing the pump check valve (25) and forcing the displaced fuel through passage (24) to raise the pump discharge valve (28). The accelerating fuel charge then goes around the valve and out the pump discharge nozzle (26).

A slot in the pump piston stem allows the pump operating rod (31) to overrun the pump piston (30) when the throttle is opened suddenly. This overrun causes the pump piston to be subjected to the pressure of the spring (27), thereby giving a prolonged discharge of the accelerating fuel.

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 (30) in the holes of the operating lever (32). The position farthest away from the pivot point is the cold weather setting since it gives the greatest discharge. The middle position is the average setting, and the position nearest the pivot is used under conditions of very hot weather.

## ADJUSTMENTS AND SERVICE HINTS

TOOLS REQUIRED - This carburetor can be cleaned or repaired without the use of special tools.

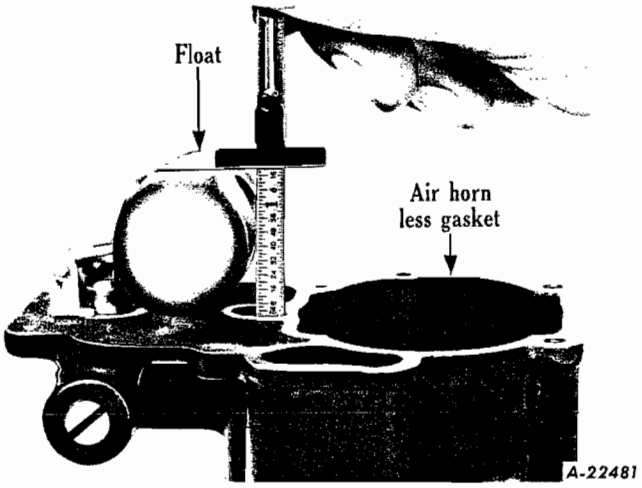


Fig. 4

Before making any adjustments to the carburetor, it is important that the breaker points and spark plugs be properly spaced, the ignition timing correct and valve tappets set to proper clearance. Check all carburetor assembly screws and manifold flange bolts, see that they are thoroughly tightened and that there are no leaks at gaskets.

FLOAT LEVEL - Proper carburetor performance is dependent on maintaining the correct fuel level in the bowl. The float level can be set accurately, when the air horn is off, by gauging the distance between the bottom of the float and the flange surface of the air horn. Holding the air horn upside down, less gasket, and with the float in the closed position, measure the distance from the flange surface of the air horn to what would normally be the bottom side of the float, not the soldered seam (Fig. 4). The correct distance that it should measure is 1-11/32". To correct the float setting, the float lever arm (11), Fig. 2, should be bent up or down to bring the float within the established limits and thus correct the fuel level for best operation. Pushing the float toward the float chamber cover raises the level; pushing it away from the cover lowers the level.

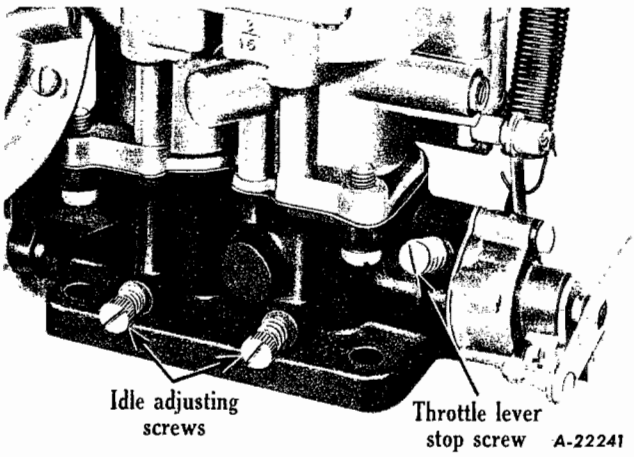


Fig. 5

NOTE: The fuel inlet valve, valve seat, and gasket are serviced as an assembly and should be used as supplied in factory matched sets. When replacing the valve seat, be sure to use a screwdriver with a blade wide and heavy enough to fill the slots in the valve seat.

IDLING SPEED ADJUSTMENT - First set the idling speed by adjusting the throttle stop screw, (Fig. 5).

The idle mixture is controlled by the idle adjusting screws (Fig. 5).

NOTE: These screws regulate fuel flow and are not air bleed needles. Turning these screws in (or to the right) makes the mixture leaner, and turning them out (or to the left) makes the mixture richer. Screws should be turned in until they just touch the seat, then backed off one full turn. Care should be taken not to jam the screws against the seat tight enough to groove the points. If this occurs, the needles will have to be replaced before a satisfactory adjustment can be made. The screws should be adjusted with the fingers to avoid damage.

When the engine has warmed up, turn both idle screws in until the engine starts to slow down, then turn both idle screws out until the engine starts to slow down. A point half way between these two will be very close to the correct idle mixture.

After arriving at the correct mixture, it may be necessary to reset the throttle stop screw to obtain the correct idle speed. Changing the speed may make a slight change in the idling mixture. In the event this occurs, re-adjust the screws as outlined above.

NOTE: When adjusting the idle mixture it is important that both idle screws be set at approximately the same number of turns open, otherwise, the off idle performance may be erratic.

FAILURE TO IDLE PROPERLY AFTER ADJUSTING - Be sure motor is tuned to specifications. Check for air leaks in intake manifold gaskets, carburetor body, bowl and flange gaskets.

If the idle is erratic and not sensitive to adjustment, check the float level in the float bowl. Check the idle tubes (10). They must be tight on seat in nozzle bar casting (15), Fig. 2.

ACCELERATING PUMP ADJUSTMENT - When the engine does not accelerate properly, check the accelerating pump system for dirt. If the pump inlet check valve (25), Fig. 3, does not seat, fuel will return to the float bowl instead

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of discharging through the pump discharge passages (26). This can be checked by removing the main body cover and operating the pump with a small amount of fuel in the bowl. If the check ball is leaking, air or fuel will bubble back into the float bowl through the inlet hole. After cleaning this seat, extreme care should be taken when reinstalling the pump piston to be sure the piston leather is not damaged and that it contacts the cylinder wall. If the leather is not a snug fit against the cylinder wall, fuel will leak by the piston on acceleration, causing a weak discharge.

To clean the accelerating pump system, remove piston assembly and check ball retainer and check ball from bottom of cylinder. Remove pump discharge nozzle, and valve (28) Fig. 3. Remove pump discharge needle valve. All channels can then be cleaned of all foreign matter by flowing out with compressed air. The small holes or restrictions in the discharge nozzle should deliver a fine, solid and round stream. When the system is in good condition, a quick steady stream will flow from the discharge outlet the instant the throttle is opened.

MAIN FUEL SYSTEM - To check for trouble at intermediate speeds, be sure all gaskets are tight. Remove main jets (13) Fig. 2, and check size in accordance with specifications. Clean main jets, main jet passages and main discharge nozzle with compressed air.

NOTE: Never attempt to clean any of the small holes or restrictions by forcing any object through them. This is apt to enlarge the hole or distort the shape and change the calibration.

HIGH SPEED COMPLAINTS - For high speed complaints, check the power valve (17), Fig. 2, as well as the main jets (13) in accordance with the above instructions. Clean all passages with compressed air. Check the fuel pump pressure to be sure it is sufficient to maintain fuel level in the bowl. Check float travel to insure full opening of the inlet valve.

ALTITUDE OPERATION - In some cases in high altitudes, it may be necessary to use leaner metered main jets. Usually a 5% or 10% leaner jet will compensate for any variation in altitude. The metering jets are marked in thousandths of an inch of hole diameter; thus, the smaller the hole, the smaller the number on the jet.

The main jets can be removed and installed without disassembling or removing the carburetor from the engine in the following manner:

1. Remove the two main jet passage plugs and gaskets from the carburetor main body. Removal of these plugs will drain the fuel bowl. See Fig. 38.

2. Remove the main jets using a screw driver having a screw starter blade. See Fig. 39.

   NOTE: If the jet fails to stick to the end of the removing tool, but falls off into the fuel bowl, it may be necessary to remove the air horn assembly.

3. Install the main jets in the reverse of the removal operation. No gaskets are used with the main jets.

   NOTE: Do not try to change the size of the power valve restriction (21) Fig. 2, or the pump discharge nozzles (26) Fig. 3, as this will cause erratic performance.

ECONOMY COMPLAINTS - Changing jets rarely increases economy more than slightly and often ruins performance. Make a thorough check on the condition of the motor with a compression gauge and make sure valves are in good condition. In a vehicle, check for dragging brakes or extra friction. Do not merely take a customer's word on mileage; run a gas test with a scientific mileage tester. Check float level in carburetor bowl and make sure the fuel pump pressure is not excessive. Then, if there is still cause for complaint, the various points as outlined above should be carefully checked over.

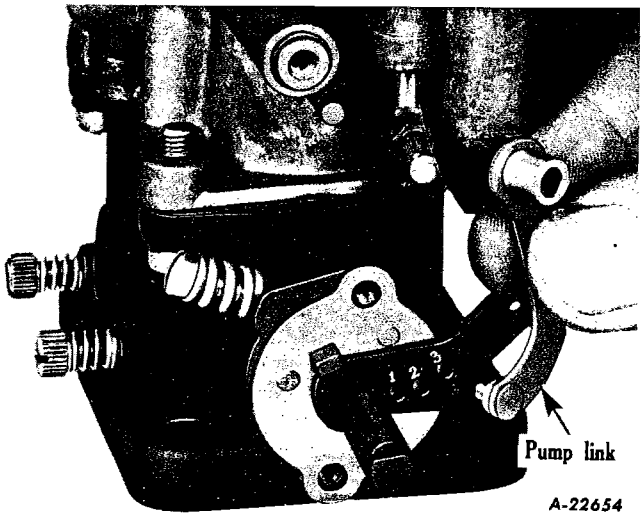


Fig. 6 - Showing adjustment provided for accelerating pump stroke. No. 1 hole shortens pump stroke. No. 2 length-increases pump stroke. The No. 2 hole is the intermediate and recommended position.

## GOVERNOR - MODEL 1174

This engine speed governor has been designed and engineered as an integral part of the Holley Carburetor. The governor is a vacuum controlled device featuring all the advantages of a

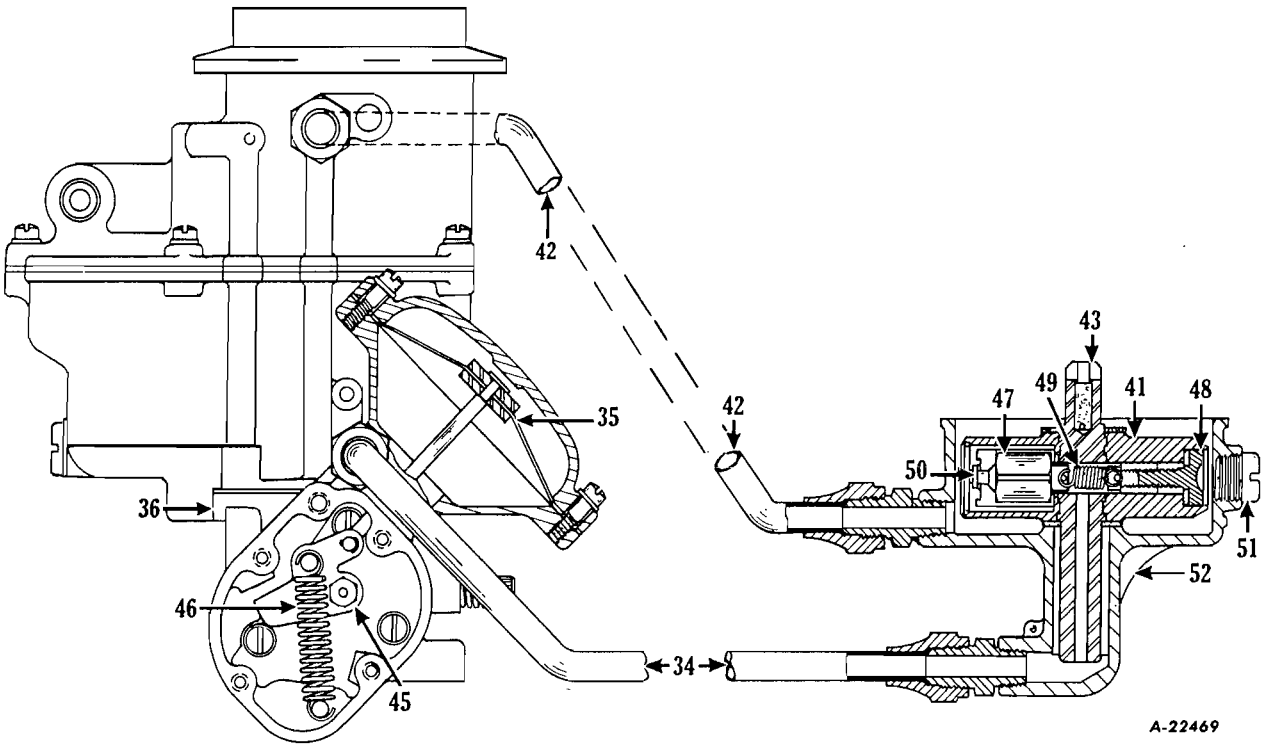


Fig. 7 - Details of governor. Spinner or rotor housing is located at distributor.

mechanical governor without resorting to lengthy and complicated linkage. The governor can be cleaned and serviced without the use of special tools.

The governor is made up of two units (see Fig. 7). The control at the engine end of the governor consists of a governor valve (47), an adjusting screw (48) and a spring (49) assembled in a rotor (41) which revolves at one half the engine speed, in a housing (52), attached to an engine driven shaft (43). The controls at the carburetor end of the governor unit consist of a diaphragm (35) which is connected to the governor lever (45) by a short rod and a tension spring (46) which is also attached to the governor lever (45) and tends to hold the throttle open.

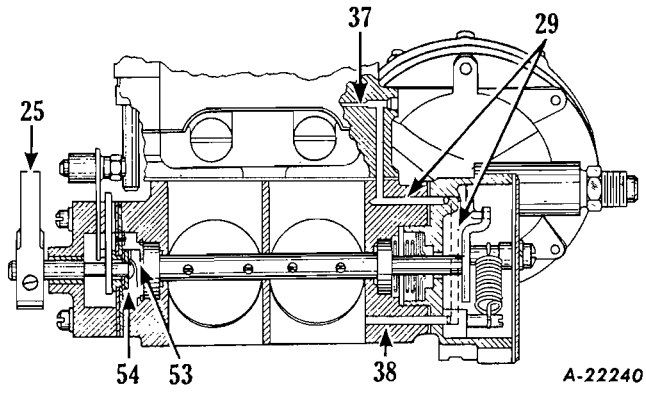


Fig. 8

The diaphragm chamber (33) in Fig. 9 is connected to the governor valve air bleed orifice (50) in Fig. 7 by means of a conventional pipe line (34). The air bleed supply enters the rotor housing (52), Fig. 7, from a pipe line (42) attached to the engine air cleaner or carburetor as shown in Fig. 7.

Vacuum to the diaphragm (33), Fig. 7, is supplied by means of the two channels (37) and (38) as shown in Fig. 8. Channel (37) opens into the carburetor above the throttle plate and channel (38) below the throttle plate. These two openings are connected by channel (29), Fig. 8, which in turn is directly connected to channel (36) as shown in Fig. 9. The vacuum is controlled by the governor by-pass channel jets (39) instead of the variable restriction formerly used.

A detailed description and the operation of the above mentioned features follows:

## Governor Operation

When the engine is running at idling speed, the throttle is controlled by the external lever (2), Fig. 8, and the pin (54) which is held against the internal lever (53) on the throttle shaft by the accelerator spring, as shown in Fig. 8. At idling speed, the governor valve (50) in Fig. 7 is held away from the air bleed orifice (50) by the spring (49) which is fastened to the governor adjusting screw (48). As the accelerator is

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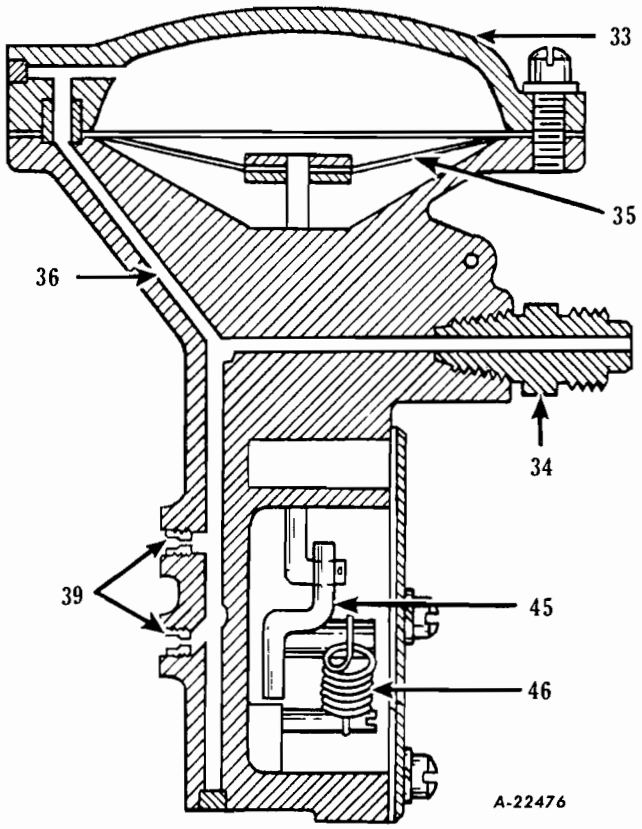


Fig. 9

moved to and held in the full open position to increase the engine speed, the governor spring (46) in Fig. 7, pulls the throttles to the wide open position to remain there until the engine r.p.m. has reached the predetermined governor cut-off speed. At this point, the governor mechanism which has kept pace with the engine speed is ready to go into action and take over control of the throttle, causing the accelerator system to become ineffective for further engine speed increase. The action of the mechanism is, that when the engine speed increases, the governor valve (50) in Fig. 7, stretches the spring (49) and moves toward the air bleed orifice (50) thus restricting the bleed to the diaphragm (35). As the air bleed to the diaphragm is reduced it permits the suction supplied by the orifices (37) and (38) in Fig. 8, to operate the diaphragm. As this suction increases, the diaphragm power overcomes the tension of the governor spring (46) in Fig. 7, and takes over full control of the throttles. The engine governed is then held constant by the valve (47) being balanced between the pull of centrifugal force actuated by the rotation of the shaft (43) and the tension of the spring (49) in Fig. 7.

Any slight change in speed or engine load will cause the governor valve (47) to act immediately either to increase or decrease the amount of air bleed through orifice (50), which in turn causes an instant response from the diaphragm to increase or decrease the throttle opening.

When the accelerator is released the control is taken away from the governor by the external throttle lever, and the governor connecting spring (40) then closes the throttle to bring the engine to any desired lower speed.

NOTE: The governor adjustments have been set at the factory to operate the engine at the proper recommended speed. It is not likely that the adjustments will change once they are set.

### Governor Adjustments and Service Hints

To adjust the governor cut-off speed, proceed as follows:

1. Remove the seal from the screw (51) that will be found on the side of the governor housing (52) in Fig. 7.

2. Remove the screw from the housing.

3. Rotate the engine until the end of the governor rotor (41) in Fig. 7, which carries the adjusting screw (48) is in line with the hole from which the screw (51) was removed.

4. With a suitable screw driver turn the adjusting screw to the RIGHT to INCREASE the engine governed speed or to the LEFT to DECREASE the speed.

   NOTE: Where the governor has been disassembled and serviced, after reassembling turn the adjusting screw (48) to the right until it stops then turn the screw to the left three full turns. Final adjustment is then made after the governor has been assembled to the engine as outlined above in operation 4.

## HOLLEY CARBURETOR AND GOVERNOR OVERHAUL

The carburetor and governor can be overhauled with ordinary tools.

Clean all loose dirt from carburetor assembly before proceeding with the following instructions:

CAUTION: Do not immerse the carburetor assembly in cleaning solvent as the solution may cause damage to leather seals and governor diaphragm. Do not direct compressed air stream into air vent tubes in air horn as air pressure will damage float.

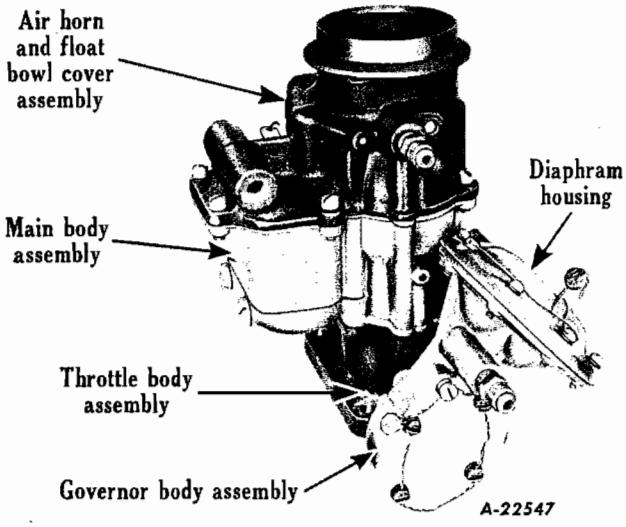


Fig. 10

Fig. 10 - The carburetor is in reality an assembly of four major sub-assemblies. These assemblies are identified above and should be disassembled and kept together in their respective groups.

## Disassembly

Disassembly of the carburetor is as follows:

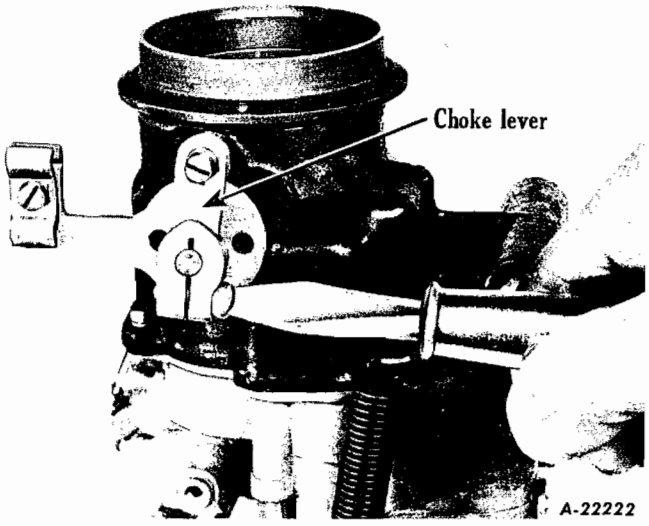


Fig. 11

Fig. 11 - Loosen screw in choke lever clamp and remove lever.

Fig. 12 - Remove two choke wire bracket retaining screws and lockwashers and remove the choke wire bracket.

Fig. 13 - Remove six air horn assembly screws and lockwashers.

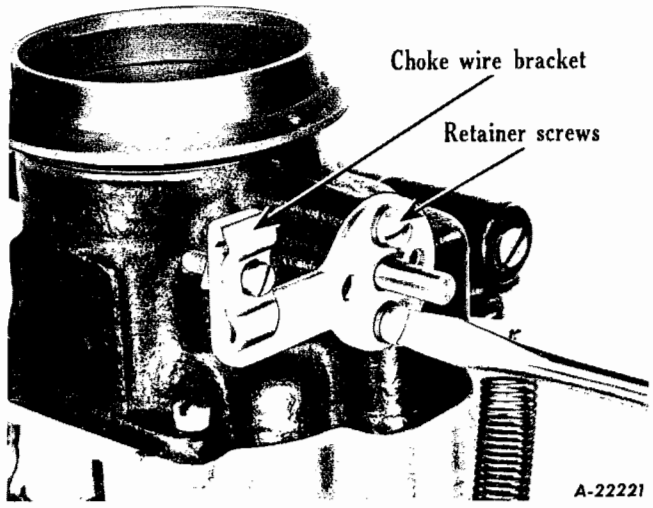


Fig. 12

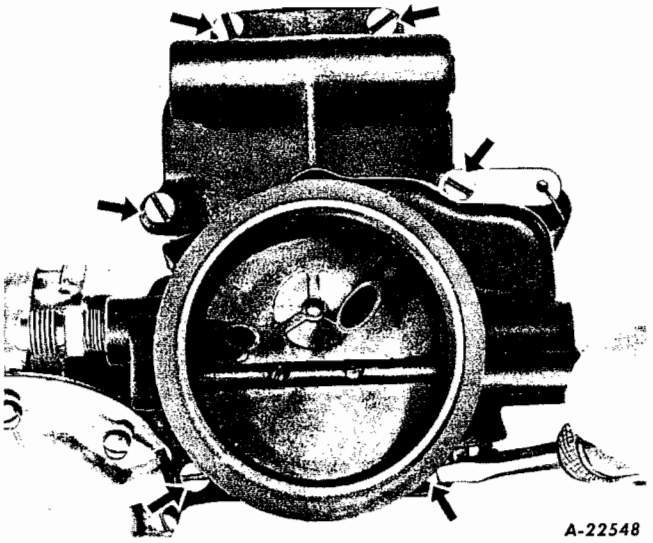


Fig. 13

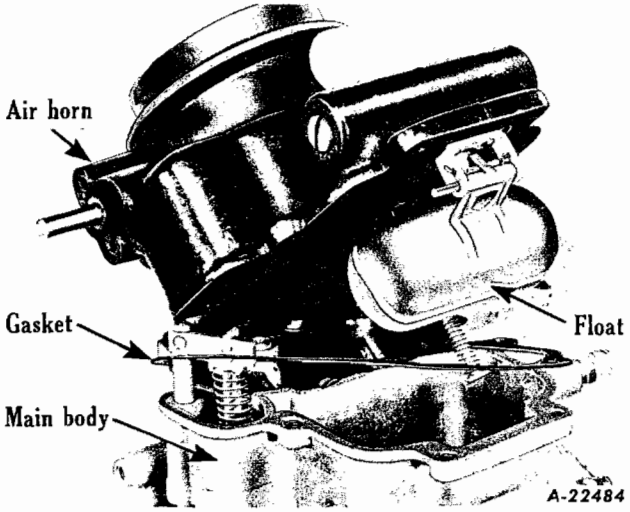


Fig. 14

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Fig. 14 - Separate air horn from main body assembly and remove gasket. Be careful not to damage float.

Fig. 15 - Remove float shaft and float.

Fig. 16 - Remove fuel valve needle. Note: The fuel inlet valve, seat and gasket are serviced as an assembly and should be used in matched sets as supplied.

Fig. 17 - Remove fuel valve needle seat and gasket using a large screw driver that fits the slot properly or SE-1190-14 wrench.

Fig. 18 - Remove economizer piston and stem assembly. Use special wrench to fit piston retainer.

Fig. 19 - In removing the choke plate note that the two choke plate screws are upset and must be filed flat before removing to prevent breakage or stripping of threads in shaft.

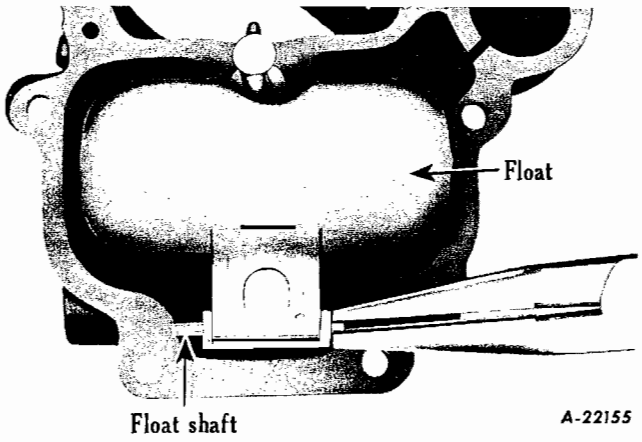


Fig. 15

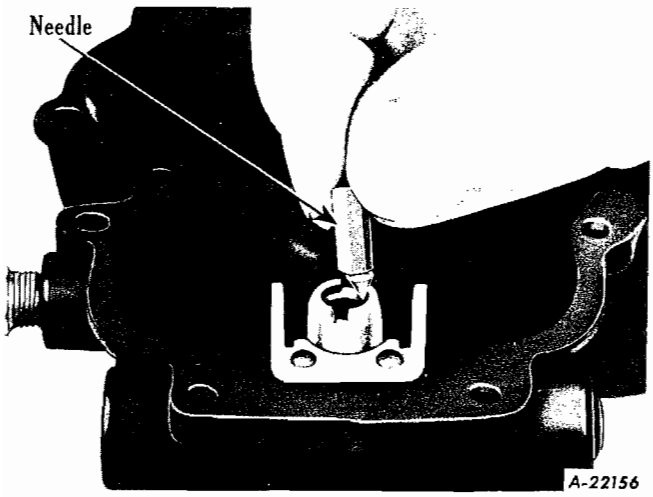


Fig. 16

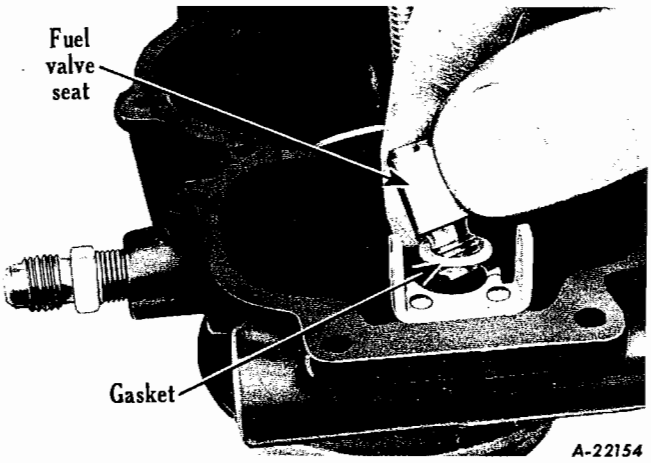


Fig. 17

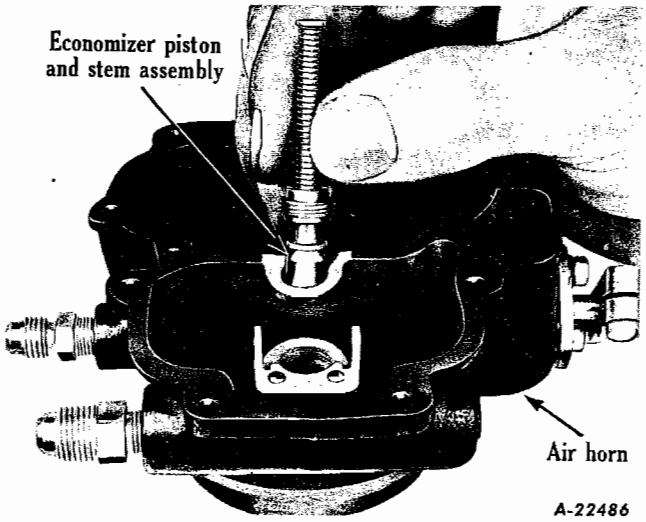


Fig. 18

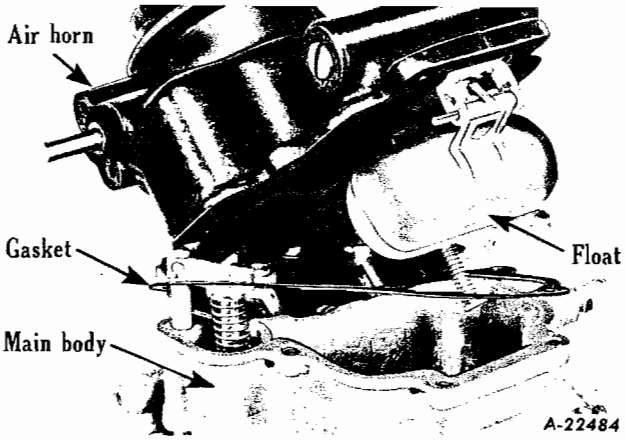


Fig. 19

**Fig. 20 -** Remove the two choke plate screws.

**Fig. 21 -** Remove choke plate, shaft and felt packing. Do not attempt to remove vent tubes. Do not remove plug from end of choke shaft bars. All removable parts have been stripped from air horn and float bowl cover assembly and should be kept together as a group ready for cleaning and inspection preparatory to reassembling.

Fig. 22 - Remove cotter pin holding accelerating pump link in place.

Fig. 23 - Remove the two throttle operator shaft housing assembly retainer screws and remove housing assembly.

Fig. 24 - Remove accelerating pump link. Note: It is not necessary to remove the throttle operator shaft housing assembly when changing pump link to secure better engine performance or to adjust carburetor for climatic changes. It was removed here to show the pump link lever more clearly.

Fig. 25 - Remove the throttle operator shaft assembly.

Fig. 26 - Remove the pump operating rod stud.

Fig. 27 - Remove the accelerating pump operator rod and piston assembly.

Fig. 28 - Disassemble the pump rod and piston by compressing the spring and removing the pump rod from the piston slot.

**Fig. 29 -** Remove accelerating pump operator rod seal. Use narrow blade screw driver and pry out felt retainer and remove felt.

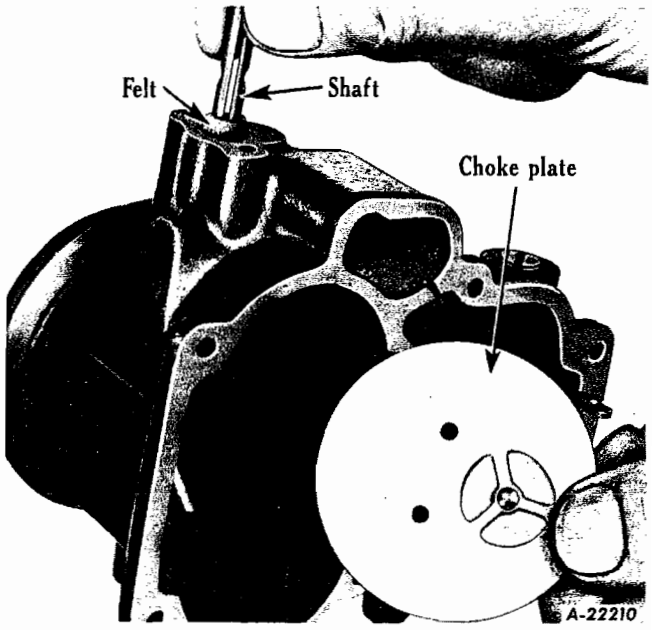


Fig. 21

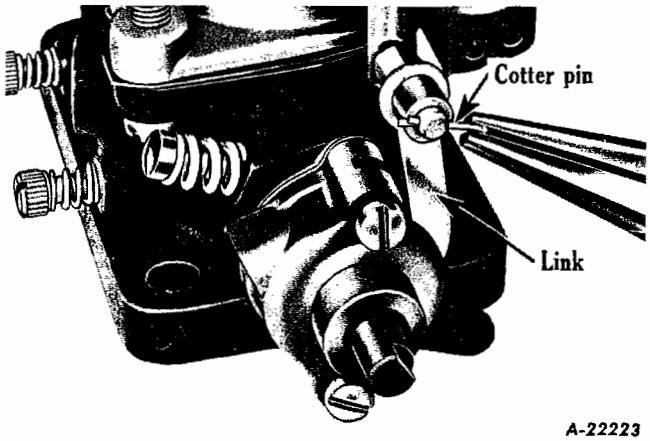


Fig. 22

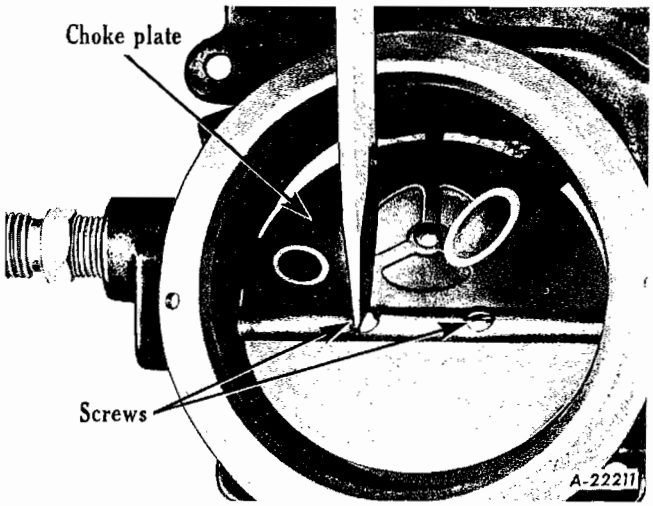


Fig. 20

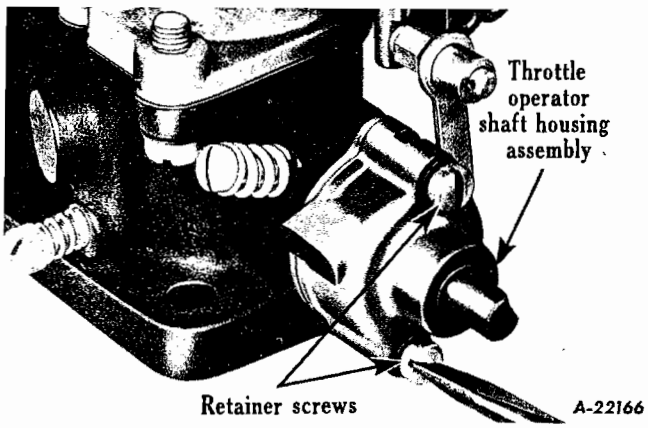


Fig. 23

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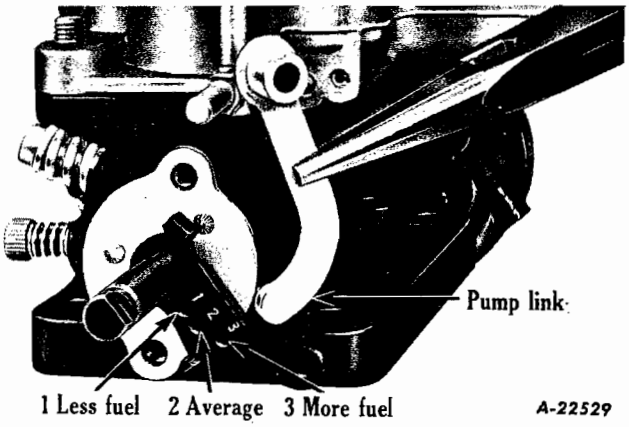


Fig. 24

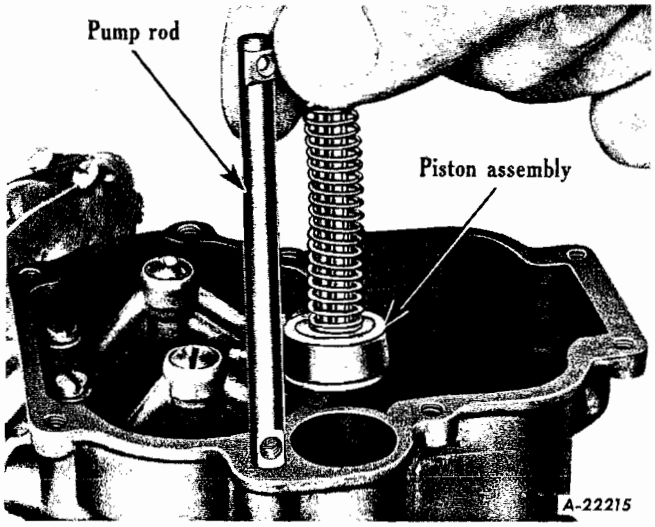


Fig. 27

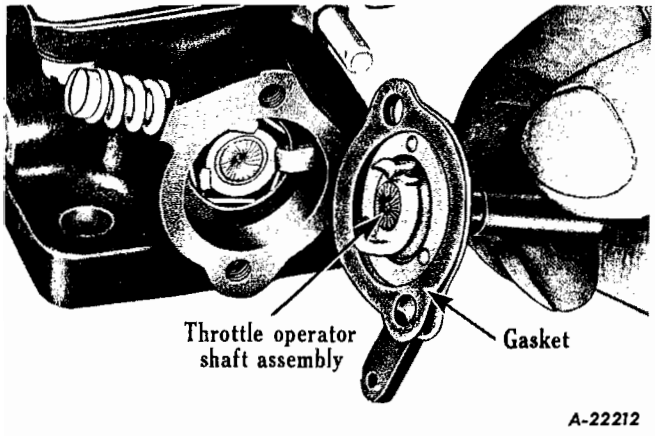


Fig. 25

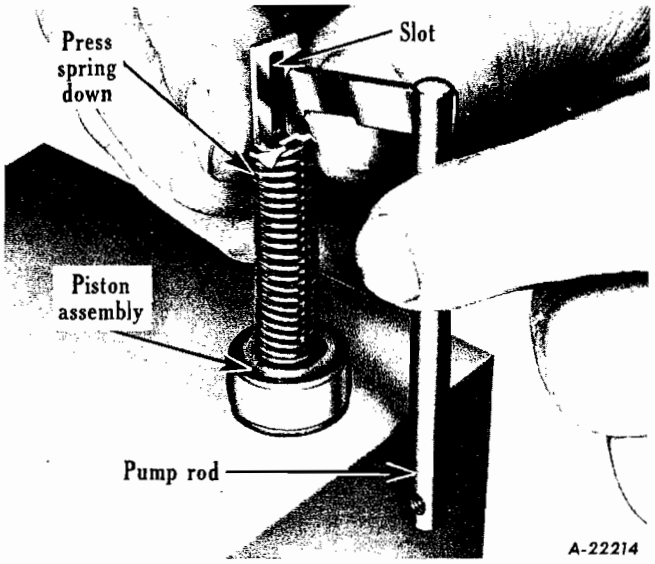


Fig. 28

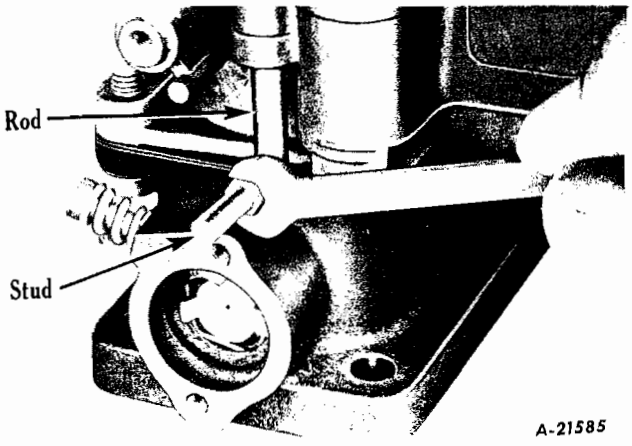


Fig. 26

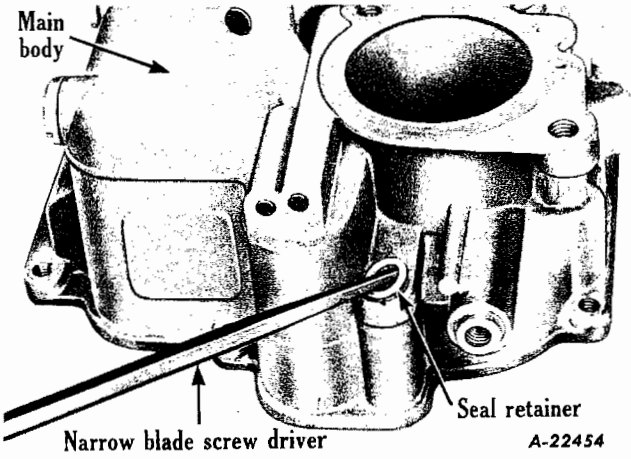


Fig. 29

Fig. 30 - Remove the two brass air bleed plugs and gaskets located at the top of the main discharge nozzle bars.

Fig. 31 - Remove the two nozzle bar clamp screws and lockwashers located nearest the fuel reservoir and remove clamp.

Fig. 32 - Remove the accelerating pump discharge nozzle and gasket.

Fig. 33 - Turn the casting upside-down and catch the coiled spring and ball check resting in the pump discharge nozzle well.

Fig. 34 - Remove the two idle tubes from the main discharge nozzle bars, using a screw driver.

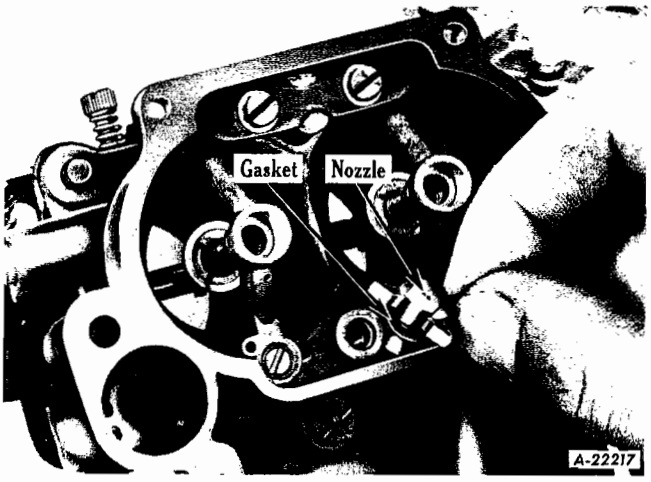


Fig. 32

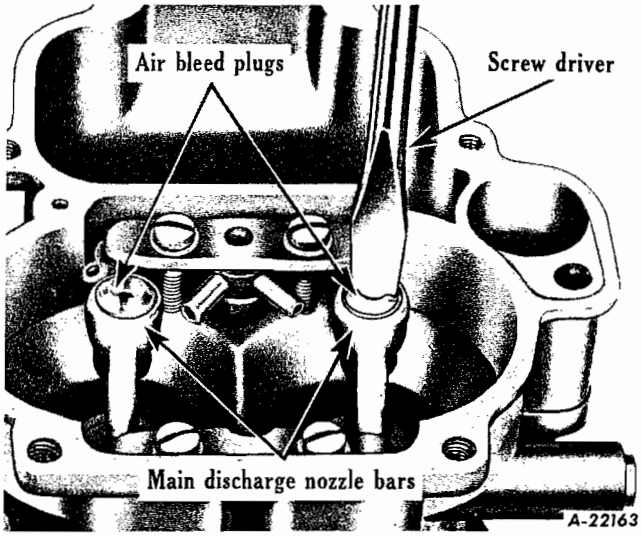


Fig. 30

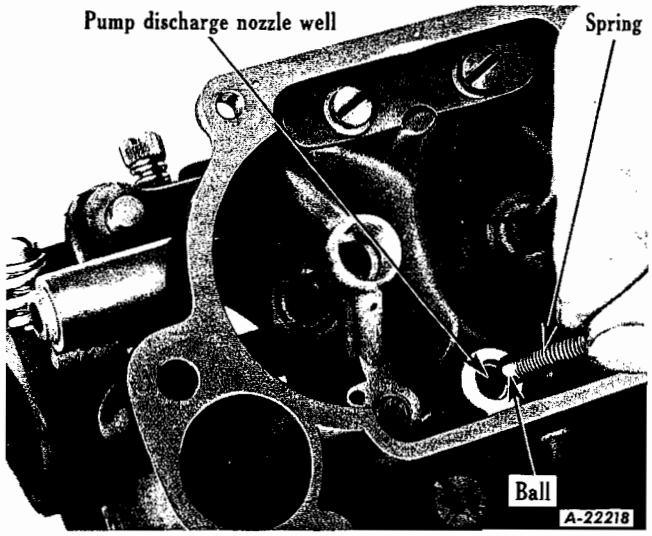


Fig. 33

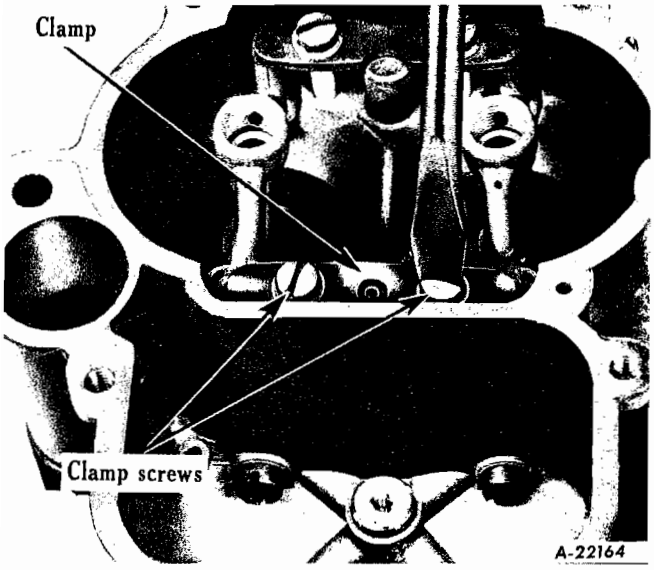


Fig. 31

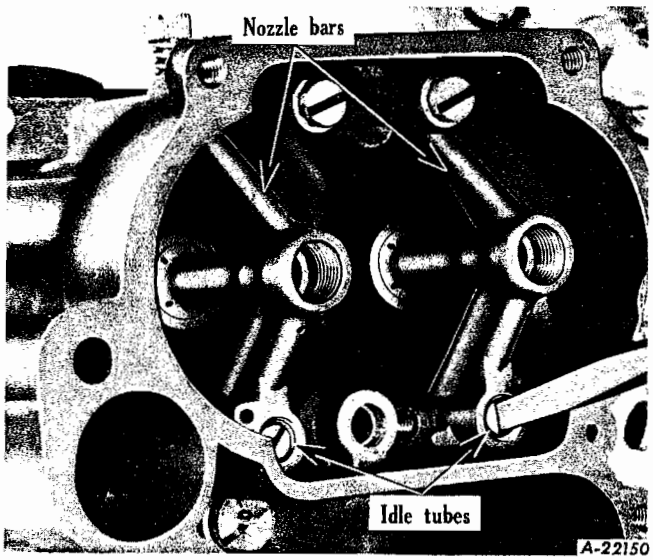


Fig. 34

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Fig. 35 - Remove the remaining two nozzle bar clamp screws and remove clamp.

Fig. 36 - Remove the two nozzle bars and gaskets.

Fig. 37 - Use a wire having a short hook bent at 90° and remove the accelerating pump inlet ball check retainer spring from the bottom of the pump chamber. Turn the casting upside down and catch the inlet ball check.

Fig. 38 - Remove the two main jet passage plugs and gaskets.

Fig. 39 - Remove the two main jets using a screw driver or SE-1190-2 jet wrench.

Fig. 40 - Remove economizer valve and gasket in bottom of fuel bowl using a screw driver with a wide blade.

Fig. 41 - Lay casting on its side and remove two throttle body to main body assembly screws. Pass screw driver through the carburetor mounting stud holes in base.

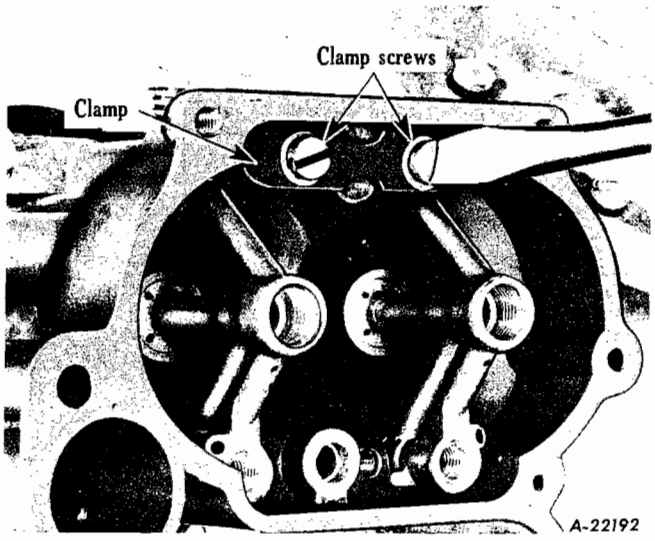


Fig. 35

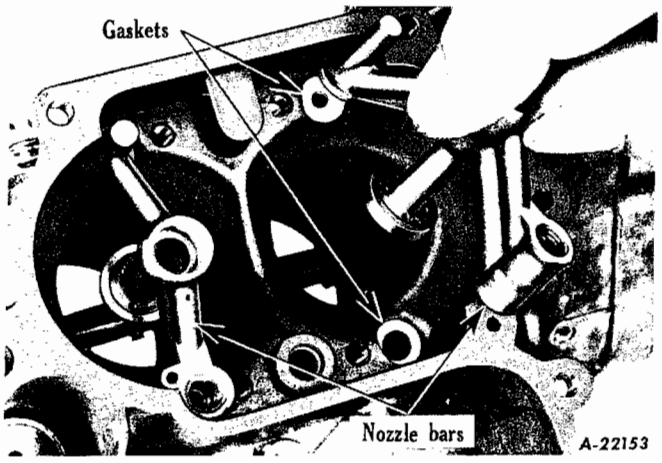


Fig. 36

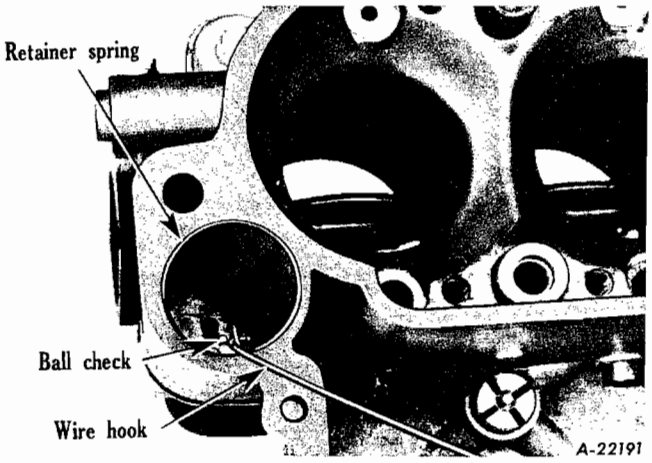


Fig. 37

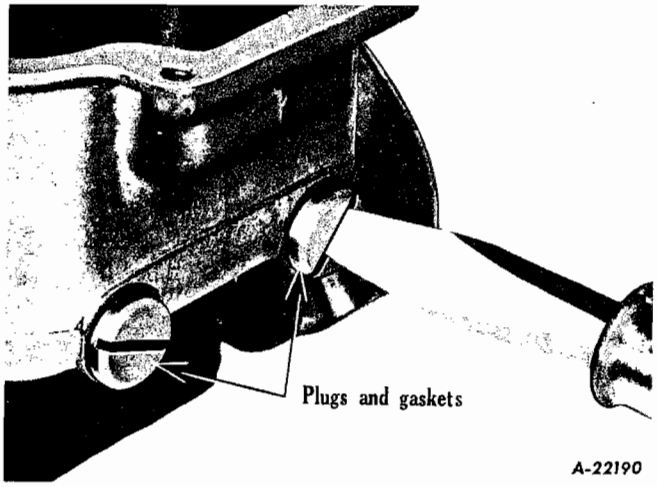


Fig. 38

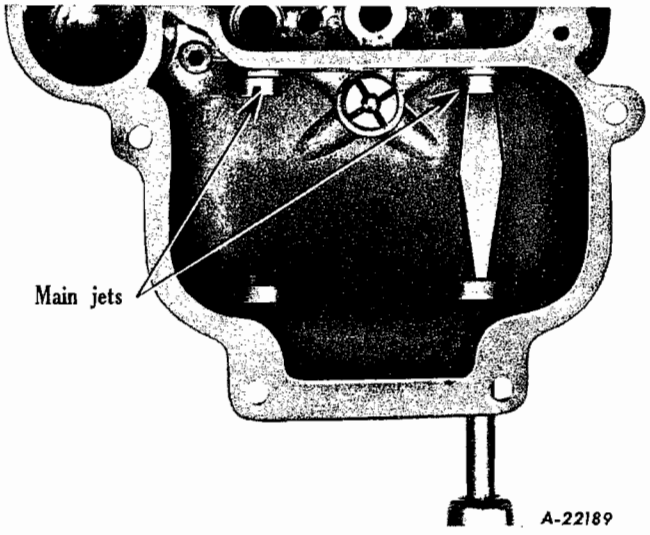


Fig. 39

Fig. 42 - Turn casting over and remove the third throttle body to main body assembly screw. Access to this screw is by means of a hole in carburetor mounting flange face.

Fig. 43 - Separate the main body from the throttle body assembly and remove gasket. Retain all parts removed from main body assembly as a group for cleaning and inspection.

Fig. 44 - Remove seal and wire from governor body cover plate screws.

Fig. 45 - Remove cover plate screws and lockwashers. Note: Plug screw located in cover plate. This screw serves to plug blind hole in governor housing and has no effect on carburetor operation.

Fig. 46 - Remove governor body cover plate and gasket.

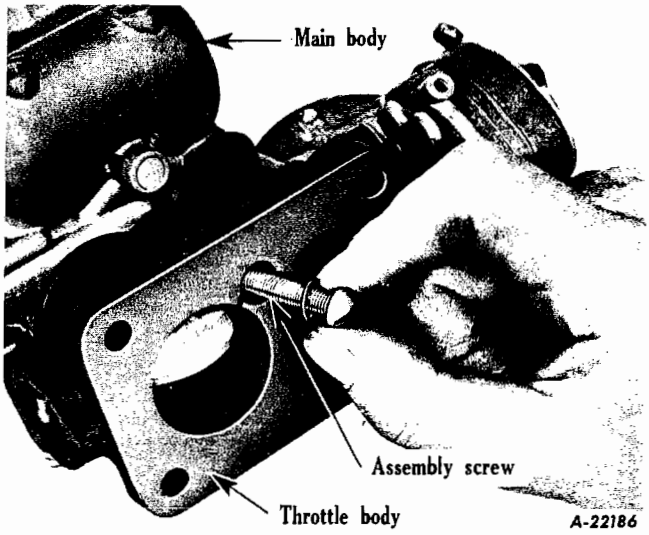


Fig. 42

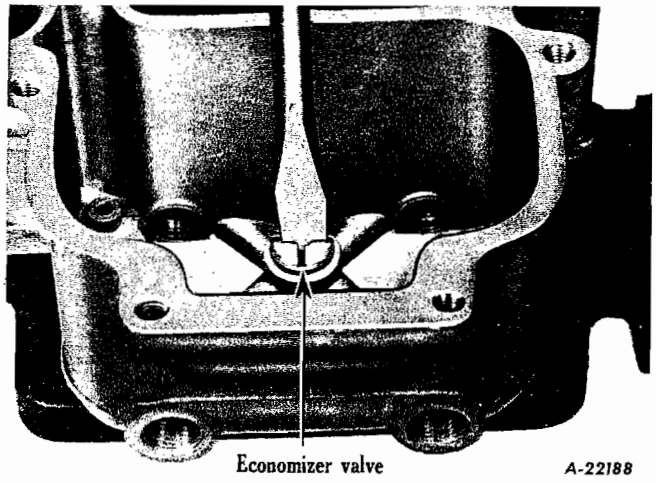


Fig. 40

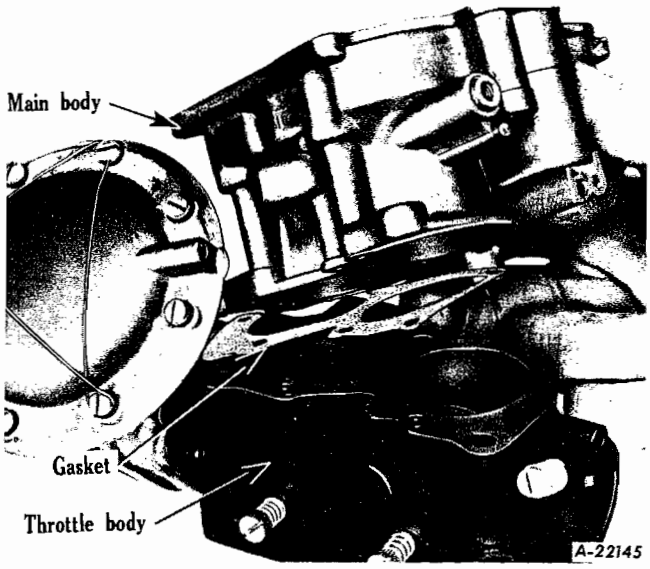


Fig. 43

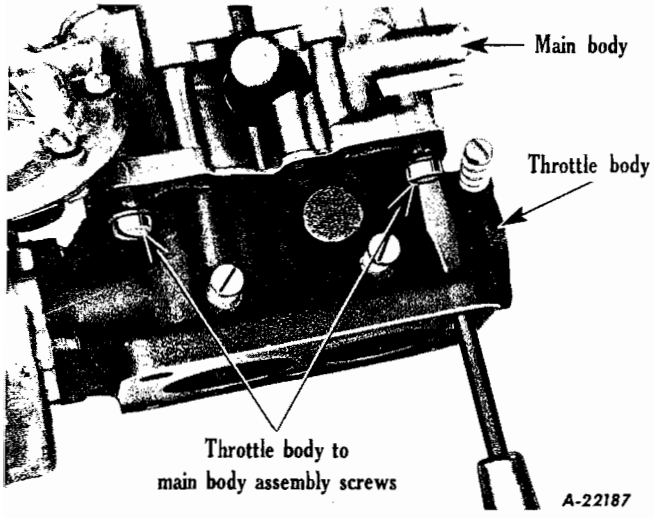


Fig. 41

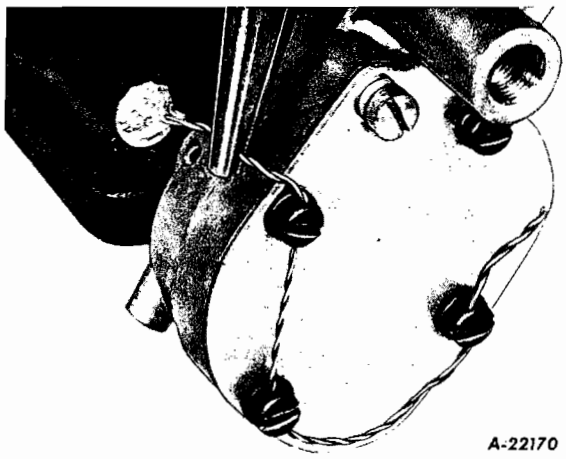


Fig. 44

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Fig. 47 - Remove the governor spring with the fingers. Be sure to hold throttle open while removing spring.

Fig. 48 - Remove cotter pin holding diaphragm rod to governor lever.

Fig. 49 - Remove governor lever retainer nut and lockwasher. SE-1190-9 wrench fits this nut.

Fig. 50 - Remove governor lever from throttle shaft.

Fig. 51 - Remove the three screws and lockwashers that hold governor housing to throttle body.

Fig. 52 - Remove the governor housing from the throttle body and remove gasket. Note: The throttle shaft leather seal and washer will usually adhere to governor body, but were placed on shaft to show correct assembly.

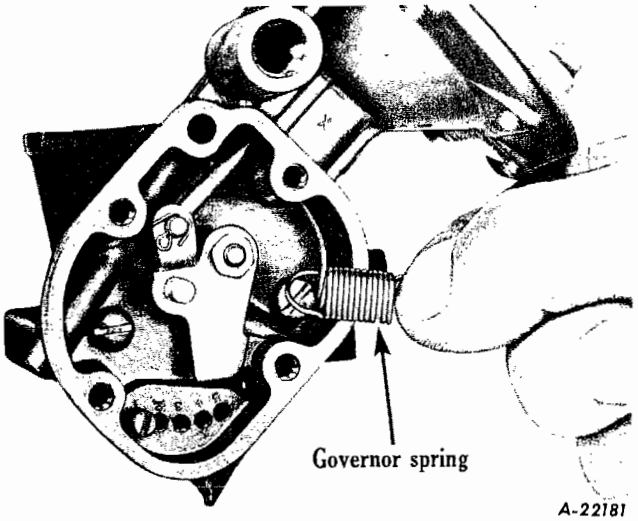


Fig. 47

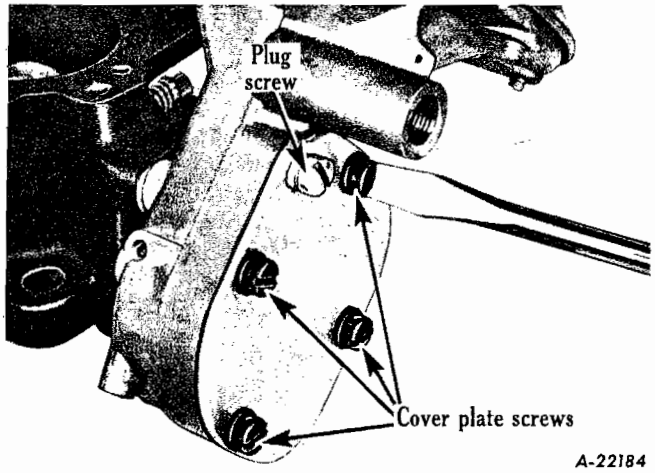


Fig. 45

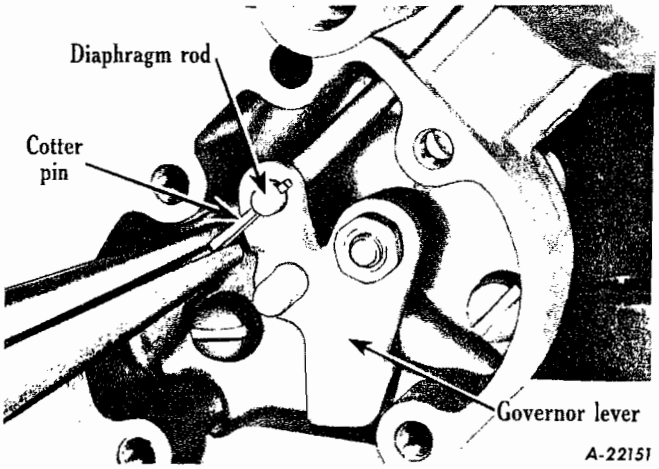


Fig. 48

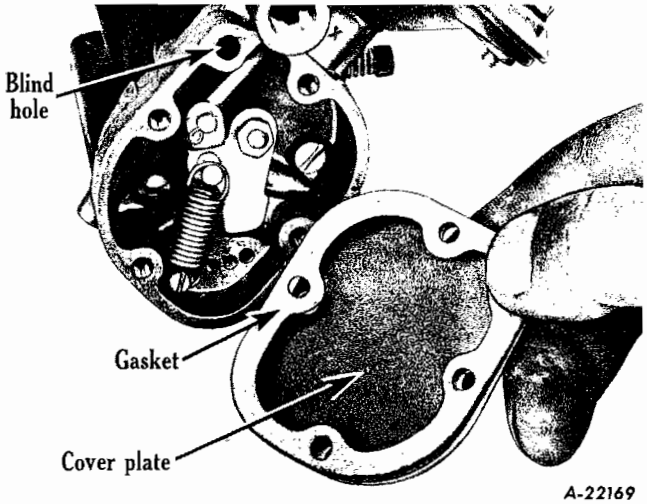


Fig. 46

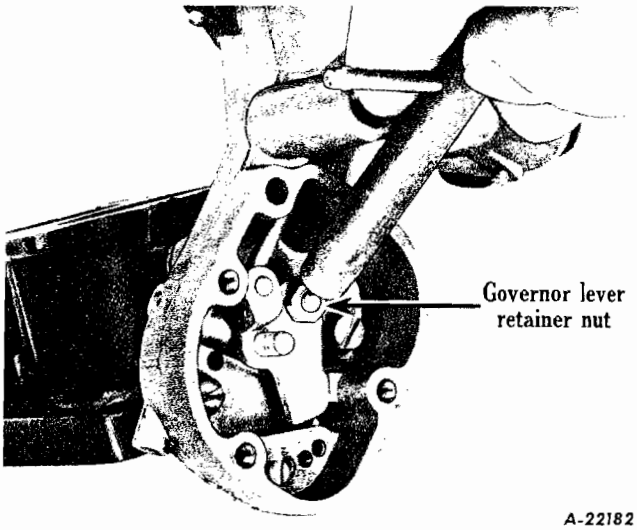


Fig. 49

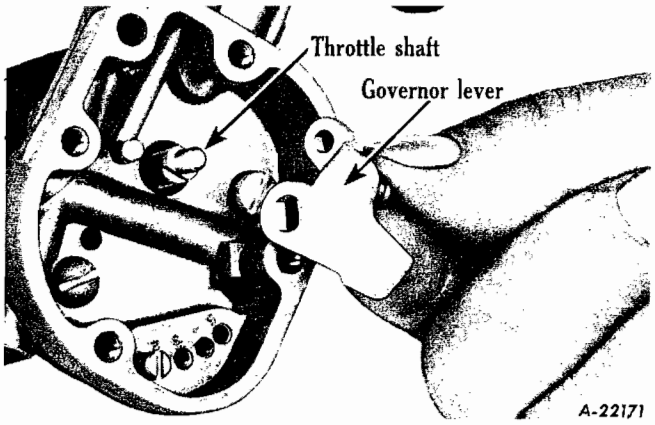


Fig. 50

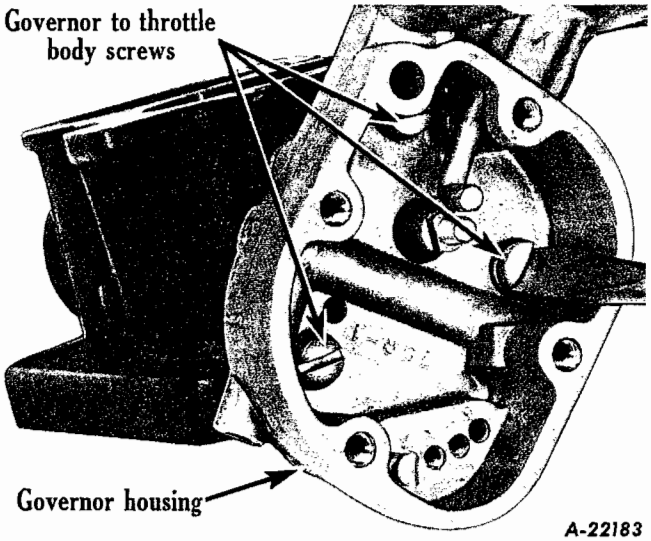


Fig. 51

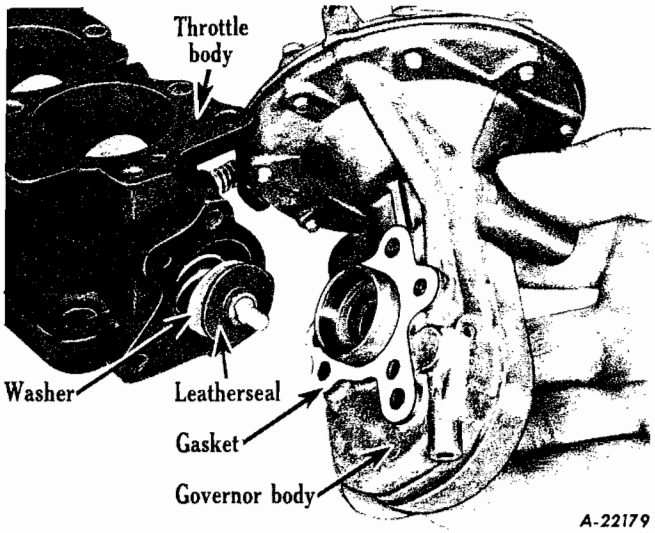


Fig. 52

Fig. 53 - Remove coiled seal retainer spring from throttle body.

Fig. 54 Remove two idle adjusting screws and springs.

Fig. 55 - Mark the throttle plates "1" and "2" and also mark the same number on the casting flange as shown. Scribe lines across the full width of the plates against the shaft. This will assure installation in their proper barrels and in correct position when reassembling.

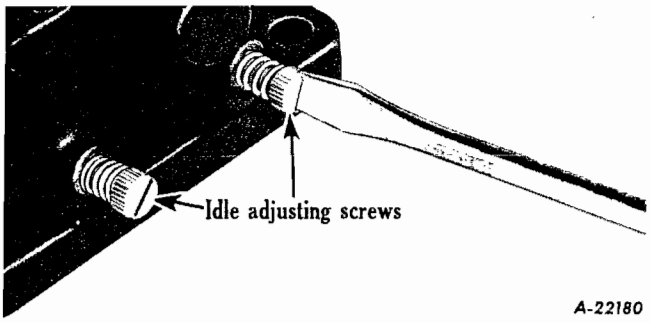


Fig. 53

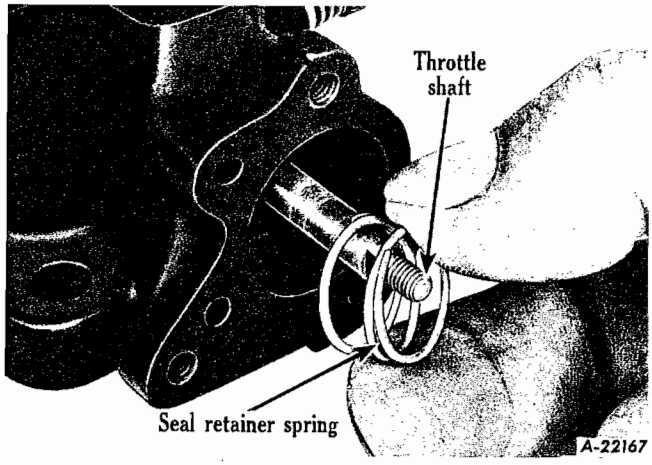


Fig. 54

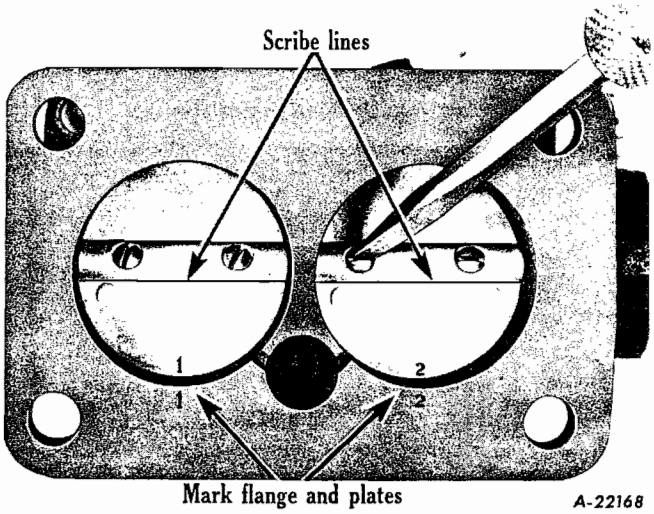


Fig. 55

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The four throttle plate screws have been upset and must be filed flat before removing to avoid breakage or stripping of threads in shaft. Remove four throttle plate screws.

Fig. 56 - Remove the throttle plates.

Fig. 57 - Remove the throttle stop screw and spring.

Fig. 58 - Remove the retainer spring holding the throttle shaft and bearing assembly in place.

Fig. 59 - Remove the throttle shaft and bearing assembly by tapping threaded end of shaft lightly with a soft hammer. Note: Do not attempt to remove the bearing on end of shaft as this bearing is pressed and staked in place.

Fig. 60 - Insert a 9/32" brass rod through shaft hole, at throttle lever end, and remove throttle shaft bearing by tapping lightly on the brass rod.

The foregoing completes removal of all parts from the throttle body; parts should be kept together in a group ready for cleaning and inspection before reassembly.

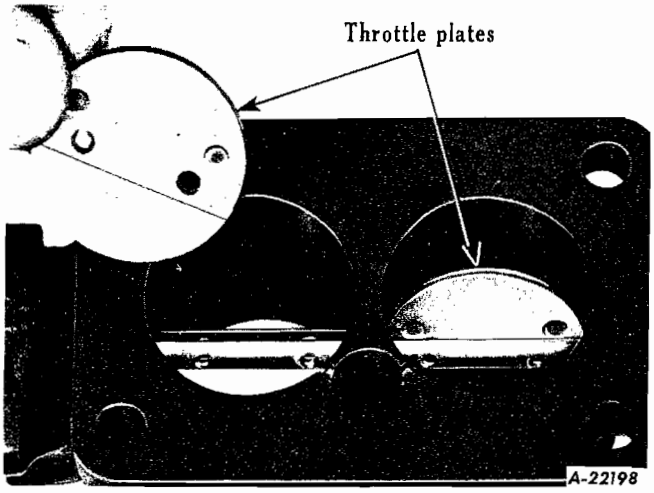


Fig. 56

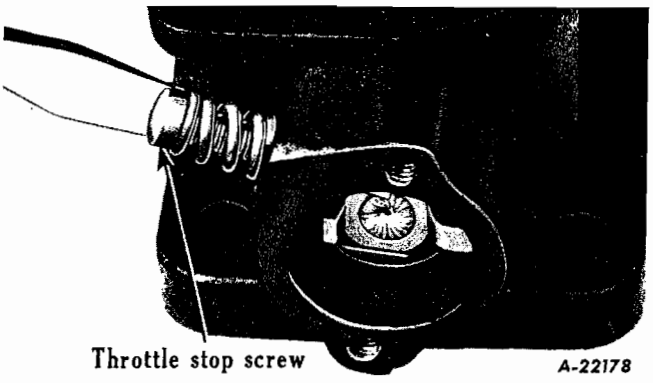


Fig. 57

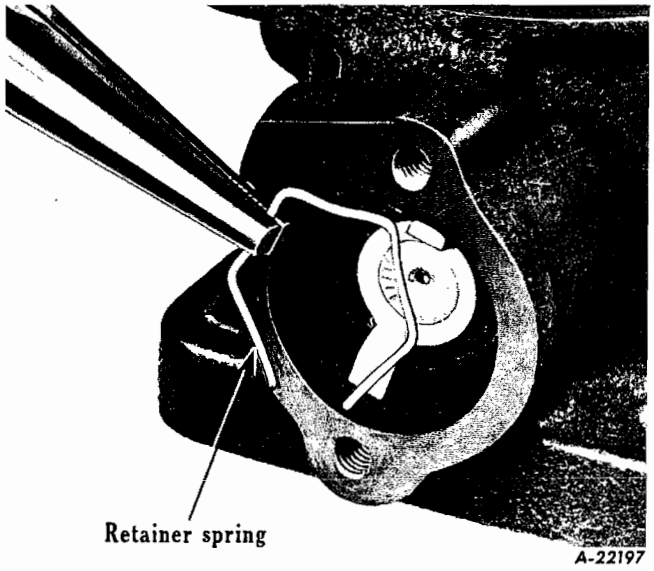


Fig. 58

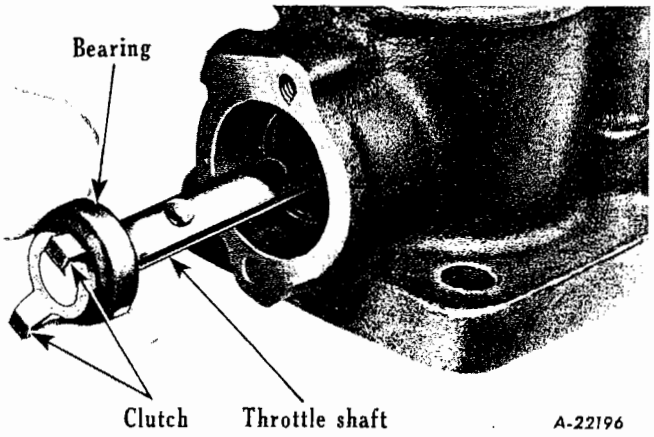


Fig. 59

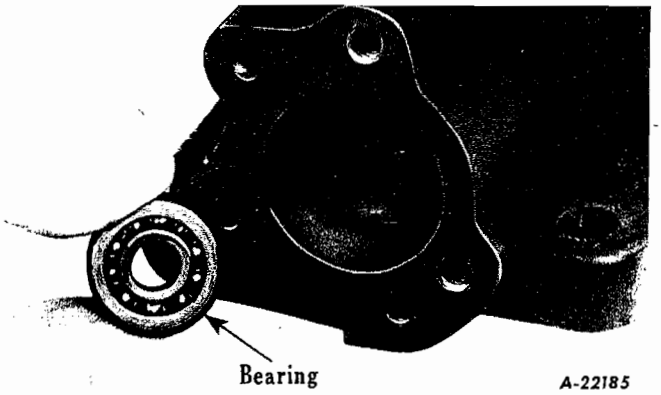


Fig. 60

Fig. 61 - Remove the washer and leather seal from governor body.

Fig. 62 - Remove the governor housing by-pass jets. The assembly of governor by-pass passage jets is shown above. The outside diameters of the "A" jet and "B" jet are not identical, hence it is impossible to assemble them incorrectly.

Fig. 63 - Remove the seal and wire from the three governor diaphragm cover retaining mounting screws.

Fig. 64 - Remove the eight governor diaphragm cover retaining screws.

Fig. 65 - Remove diaphragm cover. Use a soft hammer and tap lightly around the edge of the cover until cover breaks loose. DO NOT PRY COVER OFF.

Remove the diaphragm and rod assembly. If diaphragm sticks to the body flange, carefully work it loose with the fingers.

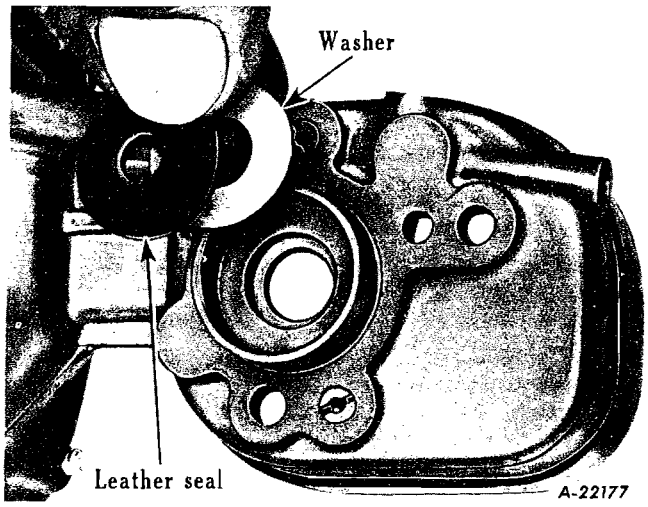


Fig. 61

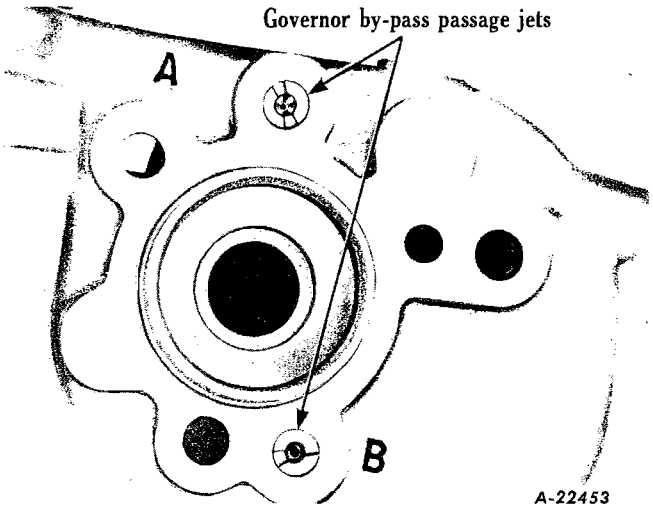


Fig. 62

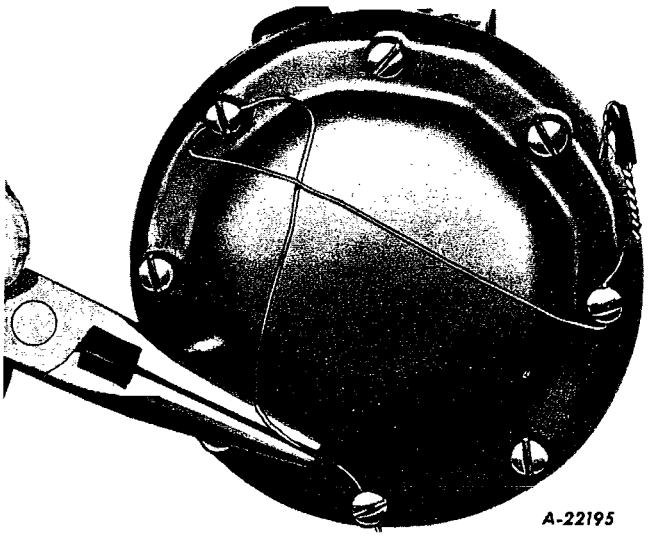


Fig. 63

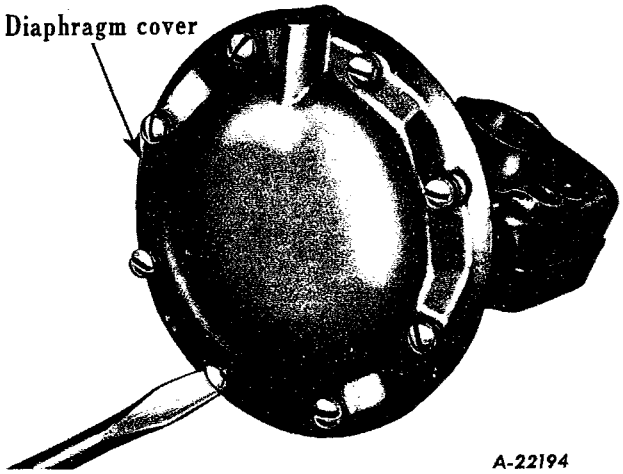


Fig. 64

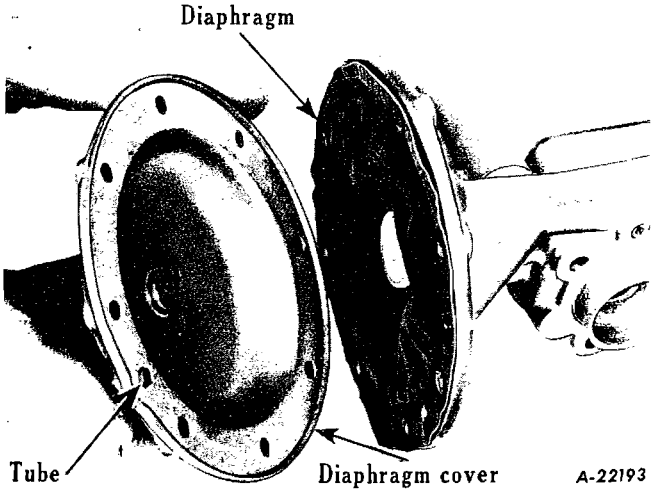


Fig. 65

NOTE: The foregoing instructions completely strip the governor; keep all the component parts together for cleaning and inspection, in preparation for reassembly.

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## Cleaning

1. The disassembled carburetor should be segregated into the four major groups. Clean the castings and parts in each individual group. Wash castings thoroughly in cleaning solvent and blow out all passages with compressed air. CAUTION: Do not wash LEATHER parts or governor DIAPHRAGM in cleaning solvent. If these parts are dirty wipe them with a soft cloth.

2. Wash metal parts in a cleaning solution and rinse them in a solvent solution. Dry all parts thoroughly.

3. Remove all carbon deposits from throttle body bores and throttle plates. CAUTION: A wire or drill used to clean metered jets or discharge holes will destroy the accurate calibration and defeat the purpose of the overhaul. Do not use a wire brush to clean parts.

## Inspection and Assembly

Inspect and assemble castings and parts by groups. NOTE: Inspect all parts thoroughly, check closely for any possible defect. Replace any doubtful parts. Never use old gaskets when reassembling the carburetor.

## Air Horn and Float Bowl Cover

Replace all defective parts and assemble as follows:

1. CASTING. Examine for cracks or breaks. Be sure sealing surfaces of casting are smooth and clean. Float lever bracket must not be twisted or bent.

2. Install new choke shaft felt in choke shaft hole counterbore.

3. Assemble choke wire clamp bracket to casting with the two mounting screws. Mount bracket with the clamp end to the left when holding casting with air filter side facing up.

4. CHOKE SHAFT. If shaft is bent or indicates excessive wear, use a new shaft. Install choke shaft.

5. CHOKE PLATE. Replace the plate if poppet valve assembly is damaged. To facilitate installation of the choke plate, rotate the choke shaft until the countersunk holes face the vent tubes. Hold the shaft in this position and insert the choke plate from the float side of casting and with the poppet valve stem pointing away from vent tubes. Center the plate in the bore and assemble to shaft using new screws. The screws must be upset to lock them firmly in place. Use a blunt center punch for this operation, also support opposite side of shaft to prevent bending the shaft.

6. CHOKE LEVER. Install on shaft with choke wire lock screw in swivel nut facing away from air horn casting and with outer edge of lever flush with end of shaft. Hold choke plate in open position and tighten lever clamp screw.

7. FUEL INLET VALVE SEAT ASSEMBLY AND GASKET. Whenever a carburetor has been in continual service for 10,000 miles or more, and when carburetor is being overhauled for any reason whatsoever, always replace original fuel inlet valve assembly with a complete new unit. Install a new fuel inlet needle, seat and gasket. Wipe taper of needle valve with a soft clean cloth before inserting in valve seat.

8. FLOAT. Replace float if it is corroded or damaged in any way. If the lip on the float lever is rough, polish with a small piece of No. 320 wet or dry abrasive paper. Place float in position in hinge bracket. Be sure float balancer spring is in position.

9. FLOAT LEVER SHAFT. Replace shaft if bent or shows excessive wear at bearing ends. Assemble shaft and float to bracket. There should be at least .005" clearance on each side of float lever and assembly bracket. If end play is insufficient, remove the float and spread the bracket.

10. FLOAT LEVEL SETTING. Hold air horn assembly at eye level (float side up) and gauge float. Gauge must just slide over top of float when float is in closed position. If float is too high, press it down gently with the fingers and regauge. If float is too low, remove it and insert a narrow screw driver between the float bracket and lip. Twist the screw driver enough to raise the lip. Install float and regauge. (See Float Level Adjustment.)

11. ECONOMIZER PISTON AND STEM ASSEMBLY. Examine assembly closely. Replace if piston is worn, stem is bent or spring is damaged. Install economizer piston and stem assembly.

12. After completing installation of economizer piston and stem assembly place casting to one side until ready to assemble to main body.

## Main Body

1. CASTING. All gasket surfaces must be smooth and clean. If any sealing surface is damaged to the extent that a perfect seal is impossible, the casting must be replaced.

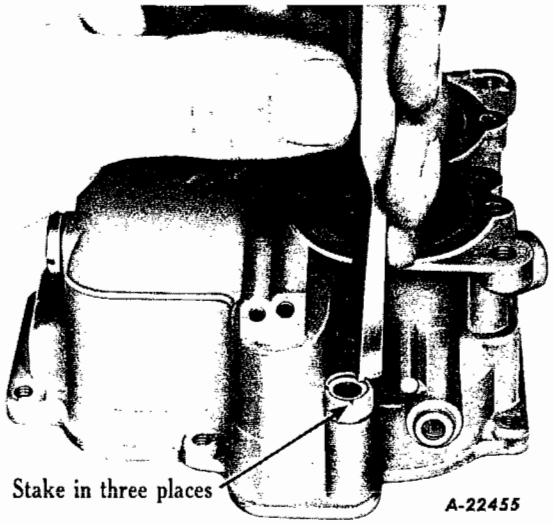


Fig. 66

2. Pump the operator rod and seal. Install a new felt seal and retainer washer and stake as shown in Fig. 66.

3. JETS. Replace jets if screwdriver slot, orifice or threads have been damaged or otherwise mutilated.

4. Install jets in casting.

5. ACCELERATING PUMP INLET BALL CHECK. Replace ball check if it is corroded or nicked. Drop ball into pump chamber and work into seat housing. (Ball seat is located in cut-away portion of chamber floor, in which the bent end of the retainer fits.)

6. RETAINER SPRING. Replace spring if bent or twisted (spring must lay flat). Install spring in pump chamber keeping bent end of spring in line with ball check. Then with a 5/8" diameter dowel pin of wood or fiber, press the retainer in the groove at bottom of chamber. Be sure bent end of spring is directly over the ball when in place

7. PUMP DISCHARGE BALL CHECK AND SPRING. Replace ball check if corroded or nicked. Replace coiled spring if corroded or distorted. Install ball check in pump discharge well. Install coiled spring over ball check.

8. PUMP DISCHARGE NOZZLE AND GASKET. Replace if damaged in any way. Discharge holes must be clean (blow out with compressed air). Place a new gasket in position on nozzle and hold assembly until ready to install bar clamp after main discharge nozzle bars have been placed in position.

9. DISCHARGE NOZZLE BARS. Replace nozzle bars if damaged in any way. All drillings and channels must be free from dirt (blow out thoroughly with compressed air).

10. Install four new neoprene nozzle bar gaskets in place. Note: In all cases where nozzle bars have been removed from casting for any reason use new gaskets when reassembling. To install gaskets, place a gasket on the blade of a narrow screw driver and put blade at edge of gasket seat. Then elevate handle of screwdriver until gasket slides into place.

11. Install nozzle bars in place, being careful not to dislodge gaskets.

    Note: Nozzle bars are marked with the letter "R" or "L" meaning right or left on the outer wall of the idle tube housing. (See Fig. 36). Place nozzle bar marked "R" next to accelerating pump chamber.

12. Place nozzle bar clamp in position on opposite side of fuel bowl. Insert short clamp screws and star washers through clamp and tighten screws just enough to hold nozzle bars in place.

13. IDLE TUBES. Replace idle tubes if bent or otherwise damaged blow out idle tubes with compressed air and install in place. Fig. 34. Idle tubes must be tight on seats.

14. Install the remaining nozzle bar clamp, first being sure to install the fuel pump discharge nozzle and gasket. Also make sure fuel pump discharge ball check and spring are still in place. Tighten both clamps.

15. Install new bleeder plug gaskets in top of nozzle bars. Install bleeder plugs in place and tighten.

16. ECONOMIZER VALVE. Replace valve if spring is weak or if the valve stem is bent. Place a new gasket on valve body and assemble valve in place. (Fig. 40).

17. ACCELERATING PUMP. Examine pump piston, operator rod, operating spring, leather cup and cup expander spring. Replace any worn, bent or distorted parts.

18. Assemble pump rod, spring and retainer to piston and install the pump assembly in the pump chamber of the main body casting. Be careful not to damage the leather as it is entered into the pump chamber.

19. PUMP OPERATING ROD STUD. Replace stud if bent or badly worn. Using a small accurate fitting open end wrench (1/4") tighten stud to rod.

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20. Assemble main jet plugs and gaskets to casting. Blow out casting thoroughly with compressed air.

21. Assemble air horn to main body. Recheck the float setting using gauge. Holding assembly gasket in place assembly air horn to main body and tighten all screws tight. Be sure throttle lever spring bracket is installed in correct position at accelerating pump chamber. See Fig. 67. Place assembly to one side being careful not to damage accelerating pump operating rod.

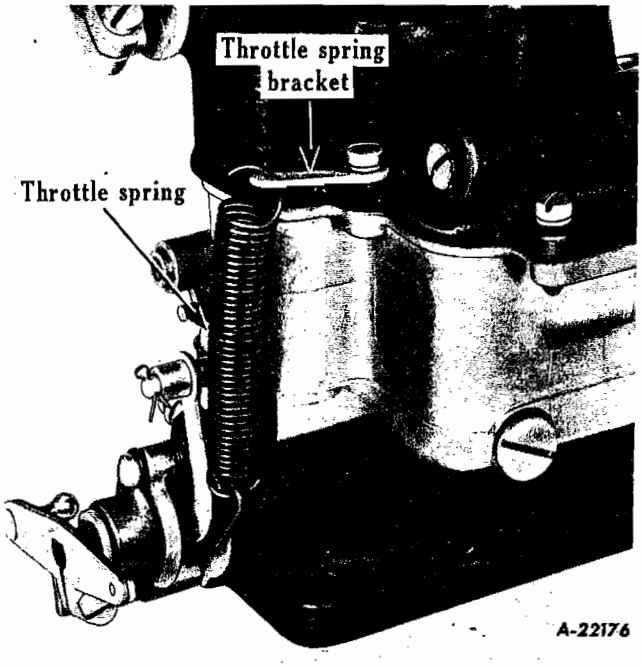


Fig. 67

## Throttle Body

Inspect and assemble throttle body as follows:

1. THROTTLE SHAFT BEARING. Replace bearing if worn, corroded or damaged in any way. Bearing must rotate freely and be free of gum and grit. Install the bearing in the throttle body bearing boss on the governor side and with a brass rod lightly tap bearing in place.

   Note: Bearing must be installed with lettering on race visible after installation.

2. THROTTLE SHAFT AND BEARING. Replace the assembly if the shaft is bent or if threads are stripped. Replace the assembly if the bearing is corroded, damaged or worn or if throttle clutch is loose. Bearing must be free from gum or grit. Install throttle shaft and bearing. Install throttle shaft bearing retainer.

3. THROTTLE PLATES. Replace throttle plates if they are nicked or otherwise damaged. To install plates, place throttle body on bench with the manifold mounting flange up and the threaded end of the throttle shaft to the left. Rotate the shaft until the countersunk holes in shaft are facing the idle adjusting screw bosses.

   Note: During the disassembly operation, the plates and barrels were marked No. 1 and No. 2. Place No. 1 plate in No. 1 barrel. Install the throttle plate with the bevel edge down and facing the countersunk side of shaft. Close the plate, and using the previously scribed lines as a guide, center the plate in the bore and assemble plate to shaft with new screws. Before drawing screws tight, be sure the plate is properly centered. Repeat same procedure to install the other throttle plate. Then check the four assembly screws to be sure they are tight.

4. Upset the threaded ends of the screws with a blunt center punch and a light hammer. Be sure to support opposite side of shaft to prevent bending. After upsetting screws, check the shaft to make sure it oscillates freely. If shaft binds or drags, tap screw heads lightly with a brass rod until shaft operates freely.

5. Rest throttle body on bench with threaded end of shaft up.

## Governor Body

1. Check all sealing surfaces for cracks, nicks, or imperfections. Replace casting if defective. Using compressed air, blow out all governor channels. Replace governor body, etc.

2. LEATHER BEARING SEAL AND STEEL WASHER. Replace leather seal if worn or otherwise damaged. Replace the steel washer if it is damaged.

3. Install leather seal in governor body so that the flat side of the seal is up. Install steel washer over leather seal.

4. Install coiled retainer spring against bearing in throttle body.

5. Assemble governor body to throttle body. Be sure gasket is correctly lined up before inserting the three assembly screws and lockwashers. Draw assembly down tight.

6. GOVERNOR DIAPHRAGM AND ROD ASSEMBLY. Replace assembly if diaphragm is burned, torn or otherwise damaged. Replace the assembly if the rod is bent or twisted.

Note: Sealing surfaces of diaphragm housing and cover must be clean and free from nicks or burrs.

7. Install diaphragm assembly to housing with the bent end of the rod parallel with the throttle shaft and pointing away from the throttle body. (See Fig. 48). Line up the holes and place diaphragm cover in position.

   Note: Be sure that suction connector tube (Fig. 65) in cover fits into suction channel in the body properly.

8. Assemble cover to body with eight screws and lockwashers. Thread all screws in until both flange surfaces nearly come together. Then with the thumb or fingers pull the diaphragm rod as far back (toward the throttle shaft) as possible, hold it there and tighten every other cover assembly screw tight. Then release the rod and tighten the remaining screws.

   Note: When inserting the cover screws, observe the three screws that are drilled for the seal wire. Space drilled screws as shown in Fig. 63. Install the seal wire and seal.

9. GOVERNOR LEVER. Replace the lever if the pin is loose or if rod is worn. Start lever onto throttle shaft and work end of diaphragm rod into hole in lever. Press lever into position and assemble to shaft with hex, nut and lockwasher. Be sure that nut is started correctly. Use a 5/16" socket wrench.

   CAUTION: Excessive tension will strip the threads on the shaft.

   DO NOT DRAW THE NUT DOWN TOO TIGHT.

10. Push end of diaphragm rod through lever by placing a thin blade screw driver or similar tool under the rod. Lock rod to the lever with a cotter pin. Insert the cotter pin so that open ends point towards the diaphragm. Spread the ends of the cotter pins around the rod.

11. GOVERNOR OPERATING SPRING. Replace the spring if corroded or distorted. Install operating spring with the fingers by hooking the loops over pins. Be sure the loops drop into the grooves in the pins.

12. GOVERNOR BY-PASS PASSAGE JETS. Replace jets if worn or damaged. Install the by-pass jets in "A" and "B" channel (Figure 62).

    Note: The by-pass jets have different outside diameters to aid in making correct installation.

13. GOVERNOR COVER AND GASKET. Install a new gasket and install cover to governor body. Install seal wire in cover screws and seal.

## Throttle Body Idle Screws and Shaft Assembly

1. IDLE ADJUSTING SCREWS AND SPRINGS. Replace screws if the tapered points are badly scored or bent. Replace the springs if they are corroded or distorted. Install adjusting screws and springs.

   Note: Turn screws in with the fingers until they are seated. (Do not use a screw driver.) Then back screws off seats one full turn.

2. THROTTLE LEVER AND THROTTLE OPERATOR SHAFT ASSEMBLY. Replace lever if bent or if ball stud is worn. Replace shaft if worn, or accelerating pump lever if loose or if clutch assembly is loose.

   Replace housing if shaft bearing is down or if housing is damaged.

   Install throttle operator shaft in housing and place throttle lever in position (ball stud facing toward carburetor) and tighten lever clamp screw.

3. Install the two throttle operator lever shaft housing mounting screws and place gasket in position. Hold the assembly with throttle lever ball stud up and assemble to throttle body as shown in Fig. 23. Tighten housing mounting screws.

   Note: Check the assembly; if correct, the throttles will close when lever is turned counter-clockwise. Releasing lever should permit governor operating spring to pull throttle into full open position.

4. THROTTLE LEVER STOP SCREW. Place spring over stop screw and install assembly in throttle body. Holding throttle plates closed, turn the throttle stop screw in until throttles open enough to allow a .003" feeler to pass freely between edge of plate and wall of bore.

## Main Body and Throttle Body Assembly

1. Install new main body to throttle body gasket.

2. Place main body in position on throttle body and assemble with the three mounting screws. (This operation is accomplished by reversing the procedure outlined in Fig. 41 and Fig. 42.) Tighten the three mounting screws.

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3. Recheck all visible assembly screws; make sure all are tight. DO NOT DISTURB INITIAL SETTING OF IDLE ADJUSTING NEEDLES AND THROTTLE STOP ADJUSTING SCREW.

4. PUMP OPERATING LINK. Replace the link if bent, twisted or worn. Install link over pump operator shaft stud first, then start pin end of link into No. 2 hole on the throttle lever (for normal operation). Push link all the way onto stud.

5. Install cotter key holding pump link to stud, bend open ends of cotter key around stud.

   Note: The recommended position for the pump link is in the No. 2 hole. Placing the link in the No. 3 hole increases the pump stroke and hence increases the accelerating fuel charge to maximum. Placing the link in No. 1 hole shortens the pump stroke and decreases the accelerating fuel charge to minimum.

6. THROTTLE LEVER SPRING. Install spring, being sure loops are securely hooked at spring bracket and throttle lever.

## CARBURETOR FINAL ADJUSTMENT

All adjustments made during assembly procedures were preliminary. Final and accurate adjustments can only be made after carburetor is mounted on engine.

## ADJUSTING GOVERNOR - MODEL 1174

Connect tachometer and adjust governor to cut off within the engine no-load cut-off range (see Specifications) as follows:

1. Turn off ignition switch. The engine must be completely stopped to adjust this governor.

2. Remove the adjusting hole plug seal located at the side of the governor housing. (Do not break the pipe connection seal). Remove the adjusting hole plug. (Figs. 68, 69).

3. Turn engine over with hand crank (ignition switch OFF) until the adjusting screw in the end of the enclosed rotor appears at the plug hole.

4. Insert a screwdriver through the opening from which the hole plug was removed and turn the screw clockwise to increase speed or counter-clockwise to decrease engine governed speed (Fig. 70). One turn of the screw will affect the governed speed approximately 150 engine r.p.m.

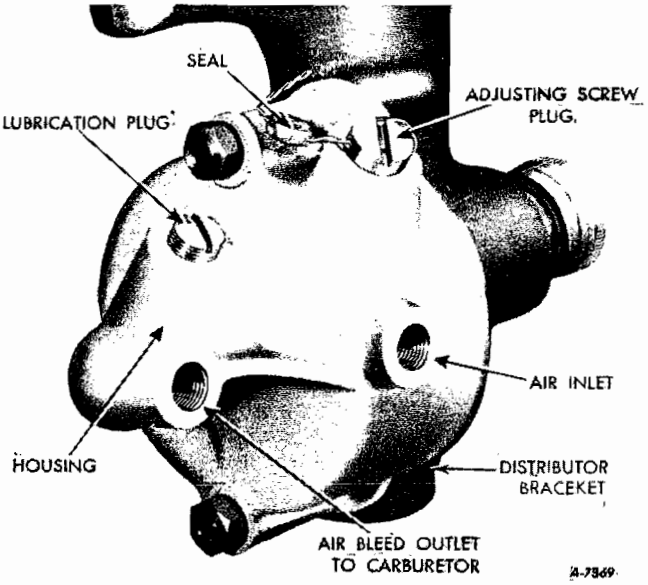


Fig. 68

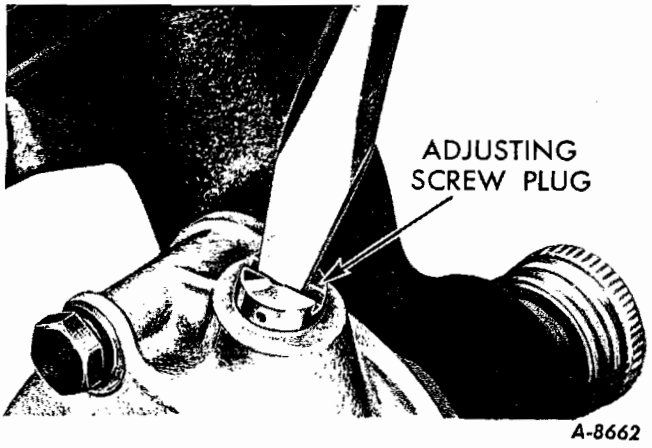


Fig. 69

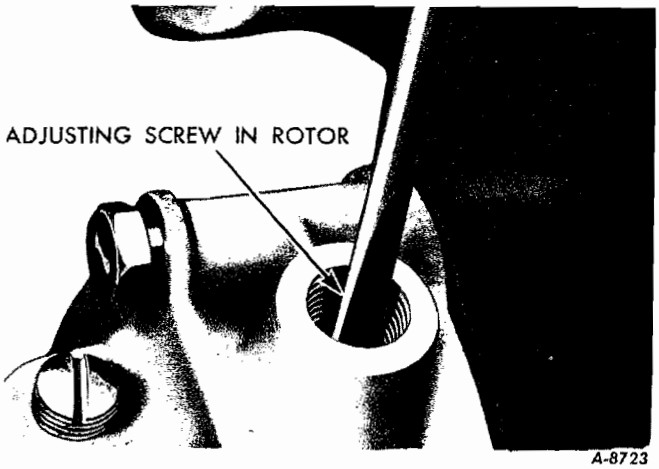


Fig. 70

CAUTION: Excessive engine speeds cause undue strains and rapid wear on engine parts, therefore, the governor must not be adjusted to allow the engine to exceed the maximum recommended r.p.m.

# AIR CLEANERS

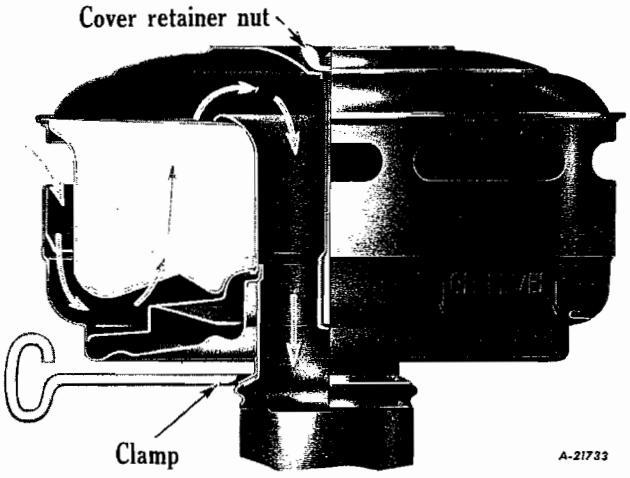


Fig. 1 - Air Cleaner (Bonnet type mounting).

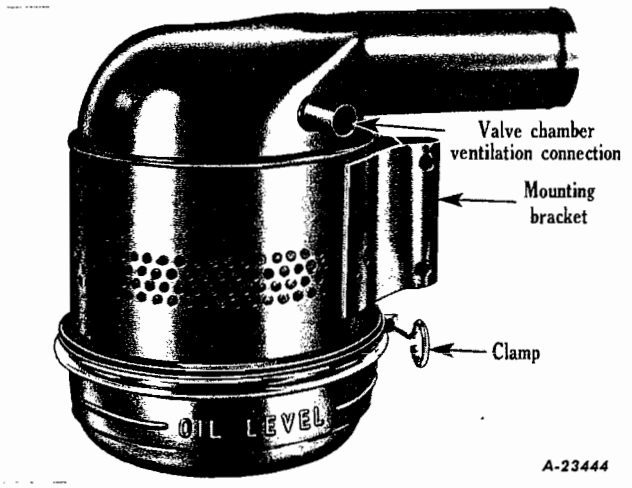


Fig. 2 - Air Cleaner (Bracket type mounting).

## Description

The construction of the oil-type air cleaner (Figs. 1 and 2) is such that uncleaned air is drawn into the upper portion of the unit and then drawn downward at high velocity. Just above the oil reservoir the direction of air travel is suddenly reversed, and this reversal of air flow causes the larger particles of dirt to fall into the oil. The partially cleaned air then travels upward through an oil moistened filtering element where any remaining dirt and dust particles are removed. The cleaned and purified air then leaves the air cleaner and enters the carburetor.

The air cleaner on Super Red Diamond Engines is located in the conventional "under the hood" position. However, the air taken into the air cleaner is drawn through a special hood opening (Fig. 3).

The purpose of this outside intake is to draw in cooler outside air during hot-weather operations, when high under-hood temperatures would otherwise make available to the engine only expanded air with low oxygen content.

By drawing in cooler air, with greater oxygen volume per cubic foot, volumetric efficiency is increased and the engine produces the greater horsepower for which it is designed.

In cold weather, when under-hood air temperature is more desirable for efficient engine operation, air intake is easily changed to draw air from under the hood.

## Servicing Air Cleaners

The necessity for cleaning and servicing of oil type air cleaners depends entirely upon operating conditions as to dust, dirt, etc.

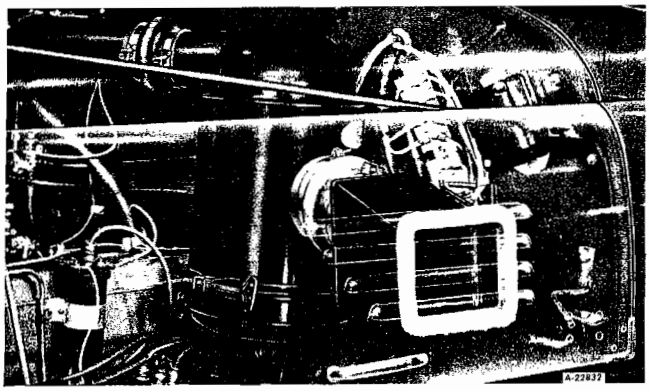

Fig. 3

Under normal conditions, oil type air cleaners should be removed and serviced every 5000 miles. The operation should be performed at earlier intervals under dusty operation - even daily, under severe conditions.

When servicing the oil type air cleaner, remove, the oil cup, or reservoir, and clean free of old oil and dirt. Wash the filtering mesh, or element, in kerosene then dip in clean oil and allow the excess oil to drain from the element.

Air cleaners should be serviced with same grade oil as used in the crankcase, and the oil cup filled to the level indicating beads in the cup. (See chart below for approximate capacities).

Air cleaner connections must be maintained in a tight and leak-proof condition. Otherwise, uncleaned air will be allowed to enter the engine.

OIL CAPACITY (PINTS)

| SD 220-240 | BD 269 | RD 372-406 450 | Cont. R-6602 |
|---|---|---|---|
| 1 | 2-1/2 | 3 | 3-1/4 |

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