

Section 3 CARBURETION

AIR CLEANERS

A properly serviced air cleaner protects the internal parts of the engine from dust particles in the air. If the air cleaner instructions are not carefully followed, the dirt and dust which should be collected in the cleaner, will be drawn into the engine and become a part of the oil film, which is very detrimental to engine life; dirt in the oil forms an abrasive mixture which wears the moving parts, instead of protecting them. No engine can stand up under the grinding action which takes place when this occurs. The air cleaner on every engine brought in for a check up or repair should be examined and serviced. If the cleaner shows signs of neglect, show it to the customer before cleaning, and instruct him on proper care to assure long engine life.

NOTE: Replace air cleaner gaskets and mounting gaskets that are worn or damaged, to prevent dirt and dust entering engine through improper sealing. Straighten or replace bent mounting studs.

Service Oil Foam Air Cleaner

Clean and re-oil air cleaner element every 25 hours or at three month intervals under normal conditions. The capacity of the "Oil Foam" air cleaner is adequate for a full season's use without cleaning in average homeowner lawn mower service. (Clean every few hours under extremely dusty conditions.) See Figures 1 and 2.

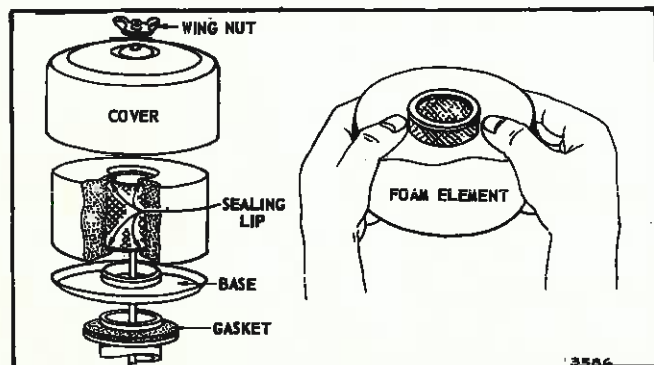


Fig. 1 — Oil Foam Air Cleaner

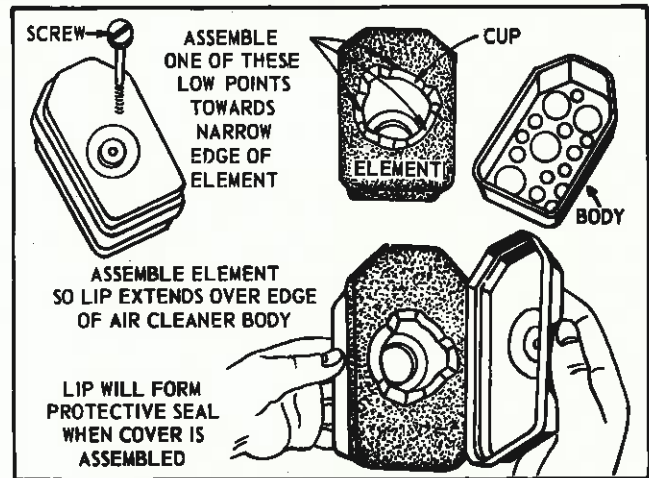


Fig. 2 — Oil Foam Air Cleaner

OIL FOAM AIR CLEANER (Figs. 1 and 2)

1. Remove screw or wing nut.
2. Remove air cleaner carefully to prevent dirt from entering carburetor.
3. Take air cleaner apart and clean.
 - a. WASH foam element in kerosene or liquid detergent and water to remove dirt.
 - b. Wrap foam in cloth and squeeze dry.
 - c. Saturate foam with engine oil. Squeeze to remove excess oil.
4. Reassemble parts and fasten to carburetor securely with screw or wing nut.

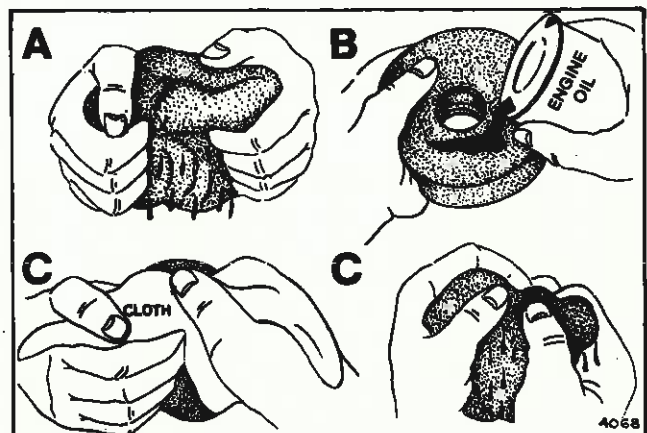
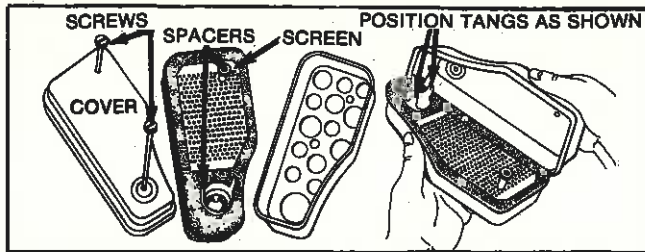


Fig. 3 — Cleaning Air Cleaner

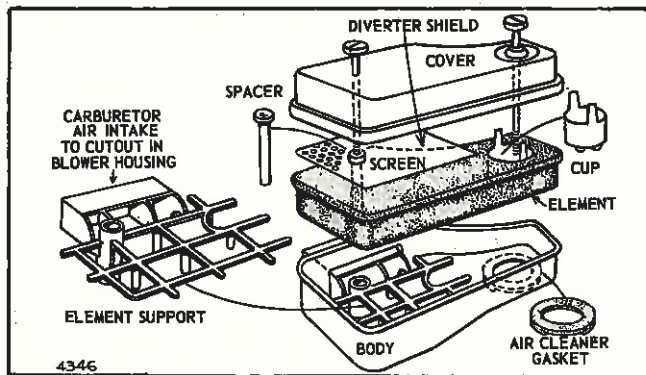
CARBURETION

Air Cleaners

OIL FOAM AIR CLEANER VARIATIONS



Standard Air Cleaner



Ducted Air Cleaner

DUAL ELEMENT AIR CLEANER

Clean and re-oil foam pre-cleaner at three month intervals or every 25 hours, whichever occurs first.

NOTE: Service more often under dusty conditions.

1. Remove knob and cover.
2. Remove foam pre-cleaner by sliding it off of the paper cartridge.
3. a. Wash foam pre-cleaner in kerosene or liquid detergent and water.
b. Wrap foam pre-cleaner in cloth and squeeze dry.
c. Saturate foam pre-cleaner in engine oil. Squeeze to remove excess oil.
4. Install foam pre-cleaner over paper cartridge. Reassemble cover and screw knob down tight.

Yearly or every 100 hours, whichever occurs first, remove paper cartridge. Service more often if necessary. Clean by tapping gently on flat surface. If very dirty, replace cartridge, or wash in a low or non-sudsing detergent and warm water solution. Rinse thoroughly with flowing water from inside until water is clear. Cartridge must be allowed to stand and air dry thoroughly before using.

CAUTION: Petroleum solvents, such as kerosene, are not to be used to clean cartridge. They may cause deterioration of the cartridge. DO NOT OIL CARTRIDGE. DO NOT USE PRESSURIZED AIR TO CLEAN OR DRY CARTRIDGE.

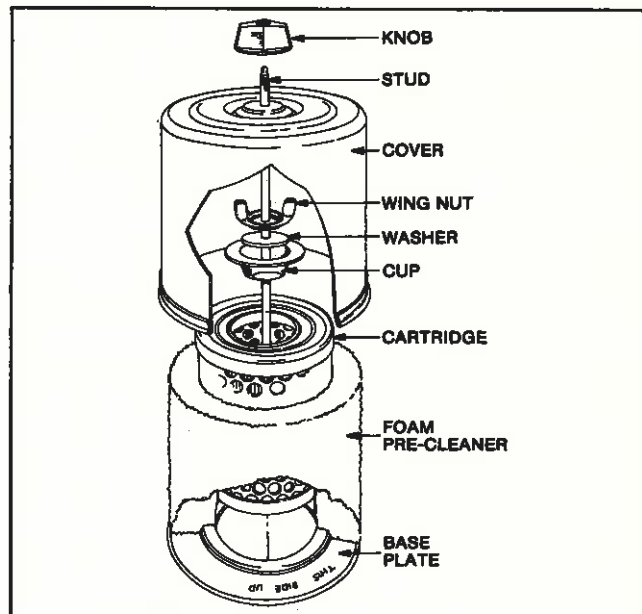


Fig. 4

CARTRIDGE TYPE

To clean — tap cartridge (top or bottom) on flat surface or wash in non-sudsing detergent and flush from inside until water is clear. After washing, air dry thoroughly before using. DO NOT OIL. Fig. 5.

CAUTION: Petroleum solvents, such as kerosene, are not to be used to clean cartridge. They may cause deterioration of the cartridge. DO NOT OIL CARTRIDGE. DO NOT USE PRESSURIZED AIR TO CLEAN OR DRY CARTRIDGE.

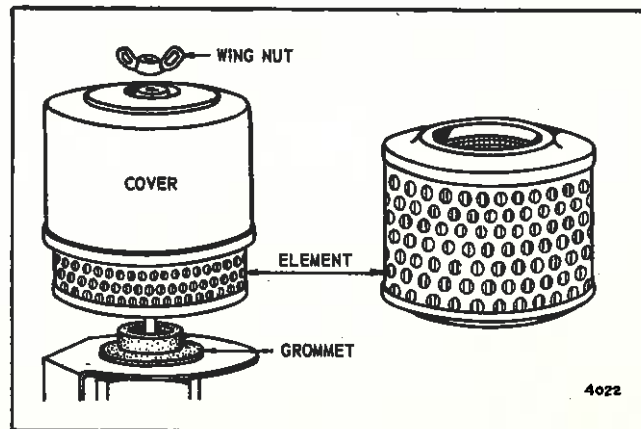


Fig. 5 — Cartridge Air Cleaner

CARTRIDGE AIR CLEANER — REVERSE AIR FLOW

1. Remove air cleaner stud, screw and gasket. Replace gasket if damaged.
2. Remove plate screw, washer and plate.
3. Remove cartridge and clean air cleaner body carefully to prevent dirt from entering carburetor. Brush dirt from body through holes into duct.
4. Clean cartridge by tapping gently on flat surface.
 - a. If very dirty, replace cartridge or wash in a low or non-sudsing detergent and warm water solution.
 - b. Rinse thoroughly from OUTSIDE IN until water is clear.
 - c. Cartridge must be allowed to stand and air dry thoroughly before using.
5. Re-assemble air cleaner. Fig. 6.

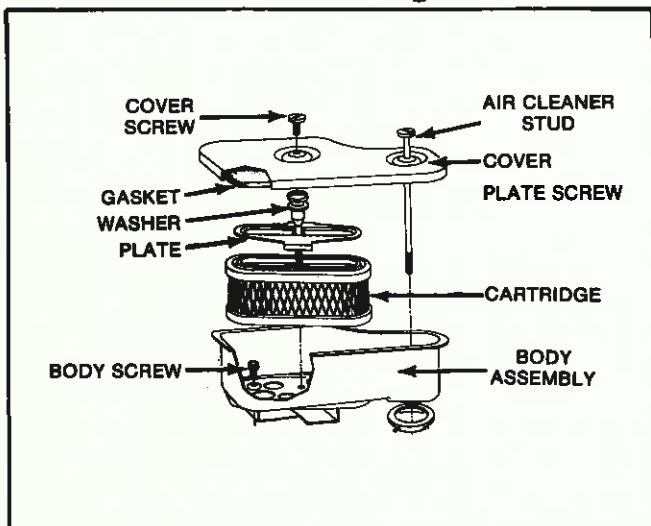


Fig. 6 — Cartridge Air Cleaner

CAUTION: Petroleum solvents, such as kerosene, are not to be used to clean cartridge. They may cause deterioration of the cartridge. **DO NOT OIL CARTRIDGE. DO NOT USE PRESSURIZED AIR TO CLEAN OR DRY CARTRIDGE.**

SERVICE OIL BATH AIR CLEANER

Pour out old oil from bowl. Wash element thoroughly in solvent and drain dry. Clean bowl and refill with same type of oil used in crankcase. See Fig. 7.

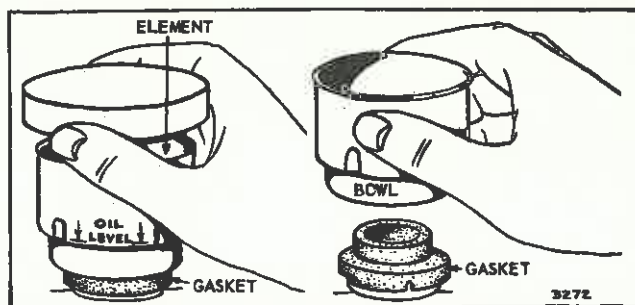


Fig. 7 — Oil Bath Air Cleaner

THREE BASIC CARBURETOR STYLES

There are three styles of carburetors used on Briggs & Stratton engines. Page 3 and 4, Fig. 8. Compare the carburetor to be repaired with the illustrations to determine style of carburetor and refer to that section for repair information.

Before removing any carburetor for repair, look for signs of air leakage, or mounting gaskets that are loose, have deteriorated, or are otherwise damaged.

Note position of governor springs, governor link, remote control or other attachments to facilitate re-assembly. Do not bend the links or stretch the spring. (Section 4 illustrates popular engine models.)

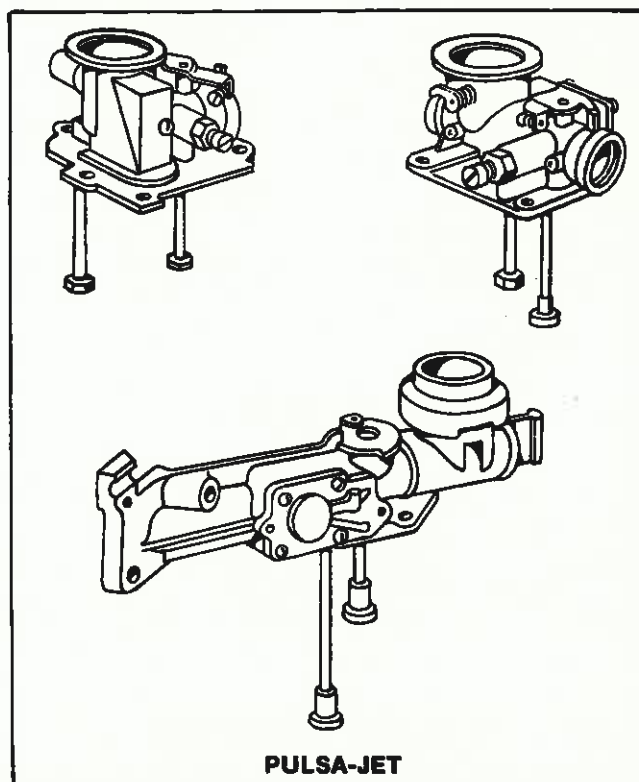


Fig. 8 — Style of Carburetors

CARBURETION

Automatic Choke

AUTOMATIC CHOKE MODEL SERIES 92000, 94000, 110900, 111900

The automatic choke operates in conjunction with engine vacuum, similar to the Pulsa-Jet fuel pump.

A diaphragm under the carburetor is connected to the choke shaft by a link. See Fig. 9. A calibrated spring under the diaphragm holds the choke valve closed when the engine is not running.

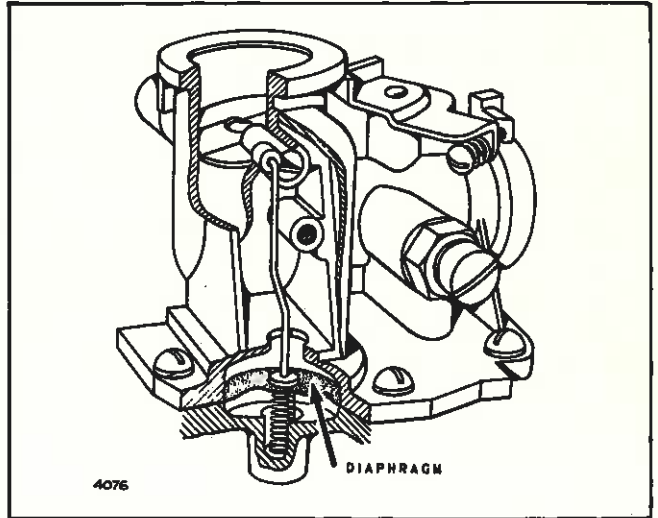


Fig. 9 — Automatic Choke System

Upon starting, vacuum created during the intake stroke is routed to the bottom of the diaphragm, through a calibrated passage, thereby opening the choke.

This system also has the ability to respond similar to an acceleration pump. As speed decreases during heavy loads, the choke valve partially closes enriching the mixture, thereby improving low speed performance and lugging power.

The automatic choke can easily be checked to determine if it is or is not functioning properly.

1. Remove the air cleaner and replace the stud. Observe the position of the choke valve; it should be fully closed.
2. Move the speed control to the stop position; the governor spring should be holding throttle in a closed position. Pull the starter rope rapidly. The choke valve should alternately open and close.

3

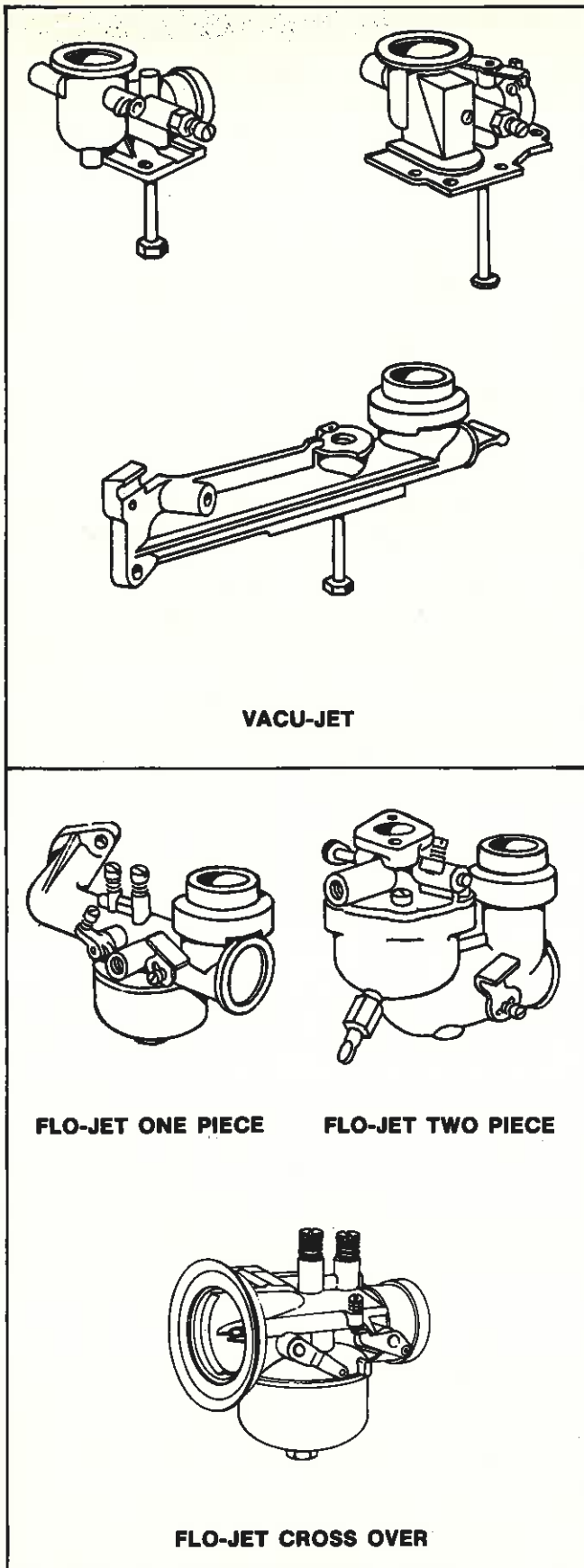


Fig. 8 — Style of Carburetors (Cont'd.)

3. If the engine can be started, run for 2 or 3 minutes, at a normal operating speed. Check to be sure fuel tank is 1/2 full of fuel. Then, open the needle valve to be sure the mixture can be made too rich. Next close the needle valve to be sure the mixture can be made too lean. Adjust needle valve to midpoint between too rich and too lean.

Allow engine to run at idle speed for 3 to 5 minutes. Again, close needle valve; the mixture should become so lean the engine will stop. If the engine continues to run at idle with the needle valve closed, a fuel leak is occurring at one of the following areas: Check items 2D, 2H, 2I, 2J and 2K.

If the choke valve does not react as stated in Steps 1, 2 and 3, the carburetor will have to be disassembled to determine the problem. (See Repair Procedure below).

The following list is given to aid you in checking the performance of the Automatic Choke Carburetion System.

1. **Engine Appears to be Under-Choked —**
 - A. Carburetor adjusted too lean
 - B. Fuel pipe check valve inoperative (Vacu-Jet only)
 - C. Bent air cleaner stud
 - D. Sticking choke shaft due to dirt, etc.
 - E. Choke spring damaged or too short (See Repair Procedure)
 - F. Diaphragm not preloaded (See Repair Procedure)
2. **Engine Appears to be Over-Choked —**
 - A. Carburetor adjusted too rich
 - B. Bent air cleaner stud
 - C. Sticking choke shaft due to dirt, etc.
 - D. Ruptured diaphragm
 - E. Vacuum passage restricted
 - F. Choke spring distorted, stretched, etc.
 - G. Gasoline or oil in vacuum chamber
 - H. Leak between link and diaphragm
 - I. Diaphragm folded during assembly, causing vacuum leak
 - J. Machined surface on tank top not flat (See Repair Procedure)
 - K. Needle valve seat loose

REPAIR PROCEDURE

Inspect the automatic choke for freeness of operation. Any sticking problems should be corrected, as proper choke operation depends on freedom of the choke to travel as dictated by engine vacuum.

Repair procedures specific to the automatic choke are as follows:

Remove the carburetor and fuel tank assembly from the engine. The choke link cover may now be removed and the choke link disconnected from the choke shaft. Disassemble carburetor from tank top, using care to insure diaphragm is not damaged.

CHECKING DIAPHRAGM AND SPRING

The diaphragm is suitable for further use, provided it has not developed wear spots or punctures. (On Pulsa-Jet models check to insure fuel pump valves are not damaged.) Also check choke spring length. The Pulsa-Jet spring minimum length is 1-1/8" —maximum 1-7/32" and the Vacu-Jet spring minimum length is 15/16" — maximum 1". NOTE: On Model 110900 and 111900 choke spring minimum length is 1-5/16"; maximum 1-3/8". If spring length is shorter or longer than specified, replace diaphragm and spring.

CHECKING TANK TOP

The machined surface on the top of the fuel tank must be flat in order for the diaphragm to provide an adequate seal between the carburetor and tank. If the machined surface on the tank is not flat, it is possible for gasoline to enter the vacuum chamber by passing between the machined surface and diaphragm. Once fuel has entered the vacuum chamber, it can move through the vacuum passage and into the carburetor. The flatness of the machined surface on the tank top can be checked by straight edge and feeler gauge, as shown in Fig. 10. A .002" feeler gauge should not enter between the straight edge and machined surface, when checking at the shaded areas depicted in the drawing. Replace tank if gauge enters. NOTE: STRAIGHT EDGE MUST BE ACCURATE.

CARBURETION

Automatic Choke

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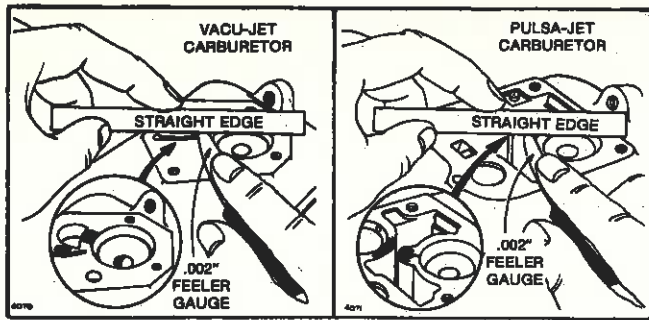


Fig. 10 — Checking Tank Top Flatness

Repair Kit #391413 may be used to repair Pulsa-Jet fuel tanks which are not flat. Install roll pin and teflon washer as shown in Fig. 11.

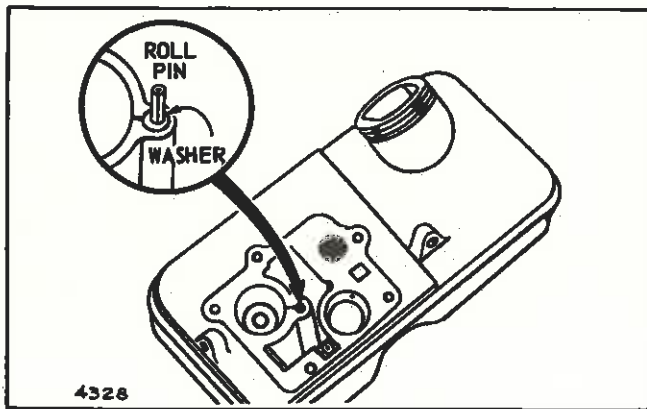


Fig. 11 — Installing Roll Pin and Teflon Washer

If needed, repair of the fuel metering and supply system may now be undertaken as shown on pages 9 and 10.

If a new diaphragm is being installed, assemble choke spring to diaphragm, as shown in Fig. 12. Be careful not to bend or distort the spring.

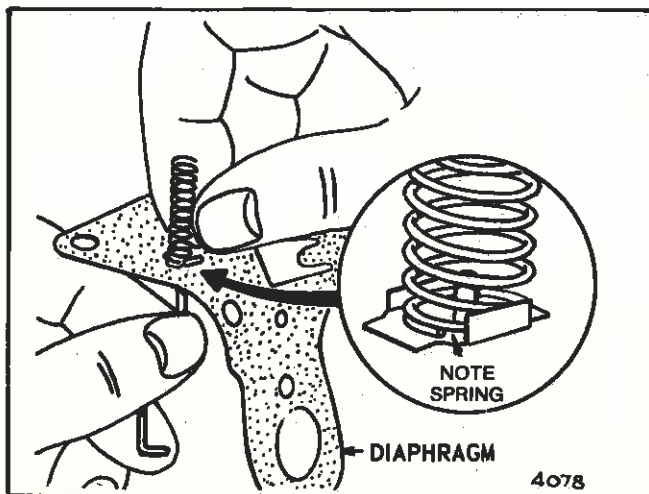


Fig. 12 — Assemble Spring to Diaphragm

Holding carburetor body upside down, place diaphragm on body while guiding choke link thru hole for link. On Pulsa-Jet carburetor, have pump spring and cap in fuel pump well, Fig. 13.

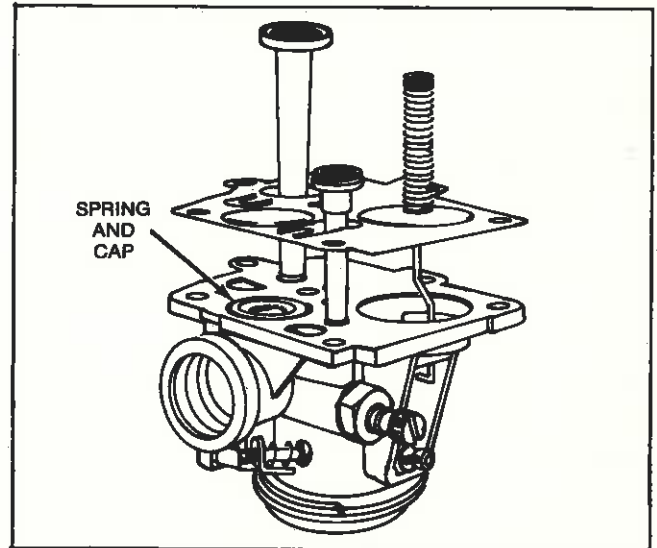


Fig. 13 — Locating Diaphragm on Carburetor

Lower tank down onto carburetor, while guiding choke spring into spring well, Fig. 14. Holding carburetor and body together, turn assembly right side up. Thread carburetor mounting screws into tank top about two (2) turns. **DO NOT TIGHTEN.**

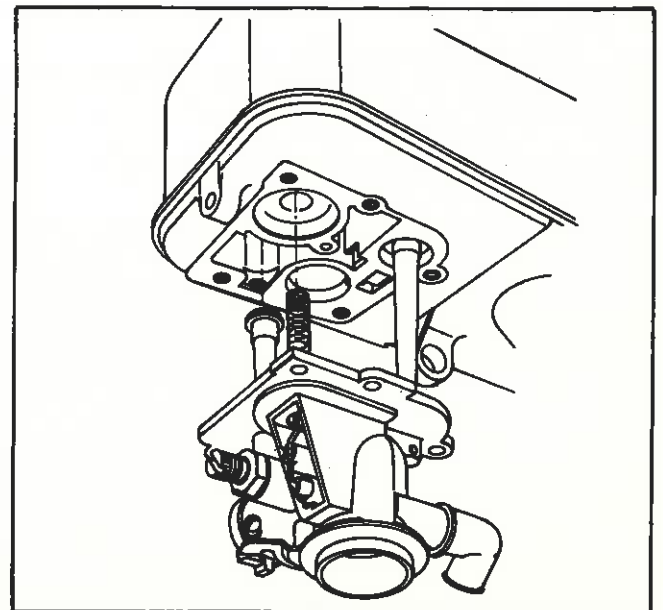


Fig. 14 — Assembling Tank to Carburetor

Close choke valve, insert choke link into choke shaft as shown. Fig. 15.

CARBURETION Automatic Choke

To Adjust Carburetor:

1. Start engine and run long enough to warm it to operating temperature.

NOTE: If engine is out of adjustment so that it will not start, close the needle valve by turning it clockwise. Then open needle valve 1-1/2 turns counterclockwise. Fig. 17.

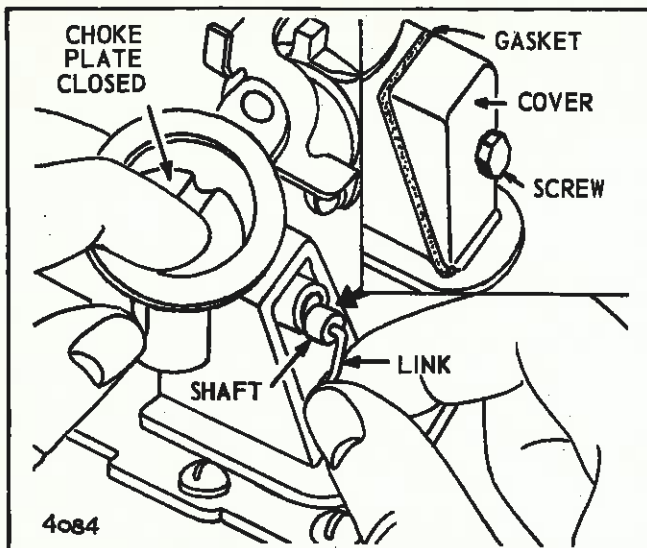


Fig. 15 — Inserting Choke Link

Move choke plate to an over center position as shown in Fig. 16. Tighten carburetor mounting screws in a staggered sequence. Please note — Opening the choke to an over center position places the diaphragm in a preloaded condition.

Move choke plate to a normal position. Choke plate should now fully close, Fig. 16.

If choke valve is not fully closed, check to be sure choke spring is properly assembled to diaphragm, and also properly inserted in its pocket in the tank top. Install choke link cover and gasket.

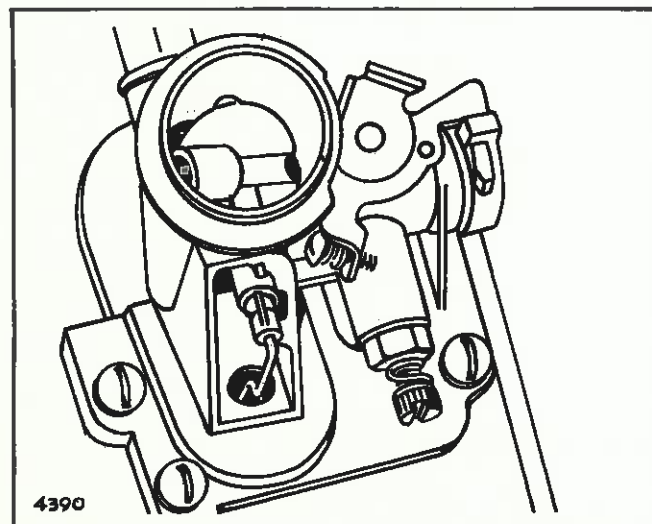


Fig. 16 — Pre-Loading Diaphragm

All carburetor adjustment should be made with the air cleaner on engine. Best adjustment is made with a fuel tank half full of gasoline.

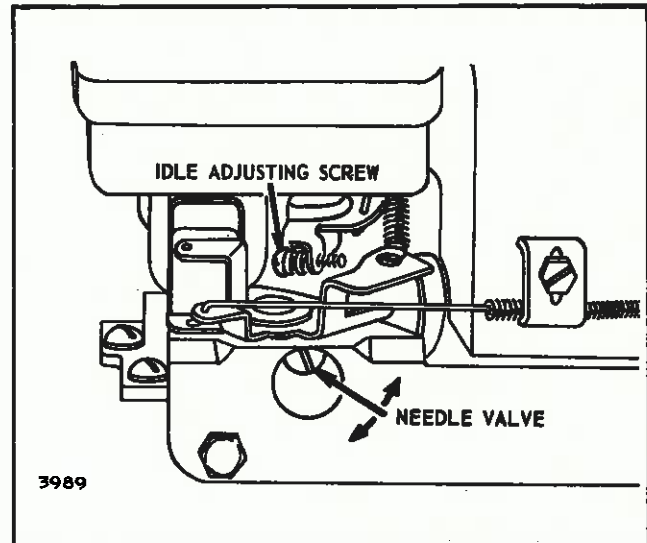


Fig. 17 — Adjusting Carburetor

2. Move speed control lever to run engine at normal operating speed.
 - a. Turn needle valve in clockwise until engine starts to lose speed (lean mixture).
 - b. Then slowly turn needle valve out counterclockwise past the point of smoothest operation until engine just begins to run unevenly (rich mixture).
 - c. Turn needle back clockwise to midpoint (smoothest operation) between rich and lean mixture.
 - d. Final adjustment of the needle valve should be at the midpoint between rich and lean.
3. Move engine to SLOW. Turn idle adjusting screw until a fast idle is obtained — 1750 R.P.M.

If the engine idles at a speed lower than 1750 R.P.M., it may not accelerate properly. It is not practical to attempt to obtain acceleration from speeds below 1750 R.P.M., since the richer mixture which would be required, would be too rich for normal operating speeds.

CARBURETION

Pulsa-Jet, Vacu-Jet (Vertical Crankshaft)

4. To check adjustment move engine control from SLOW to FAST speed. Engine should accelerate smoothly. If engine tends to stall or die out, increase idle speed or re-adjust carburetor, usually to a slightly richer mixture.

NOTE: Flooding can occur if the engine is tipped at an angle for a prolonged period of time, if the engine is cranked repeatedly when the spark plug wire is disconnected or if carburetor mixture is adjusted too rich.

In case of flooding, move the governor control to the "Stop" position and pull the starter rope at least six times. (Crank electric starter models for at least 5 seconds.)

When the control is placed in the "Stop" position the governor spring holds the throttle in a closed (idle) position. Cranking the engine with a closed throttle creates a higher vacuum which opens the choke rapidly, permitting the engine to clear itself of excess fuel.

Then move the control to "Fast" position and start engine. If engine continues to flood, lean carburetor needle valve — 1/8 to 1/4 turn clockwise or see page 5.

If the engine on a mower with a high-inertia disc type cutter blade becomes hard starting when the engine is warm, a leaner carburetor mixture may be required.

A heavy, high-inertia disc type cutter blade rotates for a longer period of time, after the governor control is placed in the STOP position. During this "coasting" period, the engine continues to induct the fuel-air mixture, even when the choke is open. If the carburetor mixture is too rich, the warm engine may flood and become hard starting. If the original carburetor adjustment has not been changed, turn the needle valve clockwise (leaner) approximately 1/8 turn. If the original carburetor adjustment has been changed, follow previous adjustment procedure paragraph No. 2 — A, B and C, then adjust 1/8 turn leaner.

Cleaning Fuel System

Gummy or dirty fuel tanks, lines and carburetors should be cleaned in a carburetor cleaner, such as Bendix. Do not soak diaphragms or nylon parts in cleaner.

MODEL SERIES 82000, 92000, 94000, 110900 and 111900 only

Model Series 82500, 92500 and 94500 have a Vacu-Jet carburetor. Model Series 82900, 92900, 94900, 110900 and 111900 have a Pulsa-Jet carburetor.

Remove carburetor and fuel tank assembly mounting bolts, Fig. 18.

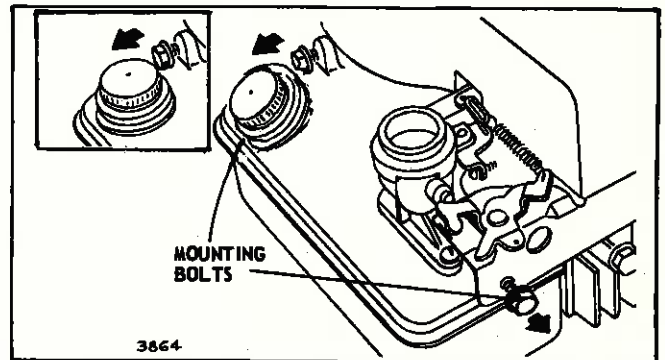


Fig. 18 — Removing Mounting Bolts

Slip carburetor and fuel tank assembly off end of fuel intake tube and turn assembly to free throttle link from throttle lever. This will leave governor link and governor spring connected to the governor blade and control lever, Fig. 19.

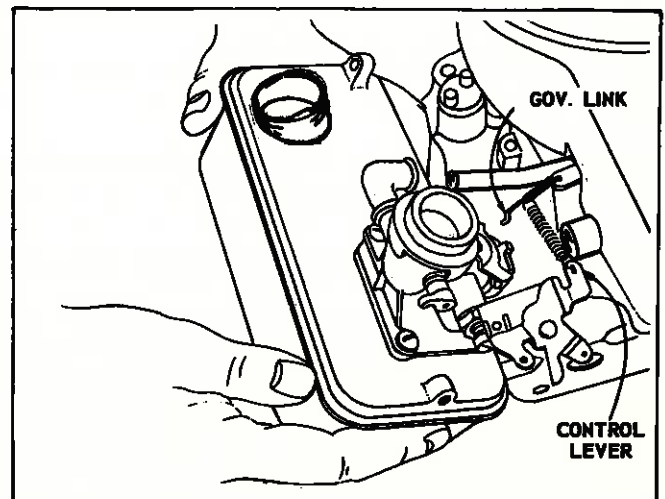


Fig. 19 — Remove Carburetor and Tank Assembly

MODEL SERIES 94000

Disconnect governor spring from control lever. Slide carburetor and fuel tank assembly off end of fuel intake tube and turn assembly to disconnect governor link from bell crank lever. This will leave governor spring and bell crank assembly on carburetor and fuel tank assembly, Fig. 20.

**Carburetor Repair —
Pulsa-Jet, Vacu-Jet**

Zinc Carburetor Body

Remove and discard "O" ring. Remove and inspect needle valve, packing and seat. Metering holes in carburetor body should be cleaned with solvent and compressed air. Do not alter size of holes. See Fig. 22.

Always remove all nylon and rubber parts if carburetor is soaked in solvent.

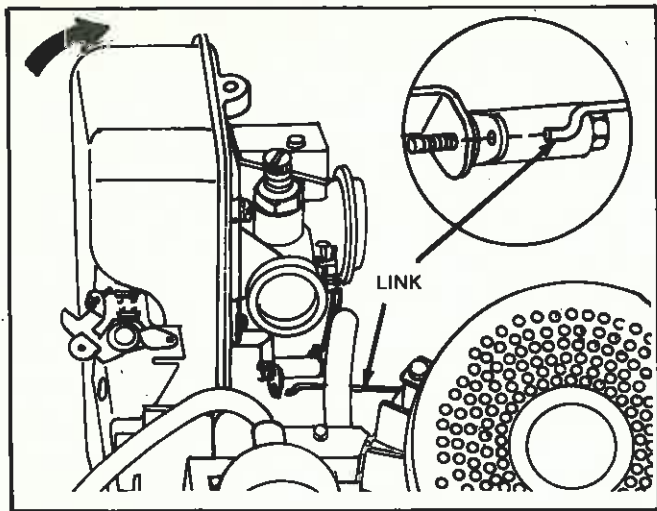


Fig. 20 — Removing Fuel Tank Assembly

**Removing Carburetor, Model Series 82000
and 92000 Choke-A-Matic**

Remove screws holding carburetor on tank body. Then lift carburetor straight up. Remove pump spring, spring cup and diaphragm.

**Removing Carburetor,
Model Series 92000, 94000,
110900 and 111900,
Automatic Choke**

Remove screws holding carburetor on tank body. On Model Series 110900 and 111900 a mounting screw is located under the choke valve. To gain access to the screw, open the choke valve completely. Use a #2 Phillips head screwdriver to remove the screw, Fig. 21. Then lift carburetor straight up. Remove pump spring, spring cup and diaphragm.

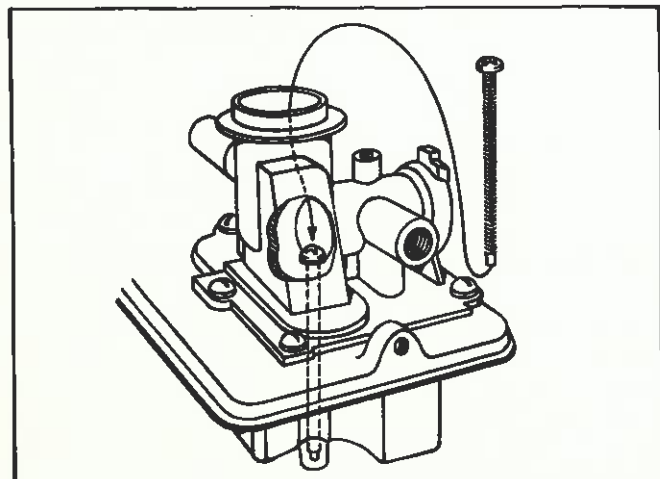


Fig. 21 — Screw Under Choke Valve

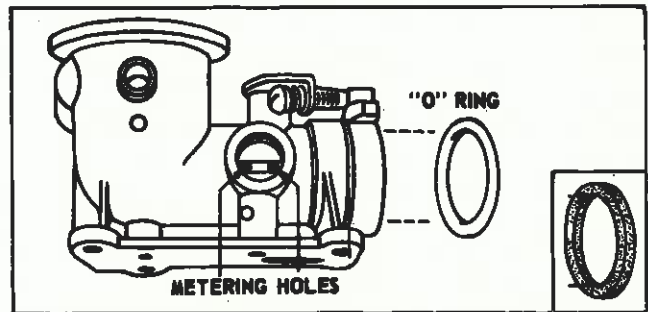


Fig. 22 — Metering Holes and "O" Ring

Minlon Carburetor Body

Remove and discard "O" ring. Remove needle and seat assembly by backing out mixture adjusting needle about 4 to 5 turns counterclockwise. Then pull needle and seat assembly out. Remove inner "O" ring. Metering holes in carburetor body should be cleaned with solvent and compressed air. CAUTION: Commercial carburetor cleaners will soften or dissolve Minlon bodies, if left in for long periods of time. DO NOT EXCEED 15 MINUTES. DO NOT ALTER SIZE OF METERING HOLES, Fig. 23.

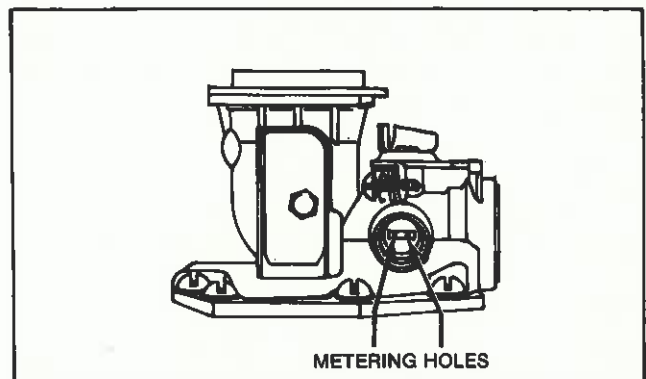


Fig. 23 — Metering Holes

Always remove all nylon and rubber parts if carburetor is cleaned in solvent.

CARBURETION

Pulsa-Jet, Vacu-Jet

Removing Nylon Choke and Shaft

Choke-A-Matic, Model Series 82000 and 92000

To remove choke parts, first disconnect choke return spring, Fig. 24. Then pull nylon choke shaft sideways to separate choke shaft from choke valve. If choke valve is heat-sealed to choke shaft, loosen by sliding sharp pointed tool along edge of choke shaft. Do not reseal parts on assembly. When replacing choke valve and shaft, install choke valve so poppet valve spring is visible when valve is in full choke position on carburetors using poppet valve, Fig. 25.

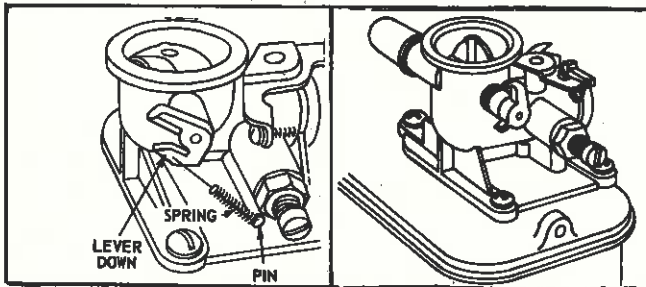


Fig. 24 — Choke Shaft and Valve — Choke-A-Matic

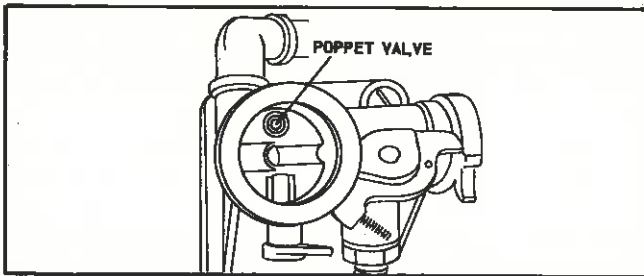


Fig. 25 — Poppet Valve

Automatic Choke, Model Series 92000, 94000, 110900 and 111900

To remove choke parts, first remove automatic choke link cover. Then slide choke link out choke shaft lever. Pull shaft out of valve, Fig. 26.

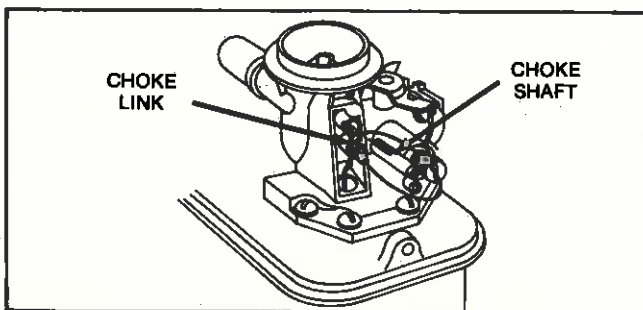


Fig. 26 — Removing Automatic Choke

Replacing Fuel Pipes, Zinc Carburetors Model Series 82000, 92000, 110900 and 111900

Nylon fuel pipe is threaded into carburetor body. To remove and replace, use socket as shown in Fig. 27. Do not over-torque. No sealer is required.

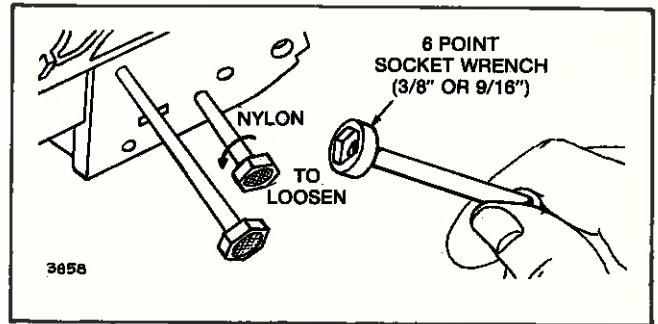


Fig. 27 — Replacing Nylon Fuel Pipes, Zinc Carburetor

Replacing Fuel Pipe, Minlon Carburetor Model Series 92500 and 94500

The fuel pipe on Minlon carburetors is of the snap-in design. The pipe may snap in and out with considerable force. Fig. 28.

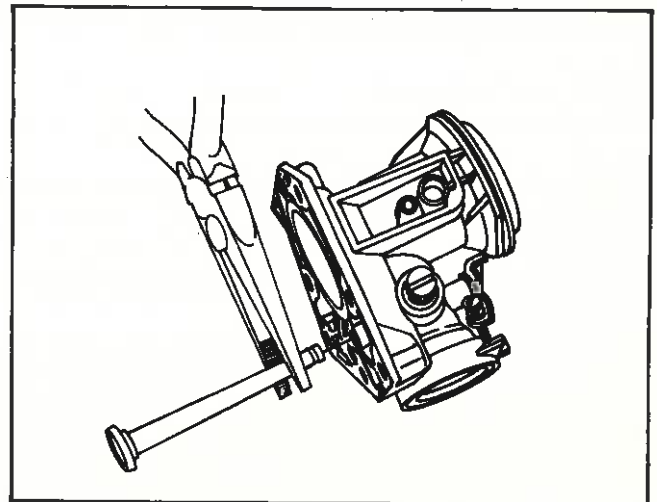


Fig. 28 — Replacing Fuel Pipe, Minlon Carburetor

Inspection and Repair

Check all parts for wear and replace as needed. Examine fuel pipe screens for gum deposits and dirt. Replace if dirty. Replace diaphragm if worn, torn, punctured or stiff. Inspect mixture adjustment needle, Fig. 29, and replace if damaged.

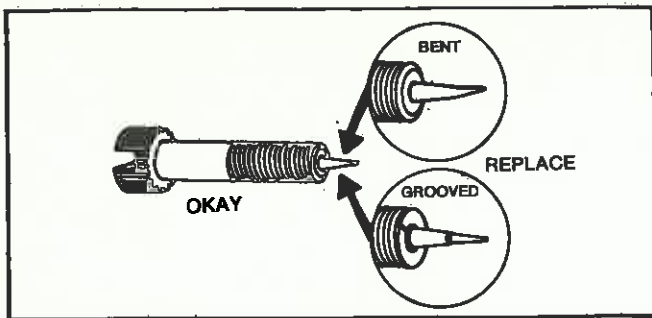


Fig. 29 — Mixture Needle

NOTE: On Vacu-Jet carburetors there is a check ball in the fuel pickup tube. To function properly, the screen must be clean and the check ball free. Replace pipe if screen is clogged or the check ball is not free to move.

Carburetor Assembly, Zinc and "Minlon"

When assembling carburetor, use new "O" rings, gaskets and/or diaphragms. Install choke plate and choke shaft. Choke shaft lever should be as shown in Fig. 30, Illus. I, II, III.

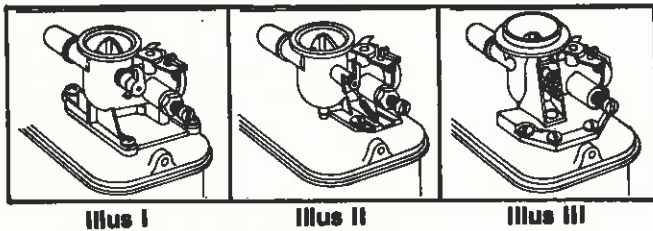


Fig. 30 — Choke Lever

On zinc carburetors, install needle valve seat being sure not to cause burrs in slot. Then install needle valve assembly, Fig. 31 or Fig. 32.

NOTE: Some zinc carburetors use Minlon valve assembly, Fig. 32.

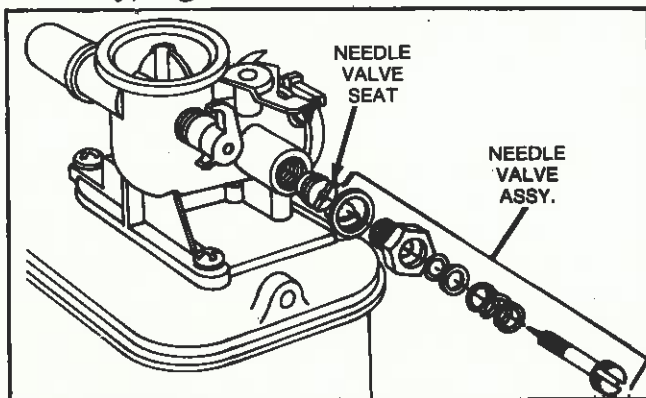


Fig. 31 — Needle Valve Assembly, Zinc Body

To install Minlon needle valve assembly, place "O" ring on shoulder of needle seat. Then turn needle in until large seal washer just touches needle seat, Fig. 32.

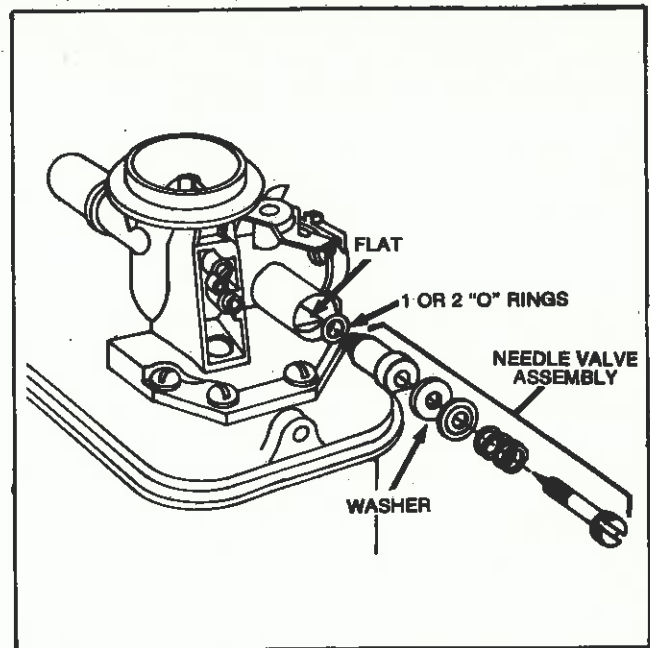


Fig. 32 — Needle Valve Assembly, Minlon Body

Install needle valve as an assembly being sure flat on valve seat lines up with flat in carburetor body, Fig. 33. Oil fill tube, part no. 280131 will help firmly seat valve assembly.

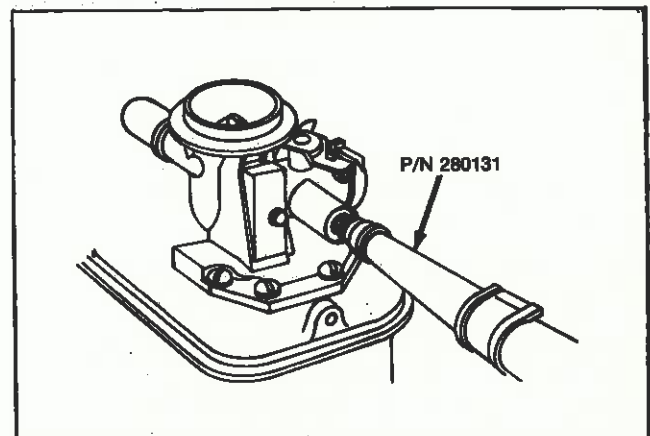


Fig. — 33 — Assembling Valve in Minlon Body

Place "O" ring in groove in throttle bore. Early "O" rings had a square cross section. Current "O" rings have a round cross section. Fig. 34.

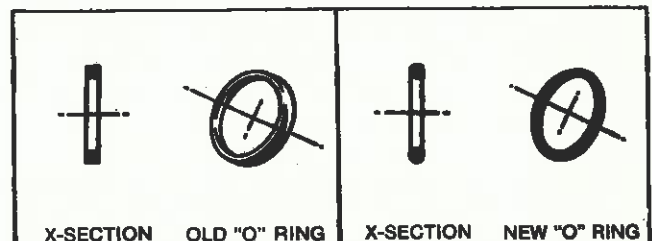


Fig. 34 — "O" Ring

CARBURETION

Pulsa-Jet, Vacu-Jet

Assembly, Carburetor to Tank, Choke-A-Matic, Model Series 82000, 92000

The gasket on Vacu-Jet carburetors acts as a seal between carburetor and tank top. The diaphragm on Pulsa-Jet carburetors also serves as a gasket between the carburetor and tank.

3

To assemble Vacu-Jet carburetor to tank, place gasket on tank and place carburetor on gasket. Install and tighten two (2) screws evenly to avoid distortion.

To assemble Pulsa-Jet carburetor to tank, first place diaphragm on tank. Then place spring cap and spring on diaphragm. Install carburetor and tighten four (4) screws evenly in staggered sequence to avoid distortion, Fig. 35.

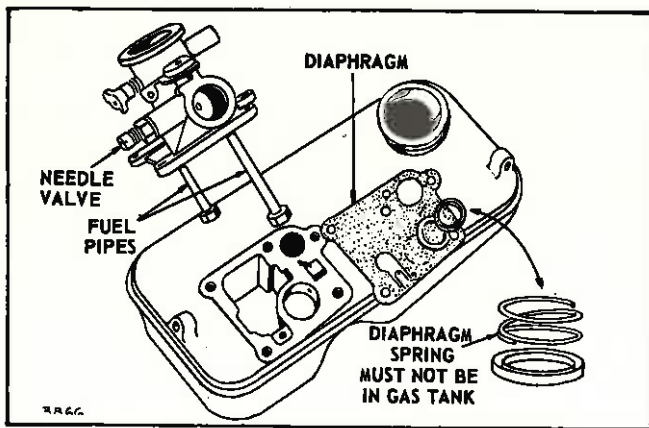


Fig. 35 — Exploded View - Carburetor and Tank Assembly

Assembly, Carburetor to Tank, Automatic Choke, Model Series 92000, 94000, 110900, 111900

Assemble carburetor to tank as outlined on pages 6 and 7 of this section.

Install Carburetor and Tank Assembly Choke-A-Matic, Model Series 82000, 92000

Put a light film of oil on "O" ring in throttle bore. With the governor link hooked to the governor blade, connect link to the throttle and slip carburetor into place. Align carburetor with the intake tube and breather tube grommet. Hold choke lever as shown in Fig. 36, so it does not catch on control plate. Be sure the "O" ring in the carburetor does not distort when fitting the carburetor to the intake tube. Install mounting bolts. Fig. 37 shows routings of ground wire.

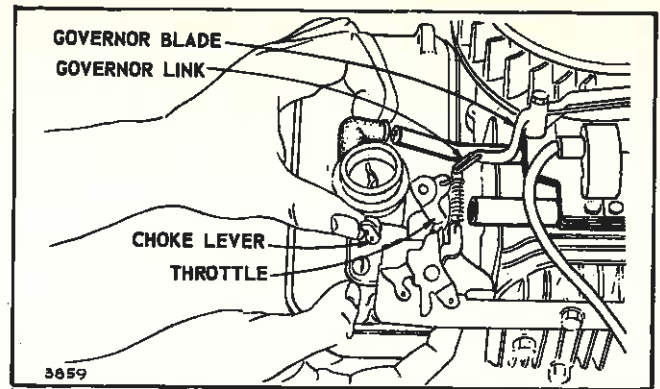


Fig. 36 — Install Carburetor and Tank Assembly

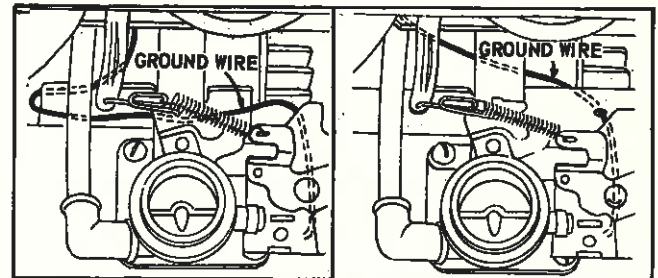


Fig. 37 — Ground Wire Leads

Install Carburetor and Tank Assembly Automatic Choke, Model Series 92000, 110900, 111900

Apply light film of oil to "O" ring in throttle bore. Then hook governor link to governor blade. Align the carburetor with the intake tube and breather tube grommet. Be sure the "O" ring does not distort when fitting the carburetor to the intake tube. Install governor spring as shown in Section 4, Page 7.

INSTALL CARBURETOR AND TANK ASSEMBLY AUTOMATIC CHOKE, MODEL SERIES 94000

Apply light film of oil to "O" ring in throttle bore. Then hook bell crank into governor lever rod. Align the carburetor with the intake tube and breather grommet. Be sure the "O" ring does not distort when fitting the carburetor to the intake tube. Install governor spring as shown in Section 4, page 8.

Carburetor Adjustment

NOTE: When making carburetor adjustments on Model Series 82000, 92000, 94000, 110900, 111900, air cleaner and stud must be installed on carburetor.

Model Series 82500, 92500 and 94500 engines should be adjusted with fuel tank half full of gasoline.

Initial Adjustment: Turn needle valve clockwise to close it. Then open 1½ turns. This initial adjustment will permit the engine to be started and warmed up before making final adjustment.

Final Adjustment: Place governor speed control lever in "FAST" position. Turn needle valve in until engine misses (clockwise — lean mixture) then turn it out past smooth operating point until engine runs unevenly (rich mixture). Now turn needle valve to the midpoint between rich and lean so the engine runs smoothly. Next, adjust idle RPM. Rotate throttle counterclockwise and hold against stop. Adjust idle speed adjusting screw to obtain 1750 RPM. Release throttle — engine should accelerate without hesitation or sputtering. If engine does not accelerate properly, the carburetor should be re-adjusted, usually to a slightly richer mixture.

Breather and Fuel Intake Tubes

Breather tube and fuel intake tube thread into the cylinder on Model Series 82000. Fuel intake tube is bolted to the cylinder on Model Series 92000, 94000, 110900 and 111900. See Fig. 38. Check for good fit or damaged gaskets to prevent air leaks or entry of dirt.

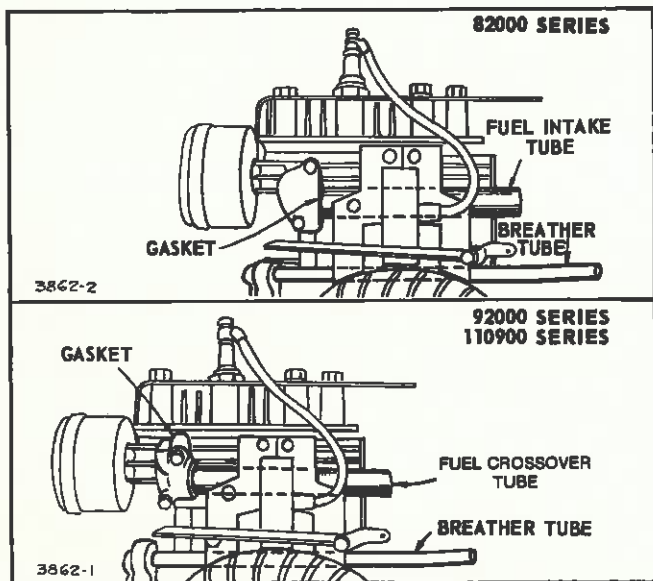


Fig. 38 — Breather and Fuel Intake Tubes

Choke-A-Matic Adjustment

The Choke-A-Matic feature was standard on Model Series 82000, 92500 (type nos. lower than 0600) 92900 (type nos. lower than 0500) engines. The remote control must be of the type in which the control wire moves out of the casing, when the control lever is moved from the stop position to the "Choke" or "Start" position. A minimum travel of 1-3/8" (34.9 mm) is required when the remote control is mounted, Fig. 39.

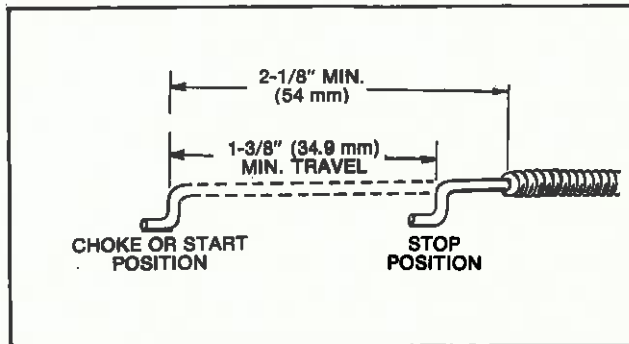


Fig. 39 — Remote Control

To install remote control assembly proceed as follows:

Remove the air cleaner and move the control lever to a position about midway between idle and fast. Then mount the remote control with the casing clamp as shown in Fig. 40.

Place control lever on equipment in fast (high speed) position. CONTROL MUST BE MOUNTED ON EQUIPMENT TO MAKE AN ACCURATE ADJUSTMENT. Lever "A" on carburetor should be just touching choke shaft at "B." Move casing "D" forward or backwards until correct position is obtained. Tighten screw "C." Recheck operation of controls after adjustment, Fig. 40.

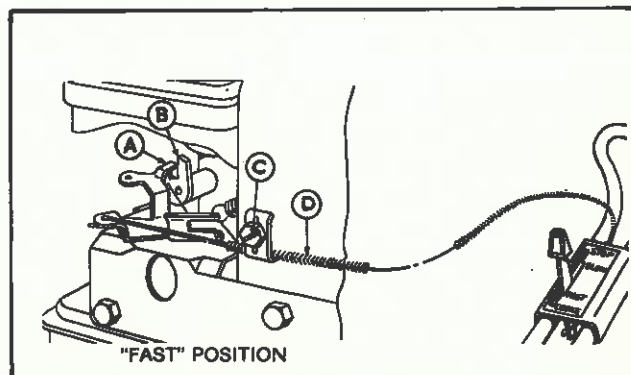


Fig. 40 — Choke-A-Matic Control (Typical)

CARBURETION PULSA—JET

PULSA-JET CARBURETORS

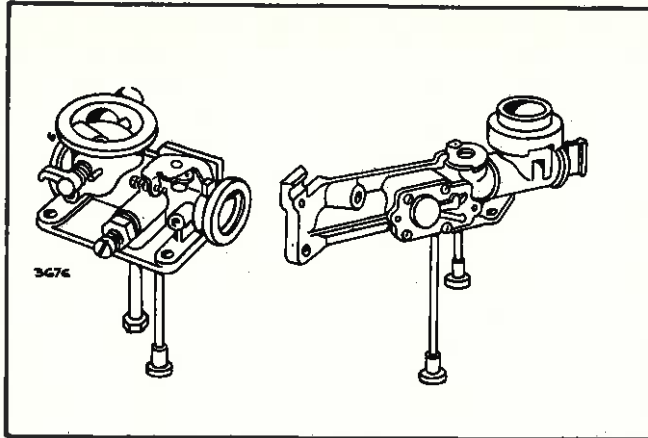


Fig. 41 — Pulsa-Jet Carburetor

Carburetor and Tank Assembly

Remove the carburetor and fuel tank as one unit, being careful not to bend the governor linkage. On models equipped with a stop switch, remove the ground wire. Fig. 42.

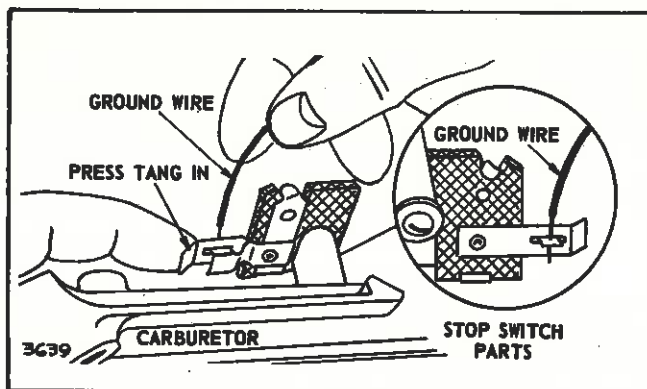


Fig. 42 — Removing Ground Wire

After removal of the carburetor from the fuel tank, inspect the tank for deposits of dirt and/or varnish.

Throttle

Cast throttles, Fig. 43, Illustration 1, are removed by backing off the idle speed adjustment screw until the throttle clears the retaining lug on the carburetor body, Fig. 44.

Stamped throttles, Fig. 43, Illustration 2, are removed by using a Phillips screw driver to remove the throttle valve and screw. After removal of the valve, the throttle may be lifted out, Fig. 45. Reverse procedure to install. Fig. 44.

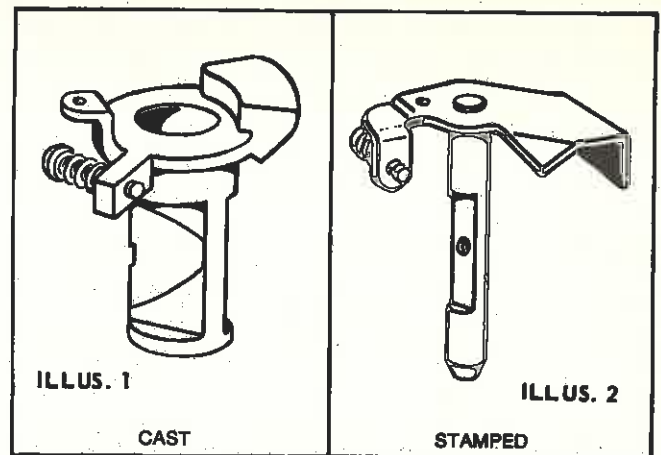


Fig. 43 — Throttle Types

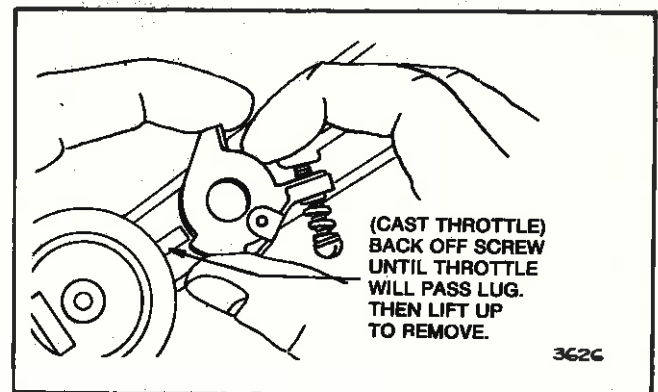


Fig. 44 — Removing Cast Throttle

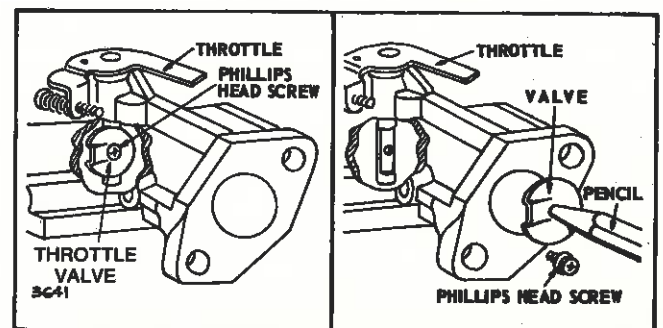


Fig. 45 — Removing Stamped Throttle

Some carburetor models have a spiral in the carburetor bore. To remove, fasten carburetor in a vise with smooth jaws about half an inch below top of jaws. Grasp spiral firmly with a pair of pliers, as shown, Fig. 46. Place a screw driver under ledge of pliers. Using edge of vise, push down on screw driver handle to pry out spiral, Fig. 46. Inspect gasket surface of carburetor. Repair if mounting surface is damaged.

When inserting spiral, top must be flush to 1/32" (.8 mm) below carburetor flange, and spiral parallel with fuel tank mounting surface, Fig. 46.

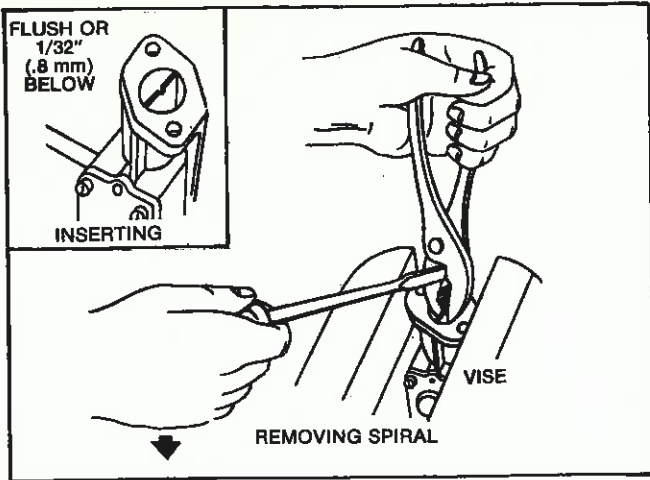


Fig. 46 — Removing and Inserting Spiral

Fuel Pipe

Check balls are not used in these fuel pipes. The screen housing or pipe must be replaced if the screen can not be satisfactorily cleaned. The long pipe supplies fuel from the tank to the pump. The short pipe supplies fuel from the tank cup to the carburetor. Fig. 47. Fuel pipes are nylon or brass. Nylon pipes are removed and replaced by using a 6 point socket, or open end wrench. Fig. 48. WHERE BRASS PIPES ARE USED, THE SCREEN HOUSING ONLY IS REPLACED. Fig. 49. Clamp the fuel pipe in a vise (do not overtighten). Drive off the brass housing with a screw driver. The new housing is installed by tapping it on the pipe with a soft hammer, Fig. 49.

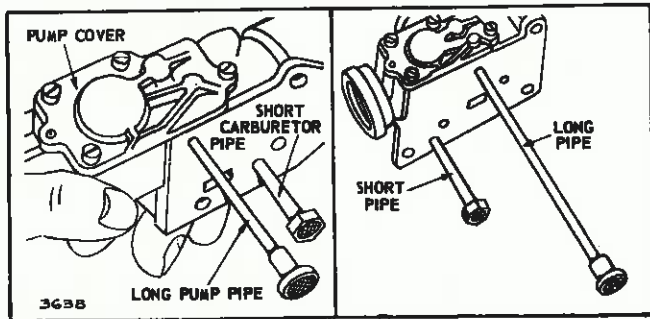


Fig. 47 — Fuel Pipes

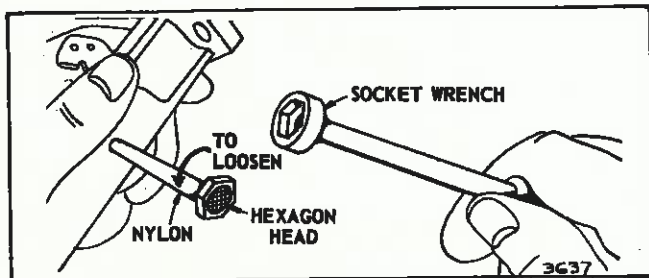


Fig. 48 — Replacing Fuel Pipe

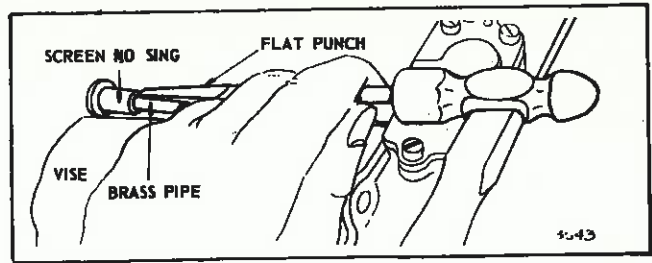


Fig. 49 — Replacing Screen Housing Assembly
Needle Valve and Seat

Remove needle valve to inspect. If carburetor is gummy or dirty, remove seat to allow better cleaning of metering holes. Fig. 50. Do not resize metering holes.

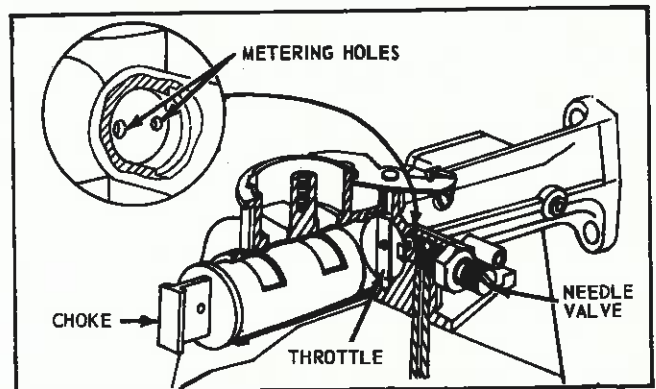


Fig. 50 — Metering Holes

Pump Disassembly and Repair

Remove fuel pump cover, diaphragm, spring and cup. Fig. 51. Inspect diaphragm for punctures, cracks and fatigue. Replace if damaged. Current style supersedes the previous style. When installing the pump cover, tighten the screws evenly in staggered sequence to insure a good seal. Inspect all sealing surfaces for nicks or damaged and repair or replace as required.

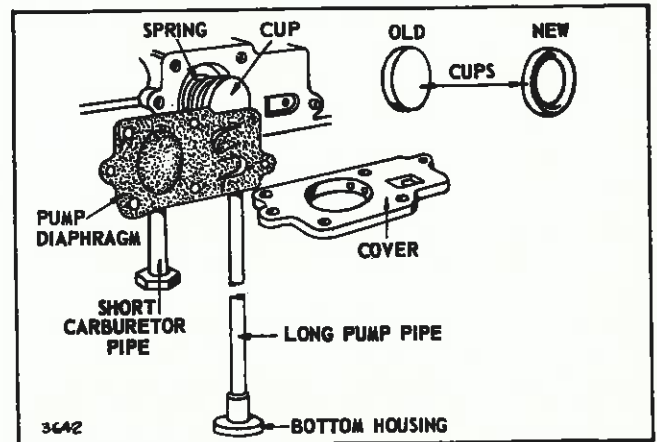


Fig. 51 — Pulsa-Jet Carburetor

CARBURETION PULSA-JET

Choke-A-Matic Linkage

Disassembly (Except Model 100900, 130900)

To remove choke link, remove speed adjustment lever and stop switch insulator plate. Remove speed adjustment lever from choke link then pull out choke link through hole in choke slide. Fig. 52.

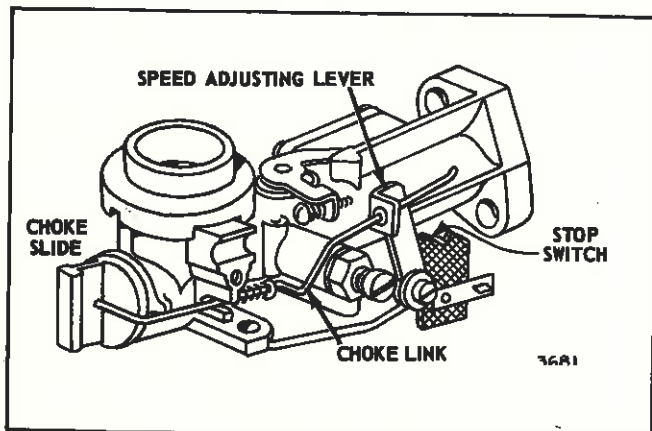


Fig. 52 — Choke-A-Matic Linkage

Repair

Replace worn or damaged parts. To assemble, slip washers and spring over choke link. Fig. 53. Hook choke link through hole in choke slide. Place other end of choke link through hole in speed adjustment lever and mount lever and stop switch insulator plate to carburetor.

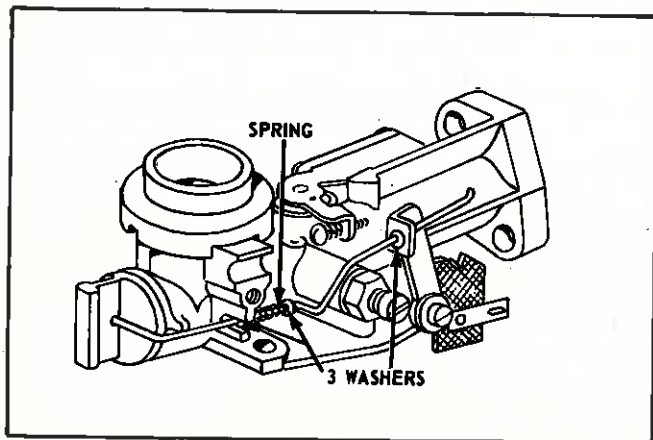


Fig. 53 — Choke-A-Matic Linkage

Adjust Choke-A-Matic Linkage

The following covers Choke-A-Matic parts installed as a part of the carburetor assembly. See Section 4 for Choke-A-Matic remote controls.

To check operation of Choke-A-Matic linkage, move speed adjustment lever to choke position. If choke slide does not fully close, replace link or use flat nose pliers to bend choke link. Fig. 54 (Do not overbend.) Speed adjustment lever must make good contact against stop switch when moved to stop position.

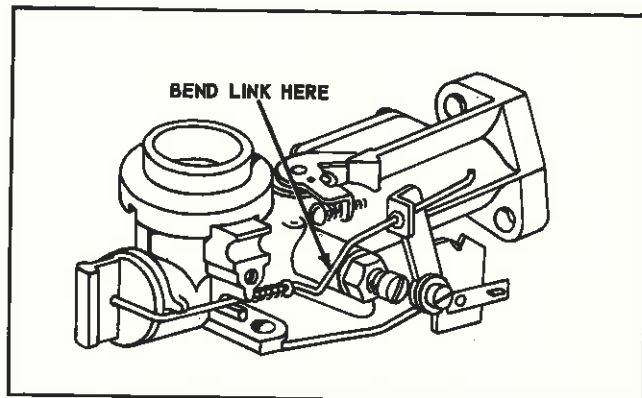


Fig. 54 — Adjust Choke Link

Choke-A-Matic Linkage Model 100900, 130900 and 131900

Manual or remote control for choke and stop is made by a lever on the control plate mounted to carburetor by two screws "A", Fig. 55. Lever for remote control has a loose fit, for manual control, a friction fit. To check lever action, move to left until it snaps into run detents. Lever "B" should just touch choke lever at "C."

If it does not, loosen screws "A" slightly and move control plate to right or left until lever just touches choke lever at "C." Tighten screws.

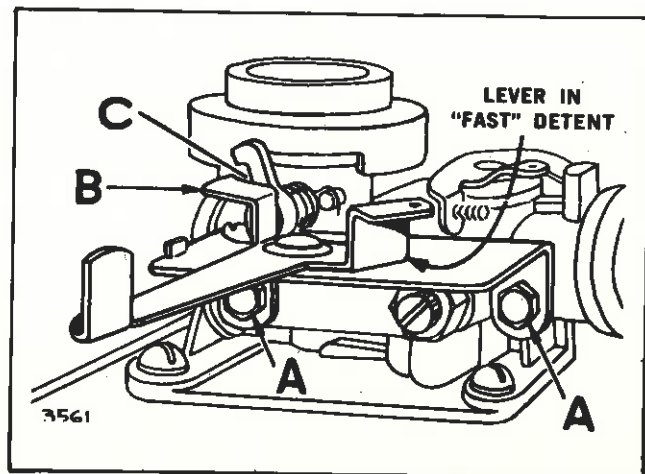


Fig. 55 — Choke-A-Matic Linkage —
Model 100900, 130900, 131900

Choke-A-Matic Remote Controls

See Section 4 for illustrations by engine model.

Install Carburetor

Except Model 100900 and 130900

Install carburetor and tank as one assembly on engine. Hook throttle link into carburetor throttle and governor lever (for various illustrations, see Section 4). Raise carburetor into place, insert a new gasket and fasten with mounting screws. Install governor spring. Fig. 56. Install ground wire and remote control where used.

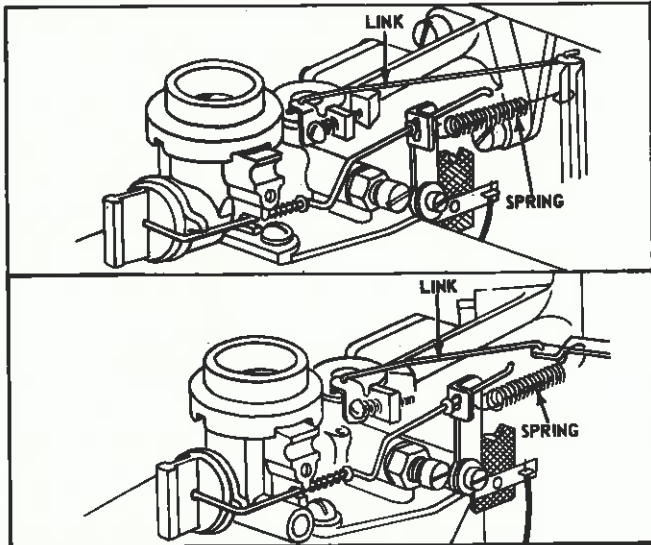


Fig. 56 — Installing Ground Wire

Install Carburetor

Model 100900, 130900, and 131900

Assemble carburetor to tank. Hold throttle link to throttle. Fig. 57. Slip carburetor over notch in cylinder shield and around intake tube. Oil the seal in carburetor body to prevent damage, when installing. Mount tank to cylinder. Hook up ground wire and governor spring.

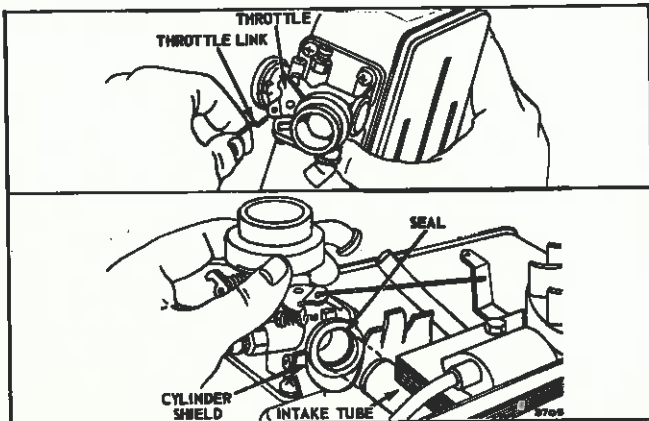


Fig. 57 — Install Carburetor — Model 100900 and 130900

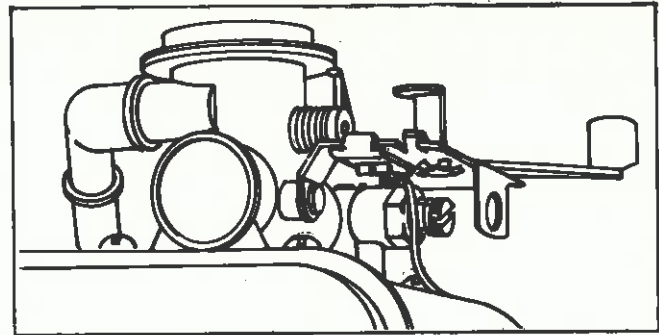


Fig. 57A — Install Carburetor — Model 131900

Carburetor Adjustment

Turn needle valve clockwise until it just closes.

CAUTION: Valve may be damaged by turning it in too far.

Now open needle valve 1½ turns counterclockwise, Fig. 58. This initial adjustment will permit the engine to be started and warmed up prior to final adjustment.

NOTE: All carburetor adjustments must be made with the air cleaner on engine. Best adjustments made with fuel tank 1/2 full.

Final Adjustment

Place governor speed control lever in "FAST" position. Turn needle valve in until engine misses (clockwise — lean mixture) then turn it out past smooth operating point until engine runs unevenly (rich mixture). Now turn needle valve to the midpoint between rich and lean so the engine runs smoothly. Next, adjust idle RPM. Rotate throttle counterclockwise and hold against stop. Adjust idle speed adjusting screw to obtain 1750 RPM. Release throttle — engine should accelerate without hesitation or sputtering. If engine does not accelerate properly, the carburetor should be re-adjusted, usually to a slightly richer mixture.

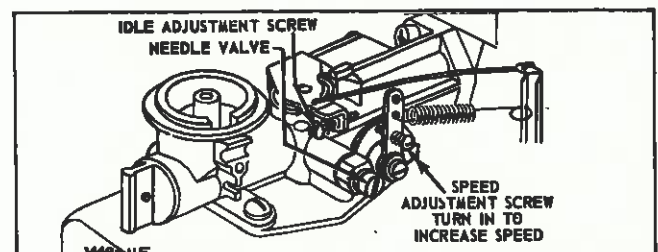


Fig. 58 — Setting Needle Valve

NOTE: When starting a Pulsa-Jet engine for the first time, fill fuel tank completely full. This eliminates priming the fuel pump, thus insuring a quick start.

CARBURETION

Vacu-Jet

VACU-JET CARBURETORS

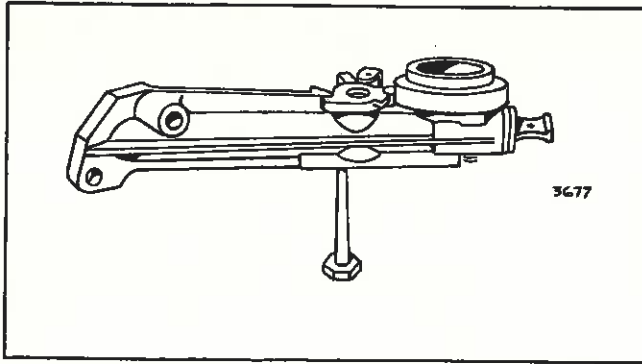


Fig. 59 — Vacu-Jet Carburetor

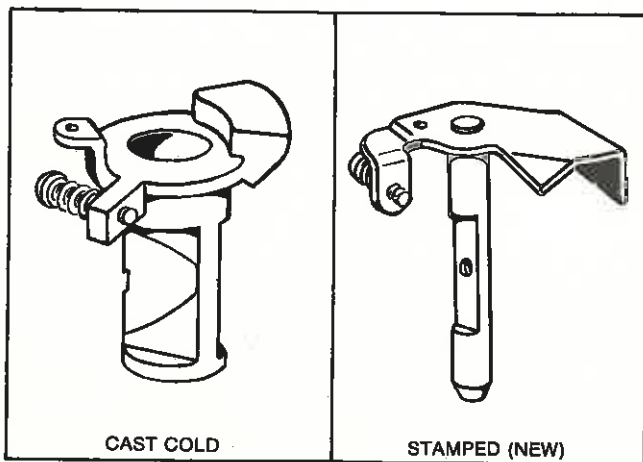
Carburetor and Tank Assembly

Remove the carburetor and fuel tank as one unit, being careful not to bend the governor linkage or spring. On models equipped with a stop switch, remove the ground wire. After removal of the carburetor from the fuel tank, inspect the tank for deposits of dirt and/or varnish and mounting surfaces. Tank should be cleaned in solvent.

Throttle

Cast throttles, Fig. 60, Illustration 1, are removed by backing off the idle speed adjusting screw until the throttle clears the retaining lug on the carburetor body. Fig. 61.

Stamped throttles, Fig. 60, Illustration 2, are removed by using a Phillips screw driver to remove the throttle valve screw. After removal of the valve, the throttle may be lifted out. Reverse procedure to install. Fig. 62.



Illus. 1

Illus. 2

Fig. 60 — Throttle Types

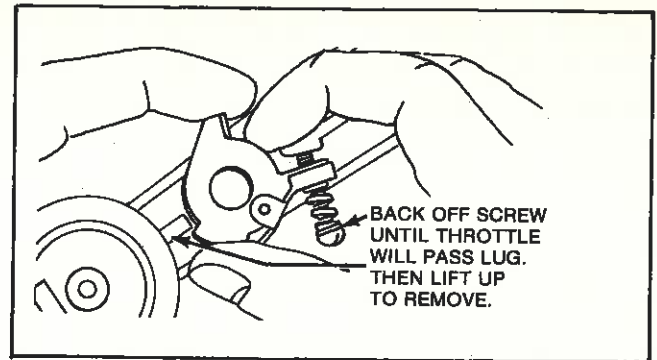


Fig. 61 — Removing Old Style Throttles

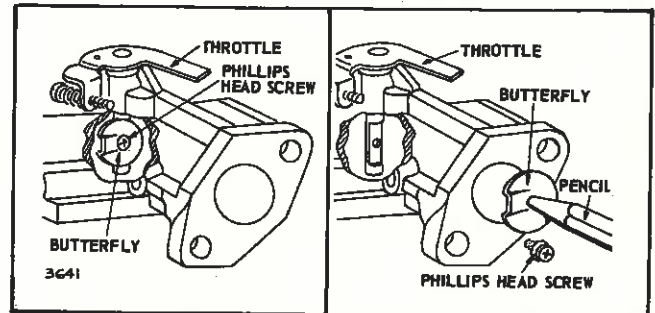


Fig. 62 — Removing and installing New Style Throttles

Fuel Pipe

The fuel pipe contains a check ball and a fine mesh screen. To function properly, the screen must be clean and the check ball free. Fig. 63. Replace pipe if screen and ball cannot be satisfactorily cleaned in carburetor cleaner. DO NOT LEAVE CARBURETOR IN CLEANER MORE THAN 1/2 HOUR WITHOUT REMOVING NYLON PARTS. Nylon fuel pipes, Fig. 64, Illustration 1, are removed and replaced with a 9/16" 6 point socket. Fig. 63. Brass fuel pipes, Illus. II, are removed by clamping the pipe in a vise and prying out as shown in Fig. 65.

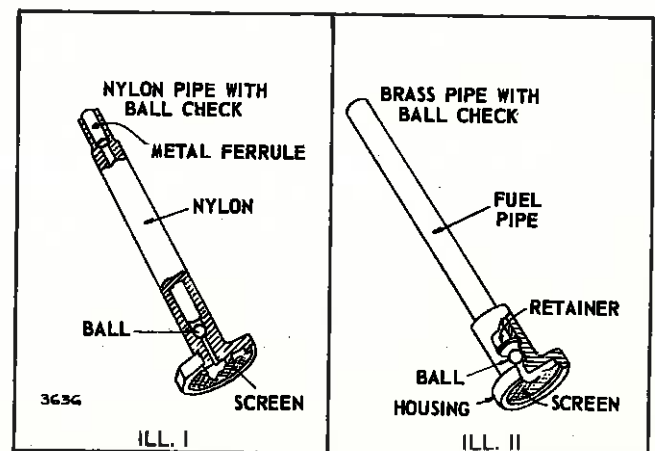


Fig. 63 — Fuel Pipes

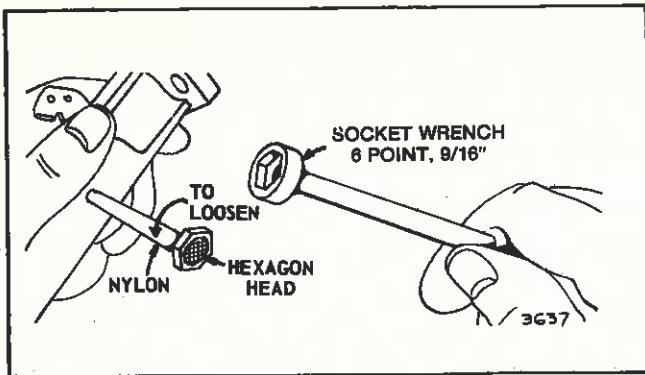


Fig. 64 — Replacing Nylon Fuel Pipe

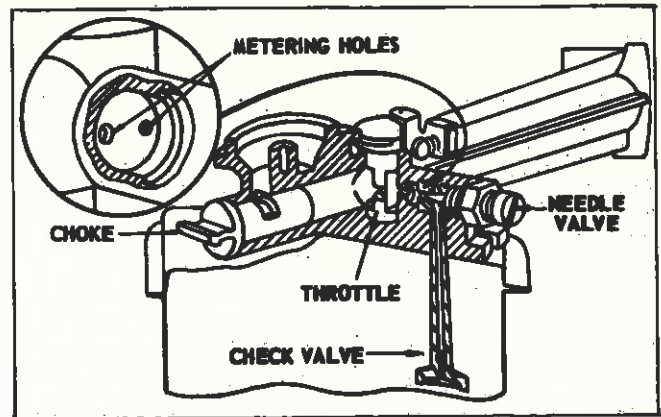


Fig. 67 — Metering Holes

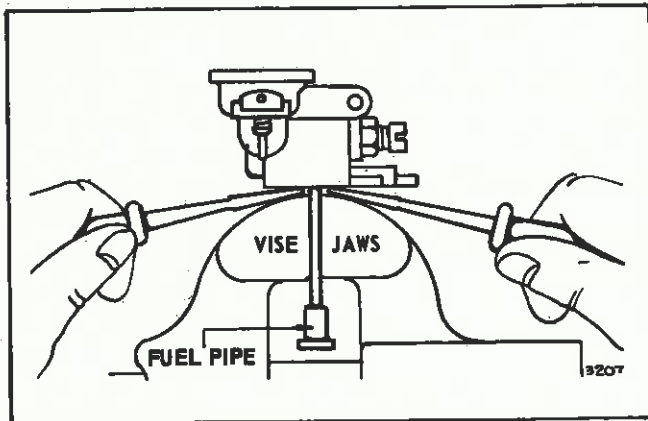


Fig. 65 — Removing Brass Fuel Pipe

To install brass fuel pipes, remove the throttle, if necessary, and place the carburetor and pipe in a vise. Press the pipe into the carburetor until it projects 2-9/32" (57.9 mm) to 2-5/16" (58.7 mm) from carburetor gasket surface. Fig. 66.

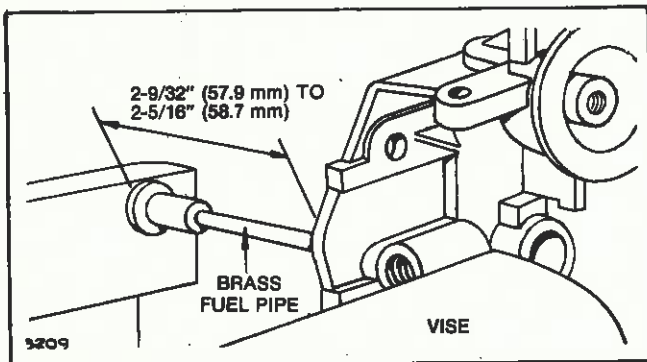


Fig. 66 — Replacing Brass Fuel Pipe

Needle Valve and Seat

Remove needle valve assembly to inspect. If carburetor is gummy or dirty, remove seat to allow better cleaning of metering holes. CAUTION: Do not change metering hole sizes. Fig. 67.

Choke-A-Matic Linkage

Disassemble

To remove choke link, remove speed adjustment lever and stop switch insulator plate. Work link out through hole in choke slide. Fig. 68.

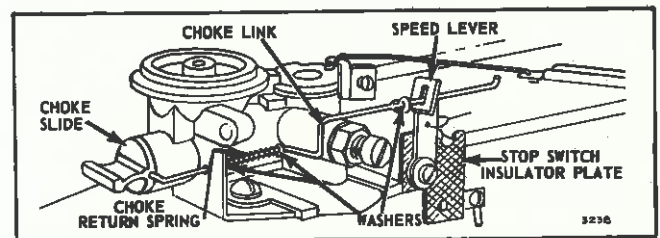


Fig. 68 — Choke-A-Matic Linkage

Repair

Replace worn or damaged parts. To assemble carburetor using choke slide, Fig. 68, place choke return spring and three washers on choke link. Push choke link through hole in carburetor body, turning link to line up with hole in choke slide. Speed adjustment lever screw and stop switch insulator plate should be installed as one assembly after placing choke link through end of speed adjustment lever.

Adjust Choke-A-Matic Linkage

The following covers Choke-A-Matic parts installed on and as a part of the carburetor assembly. See Section 4 for Choke-A-Matic remote controls. To check operation of Choke-A-Matic linkage, move speed adjustment lever to CHOKE position. If choke slide does not FULLY close, bend choke link. Fig. 69. Speed adjustment lever must make good contact against stop switch.

CARBURETION

Vacu-Jet and One Piece Flo-Jet

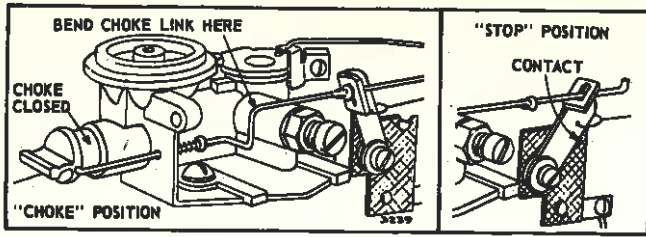


Fig. 69 — Adjust Choke Link

3

Install Carburetor

Install carburetor and fuel tank as an assembly. Hook throttle link into carburetor throttle and governor lever. (For various hook-ups, see Remote Control, Section 4.) Raise carburetor into place, insert a new gasket and fasten with mounting screws.

Install governor spring. Install ground wire and remote control where used. Fig. 70.

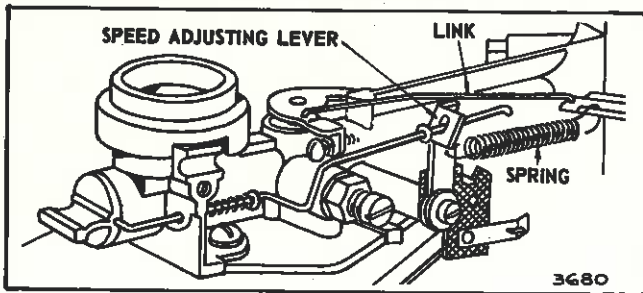


Fig. 70 — Install Carburetor

Choke-A-Matic Remote Controls

See Remote Controls, Section 4, for illustrations by engine model.

Carburetor Adjustment

The initial setting of the needle valve, Fig. 71, is made by turning the needle valve all the way in, then turning out $1\frac{1}{2}$ turns. Final adjustment is made with the engine running.

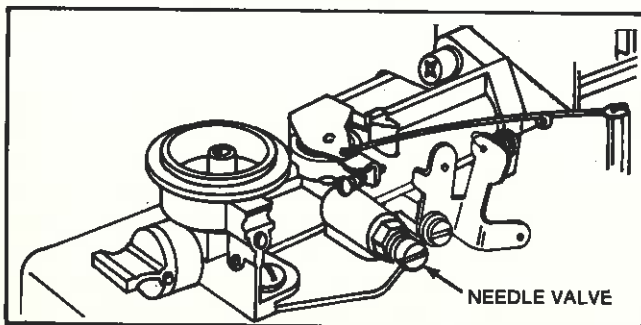


Fig. 71 — Carburetor Adjustment

NOTE: All carburetor adjustments should be made with the air cleaner on engine. Best adjustments made with fuel tank $1/2$ full.

FINAL ADJUSTMENT

Place governor speed control lever in "FAST" position. Turn needle valve slowly in until engine misses (clockwise — lean mixture) then turn it out slowly past smooth operating point until engine runs unevenly (rich mixture). Now turn needle valve to the midpoint between rich and lean so the engine runs smoothly. Next, adjust idle RPM. Rotate throttle counterclockwise and hold against stop. Adjust idle speed adjusting screw to obtain 1750 RPM minimum. Release throttle — engine should accelerate without hesitation or sputtering. If engine does not accelerate properly, the carburetor should be re-adjusted, usually to a slightly richer mixture.

ONE PIECE FLO-JET CARBURETOR

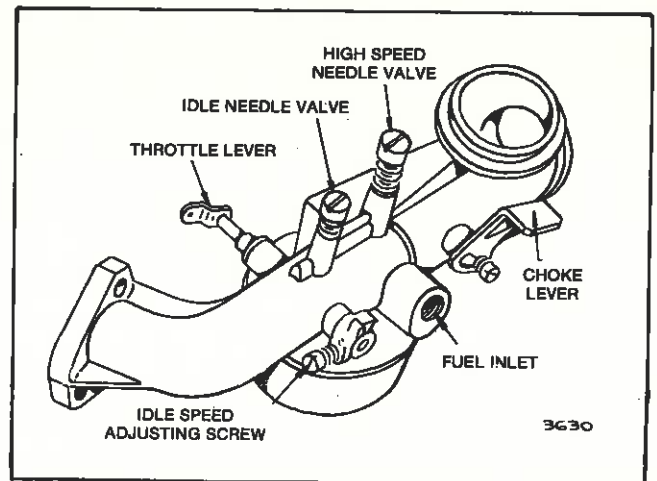


Fig. 72 — Small One Piece Flo-Jet Carburetor

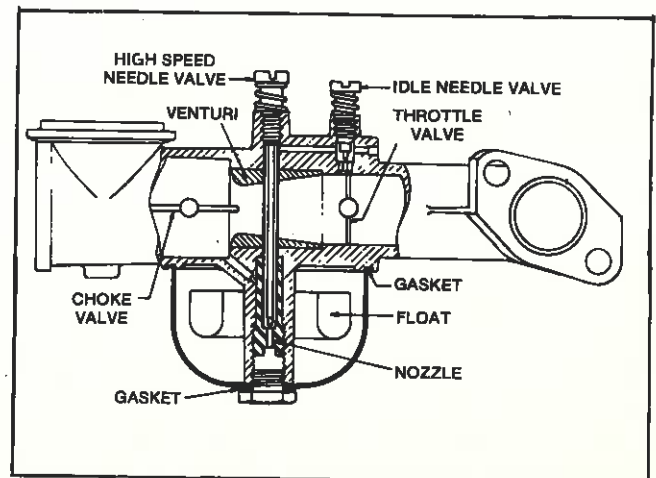


Fig. 73 — Small One Piece Flo-Jet Carburetor

CARBURETION

One Piece Flo-Jet

The small one piece Flo-Jet carburetor is illustrated in Figs. 72 and 73 and was used on Model Series 60700, 61700, 80700, 81700, 140700, 141700, 144700 and 145700. These are float feed carburetors with high speed and idle needle valve adjustments.

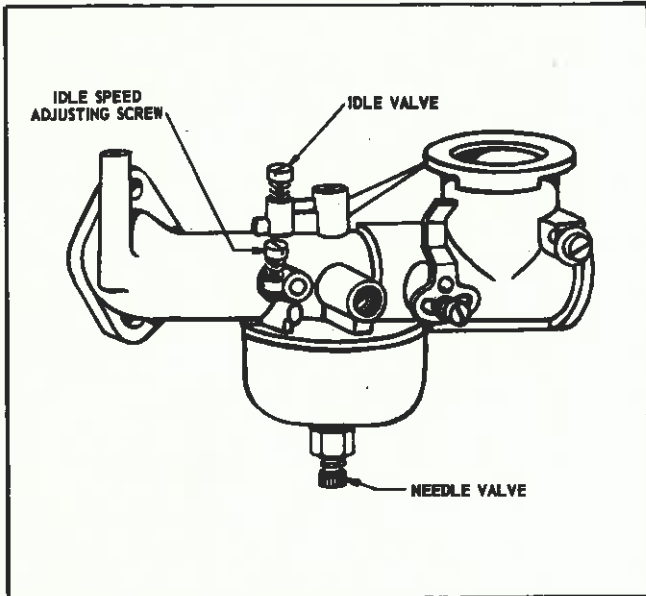


Fig. 74 — Large One Piece Flo-Jet Carburetor

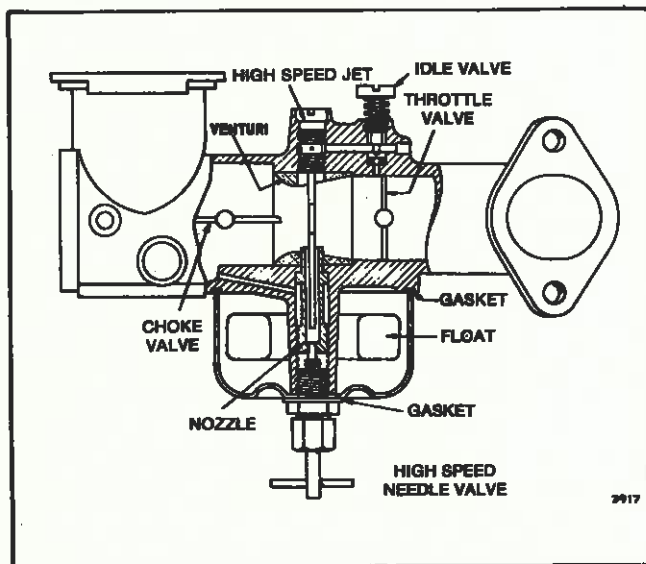


Fig. 75 — Large One Piece Flo-Jet Carburetor

The large one piece Flo-Jet carburetor is similar to the small one piece Flo-Jet. The main difference is that the high speed needle is below the float bowl. See Figs. 74 and 75.

Repair procedures for small and large Flo-Jet carburetors are similar except for location of adjusting needles.

Disassemble Carburetor, Small One-Piece Flo-Jet

Remove idle and high speed adjusting needles. Remove bowl nut and float bowl. Use screw driver to remove nozzle. Remove float pin to remove float and float needle. Use a large wide screw driver to remove float valve seat.

Disassemble Carburetor, Large One-Piece Flo-Jet

Remove idle mixture needle. Remove high speed needle valve assembly from float bowl and remove float bowl. Use a thick blade screw driver to remove nozzle, then remove jet from top of carburetor. Remove float pin to remove float and float needle.

Disassemble Continued, Small and Large One-Piece Flo-Jet

If necessary to remove choke shaft, venturi or throttle shaft, proceed in following sequence. Pry out welch plug. Remove choke valve. On carburetors with nylon choke shafts, remove choke valve as shown in Fig. 78. Venturi can now be removed, Fig. 77. (Choke-A-Matic large carburetors have a plate stop pin which must be pressed out to remove venturi.) To check for throttle shaft wear, refer to Two Piece Flo-Jet for procedure for checking.

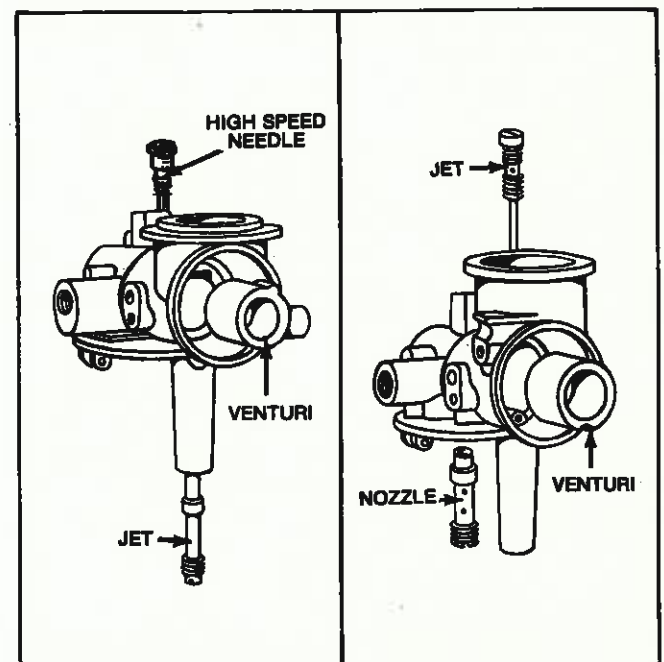


Fig. 76 — Repair Carburetor

CARBURETION

One Piece Flo-Jet

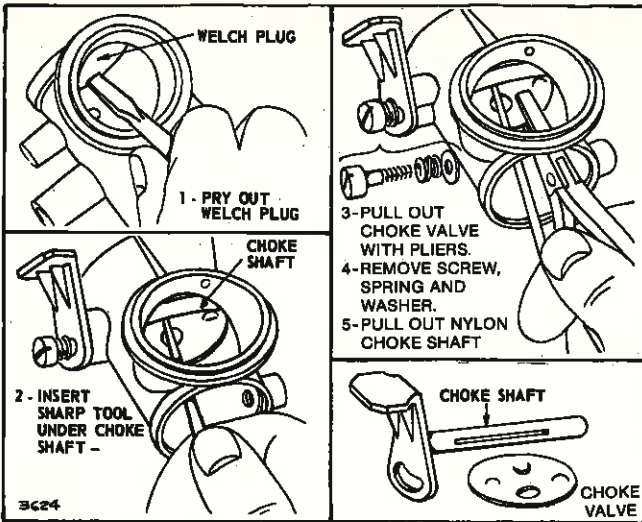


Fig. 77 — Nylon Choke Shaft

Inspection

Reject idle and high speed mixture needles if damaged, Fig. 78. Check float for leakage. If it contains fuel or is crushed, it must be replaced. Replace float needle, if worn. If carburetor leaks with new float needle on carburetors with pressed in float needle seat, refer to next paragraph.

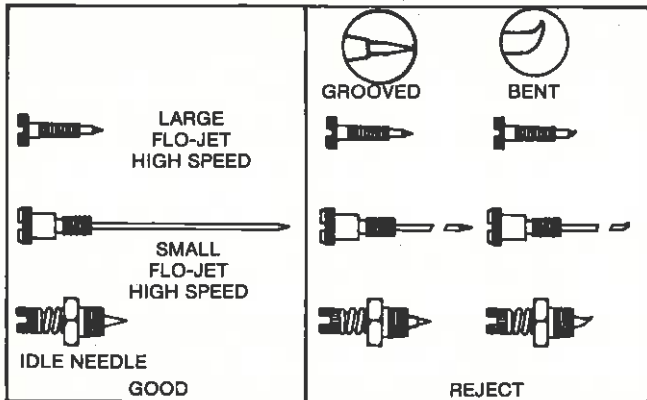


Fig. 78 — Mixture Needles

Replacing Pressed in Float Valve Seat

Use a #93029 self-threading screw or remove one self-threading screw from a #19069 flywheel puller and clamp head of screw in a vise. Turn carburetor body to thread screw into seat. Fig. 80. Continue turning carburetor body drawing seat out. Leave seat fastened to screw. Insert new seat #230996 into carburetor body. (Seat has starting lead.)

NOTE: If engine is equipped with a fuel pump, install #231019 seat.

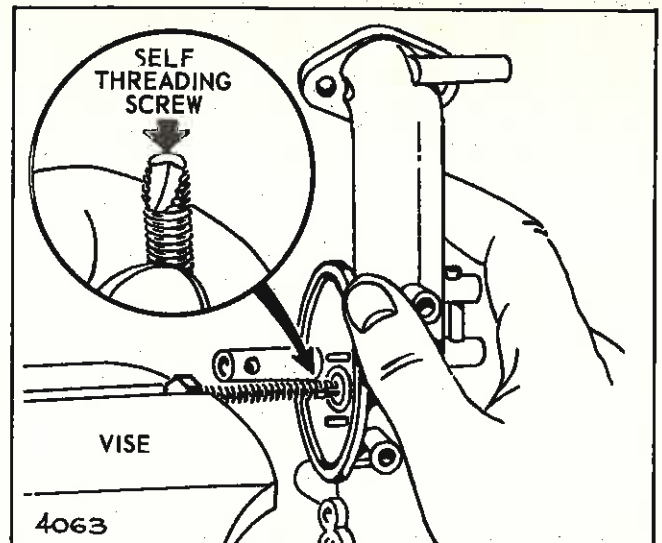


Fig. 79 — Replacing Float Valve Seat

Press new seat flush with body using screw and old seat as a driver. See Fig. 79. Use care to insure seat is not pressed below body surface or improper float to float valve contact will occur. Install float needle valve as shown in Fig. 80.

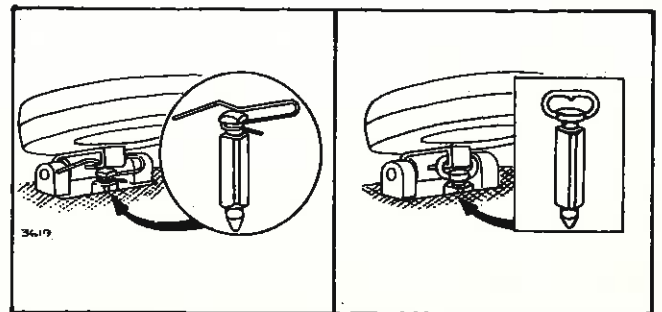


Fig. 80 — Float Needle Valve Variations

CARBURETION

One Piece Flo-Jet

Checking Float Level

With body gasket in place on upper body and float valve and float installed, the float should be parallel to the body mounting surface. Fig. 81. If not, bend tang on float until they are parallel. DO NOT PRESS ON FLOAT. Fig. 81.

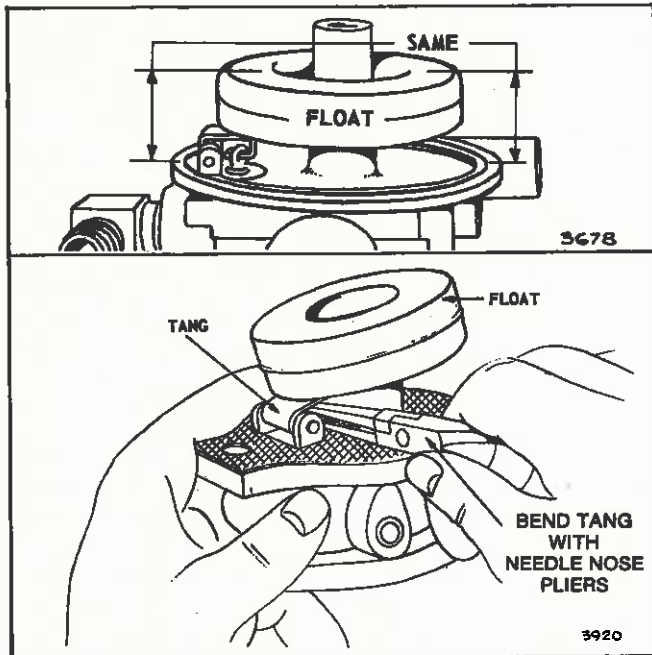


Fig. 81 — Checking Float Level

Repair Carburetor

Use new parts where necessary. Always use new gaskets. Carburetor repair kits are available. See illustrated parts list for particular model. If throttle shaft and/or venturi has been removed, install throttle and throttle shaft first. Then install venturi. Now install jet on small one piece or nozzle on large one piece Flo-Jet. The nozzle or jet holds the venturi in place, Fig. 76. Replace choke shaft and valve. Install new welch plug using sealer around edge of plug. Stake plug in two (2) places. Sealer is to prevent entry of dirt into engine. Install float bowl, idle and high speed adjustment needles.

Initial Adjustments

On small one piece Flo-Jets, turn in idle and high speed needles until they just bottom. Open high speed needle $2\frac{1}{2}$ turns and idle needle $1\frac{1}{2}$ turns on large one piece Flo-Jets, turn both idle and high speed needles in until they just bottom. Then turn both valves $1\frac{1}{2}$ turns open.

These settings will allow the engine to start. Final adjustment should be made when engine is running and has warmed up. See carburetor adjustment. (Two piece Flo-Jet carburetor.)

Choke-A-Matic Remote Control Adjustment

On Choke-A-Matic carburetors, the remote control must be correctly adjusted in order to obtain proper operation of the choke and stop switch. See Section 4 for illustrations by engine model.

TWO-PIECE FLO-JET CARBURETOR SMALL, MEDIUM AND LARGE FLO-JET

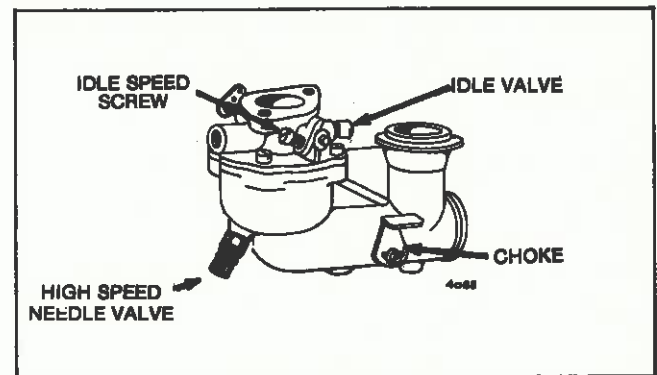


Fig. 82 — Small Flo-Jet

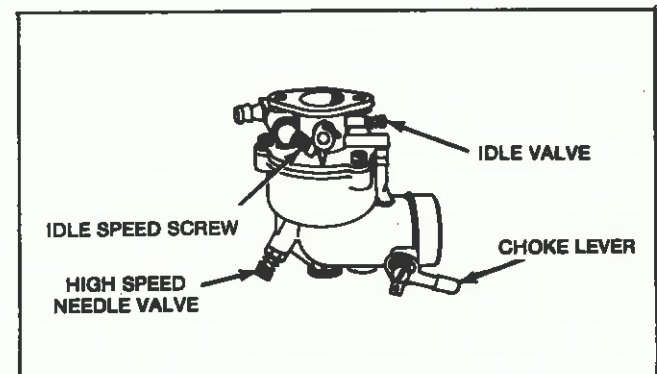


Fig. 83 — Medium Flo-Jet

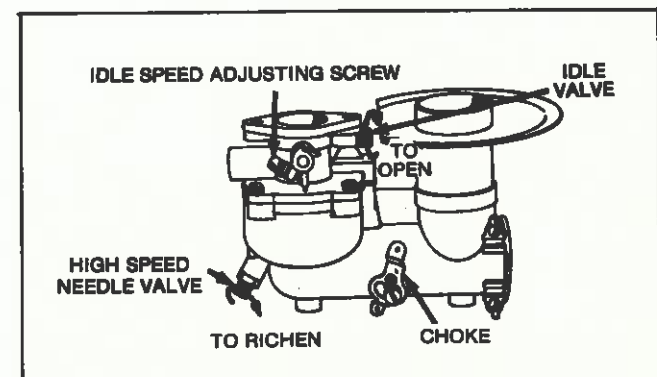


Fig. 84 — Large Flo-Jet

CARBURETION

Two Piece Flo-Jet

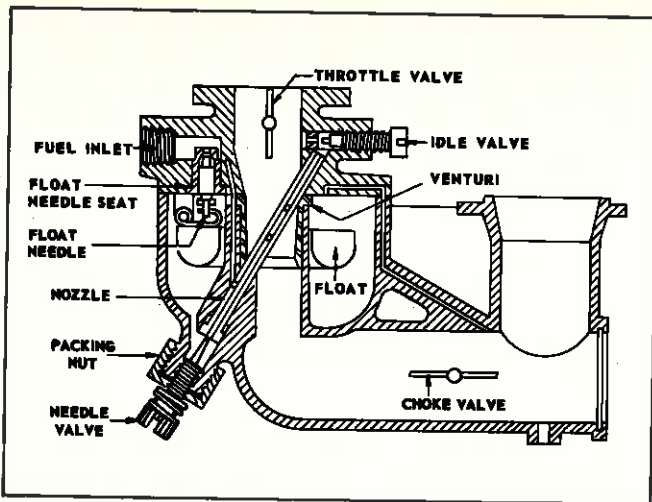


Fig. 85 — Typical Two Piece Flo-Jet Carburetor

Check Upper Carburetor Body for Warp

With carburetor assembled and body gasket in place, if a .002" feeler gauge can be inserted between the upper and lower bodies at the air vent boss, just below the idle valve, the upper body is warped or gasket surfaces are damaged and should be replaced. Fig. 86.

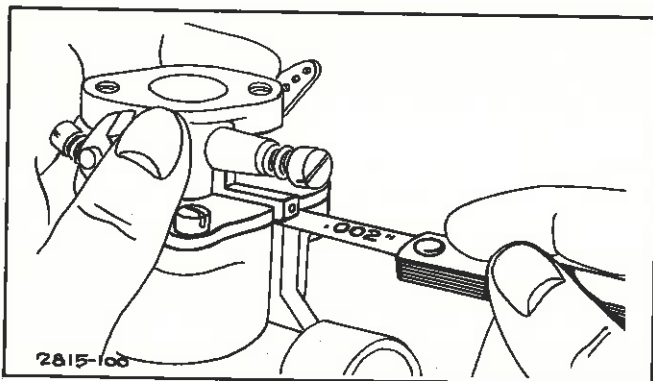


Fig. 86 — Checking Carburetor Body

Check Throttle Shaft and Bushings for Wear

Wear between throttle shaft and bushings should not exceed .010". Check wear by placing a short iron bar on the upper carburetor body as shown in Fig. 87. Measure the distance between the bar and shaft with a feeler gauge while holding the shaft down and then holding shaft up. If the difference is over .010", either the upper body should be rebushed, the throttle shaft replaced, or both. Wear on the throttle shaft can be checked by comparing the worn and unworn portions of the shaft. To replace bushings, see "Remove Throttle Shaft and Bushings."

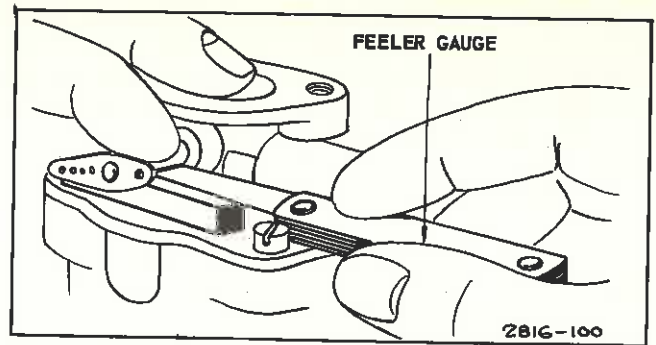


Fig. 87 — Checking Throttle Wear

Remove idle valve. On small line Flo-Jet loosen high speed valve packing nut. Remove packing nut and needle valve together. On medium and large line Flo-Jet remove high speed valve assembly. Remove nozzle on small line Flo-Jet with 19061 screw driver. On medium and large line Flo-Jet use 19062 screw driver to remove nozzle. Using 19061 or 19062 will help to prevent damage to the threads in lower carburetor body. The nozzle projects diagonally into a recess in the upper body and must be removed before the upper body can be separated from the lower body, or the nozzle will be damaged. See Fig. 85. Remove screws holding upper and lower bodies together. A pin holds the float in place. Remove pin and remove float and float needle as an assembly. Use wide blade screw driver that fits slot to remove float inlet seat. On carburetors with pressed in float seats, see "Replacing Pressed In Float Valve Seat." On small Flo-Jets the venturi is a separate part and can be slipped out of the lower body. Some carburetors have a welch plug. This should be removed, only if it is necessary, to remove the choke shaft or choke plate. Some carburetors have a nylon choke shaft. Remove as shown in Fig. 88.

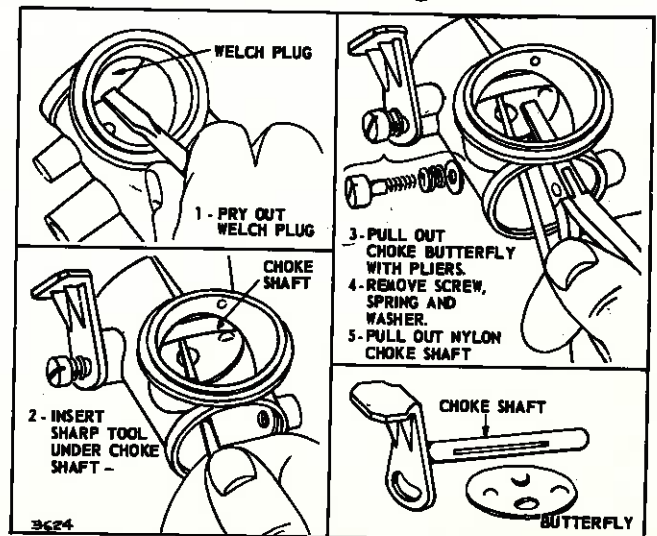


Fig. 88 — Nylon Choke Shaft

Remove Throttle Shaft and Bushings

Throttle shaft should be removed only when necessary to replace throttle shaft and/or bushings. To remove throttle shaft, use a thin punch to drive out the pin holding throttle stop to the shaft, remove the throttle valve, then pull out the shaft. Fig. 89.

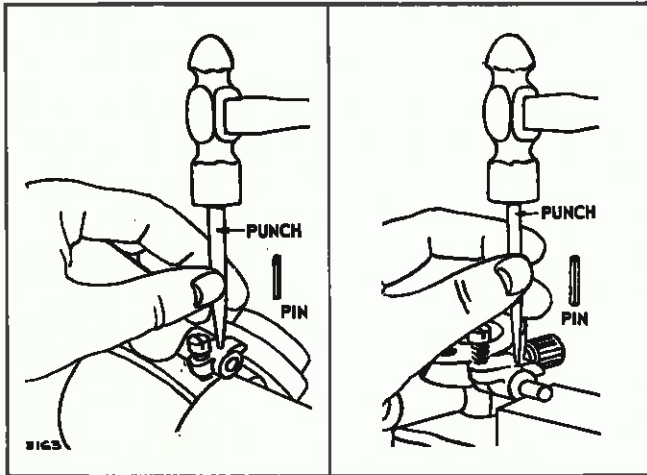


Fig. 89 — Remove Throttle Shaft and Bushings

Replace Throttle Shaft Bushings

Place a 1/4" x 20 tap or an E-Z out in a vise. Turn carburetor body so as to thread tap or E-Z out into bushings enough to pull bushings out of body, Fig. 90. Press new bushings into carburetor body with a vise. Insert throttle shaft to be sure it is free in the bushings. If not, run a size 7/32" drill through both bushings to act as a line reamer. Install throttle shaft, valve and stop.

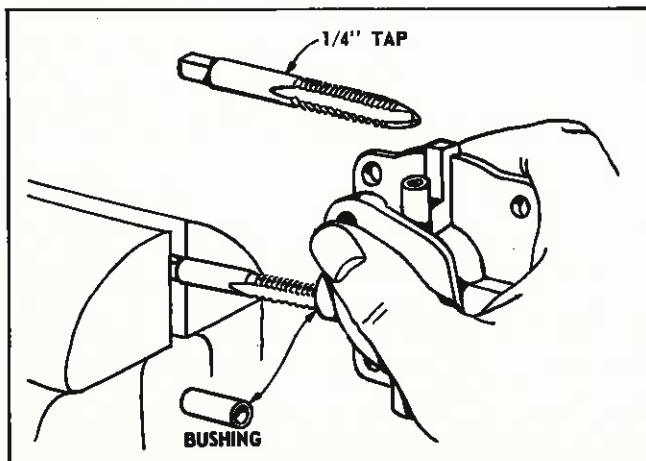


Fig. 90 — Replacing Throttle Shaft Bushings

Repair Carburetor

Use new parts when necessary. Always use new gaskets. Old gaskets take a set or harden and may leak. Carburetor repair kits are available, see illustrated parts list for part number for specific model. Tighten inlet seat with gasket securely in place, if used. Some float valves have a spring clip to connect the float valve to the float tang. Others are nylon with a stirrup which fits over the float tang. Older type float valves and earlier engines with fuel pumps have neither spring or stirrup.

A viton tip float valve is used on later models of the Flo-Jet carburetor. These needles are used with the inlet needle seat pressed into the upper carburetor body and does not need replacement unless damaged.

Replacing Pressed-In Float Valve Seat

Use a #93029 self-threading screw or remove one self-threading screw from a #19069 flywheel puller and clamp head of screw in a vise. Turn carburetor body to thread screw into seat. Fig. 91. Continue turning carburetor body drawing seat out. Leave seat fastened to screw. Insert new seat #230996 into carburetor body. (Seat has starting lead.)

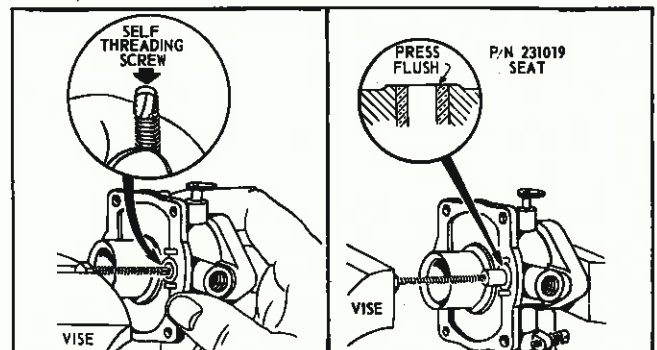


Fig. 91 — Replacing Float Valve Seat

NOTE: If engine or equipment is equipped with a fuel pump, install #231019 seat. Carburetors factory equipped with fuel pump seat have letter "P" stamped on flange, Fig. 92.

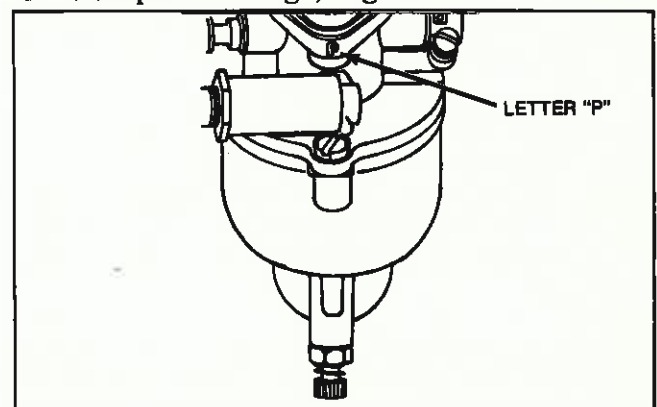


Fig. 92 — Flange

CARBURETION

Two Piece Flo-Jet

Press new seat flush with body using screw and old seat as a driver. See Fig. 91. Use care to insure seat is not pressed below body surface or improper float to float valve contact will occur. Install float valve as shown in Fig. 93.

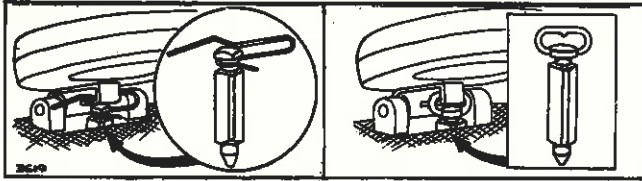


Fig. 93 — Float Valve Variations

Checking Float Level

With body gasket in place on upper body and float valve and float installed, the float should be parallel to the body mounting surface. If not, bend tang on float until they are parallel. DO NOT PRESS ON FLOAT TO ADJUST. Fig. 94A and 94B.

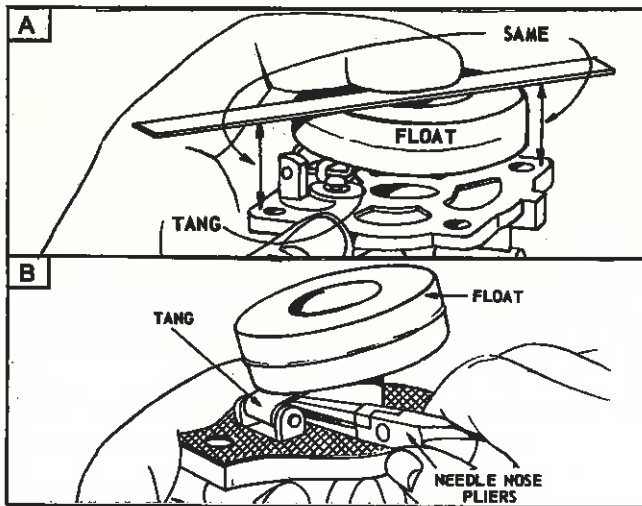


Fig. 94 — Checking Float Level

Assemble Carburetor

Assemble venturi and venturi gasket to lower body. Be sure holes in the venturi and venturi gasket are aligned. Most models do not have a removable venturi. Install choke parts and welch plug if previously removed. Use a sealer around the welch plug to prevent entry of dirt. Stake welch plug at least twice.

Fasten upper and lower bodies together with the mounting screws. Screw in nozzle with narrow blunt screw driver #19061 or #19062, being careful that nozzle tip enters the recess in the upper body. Fig. 95. Tighten nozzle securely. Screw in needle valve and idle valve until they just seat. Back off high speed needle valve 1-1/2 turns. Do not tighten packing nut. Back off idle needle valve 3/4 turn. These settings are approximately correct. Final adjustment will be made when engine is running.

NOTE: All carburetor adjustments must be made with the air cleaner installed.

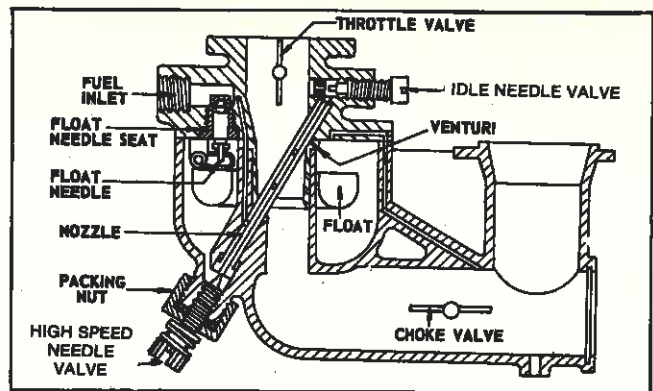


Fig. 95 — Assemble Carburetor

Carburetor Adjustment

Start engine and run to warm up. Then place governor speed control lever in "FAST" position. Turn high speed needle valve in until engine slows (clockwise — lean mixture). Then turn it out past smooth operating point (rich mixture). Now turn high speed needle valve to midpoint between rich and lean. Next, adjust idle RPM. Rotate throttle counterclockwise and hold against stop. Adjust idle speed adjusting screw to obtain 1750 RPM, aluminum engines; 1200 RPM, cast iron engines.

Holding throttle against idle stop, turn idle valve in (lean) and out (rich). Set at midpoint between rich and lean. Recheck idle RPM. Release throttle. If engine will not accelerate properly, the carburetor should be re-adjusted, usually to a slightly richer mixture.

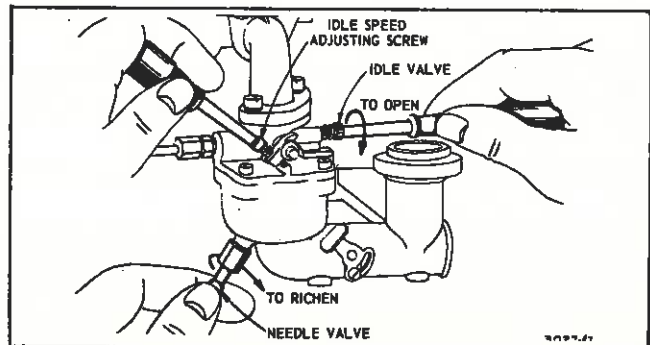


Fig. 96 — Adjusting Carburetor

Governed Idle

To adjust for governed idle, refer to Section 4 for specific model of engine.

Choke-A-Matic Remote Control Adjustment

On Choke-A-Matic carburetors, the remote control must be correctly adjusted in order to obtain proper operation of the choke and stop switch. For adjustment, see Section 4.

Idling Device and Throttle Control (Two Piece Flo-Jet)

A manual friction control may be used to limit throttle movement, to any pre-set position. It is commonly used for two purposes. 1. To return the throttle to a "no-load" position on a pump, generator, etc.; 2. For cold weather starting on governed idle engines. The throttle can easily be kept in a "near closed" position, while starting, which is most favorable for cold weather starts. Fig. 97.

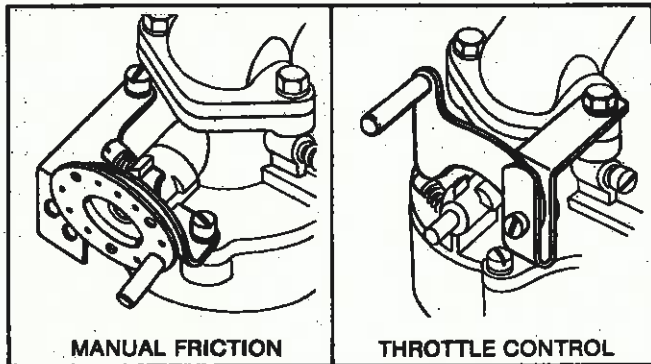


Fig. 97 — Idling Device and Throttle Control

Remote Throttle Control (Two Piece Flo-Jet)

The remote throttle control opens the carburetor throttle until the full governed speed is obtained, at which point the governor takes over control of the throttle. At any point below the governed speed, the throttle is held in a fixed position and the engine speed will vary with the load. Fig. 98.

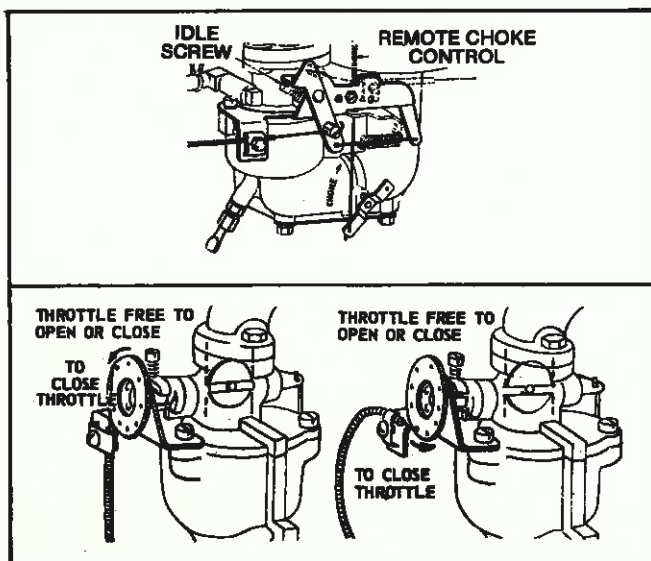


Fig. 98 — Remote Throttle Control

CROSS-OVER FLO-JET

The cross-over Flo-Jet carburetor is used on Model Series 253400 engines and is a float type carburetor with idle and high speed adjustment needles. This carburetor also has an integral fuel pump. All adjustments can be made from the top of the carburetor, Figs. 99 and 100.

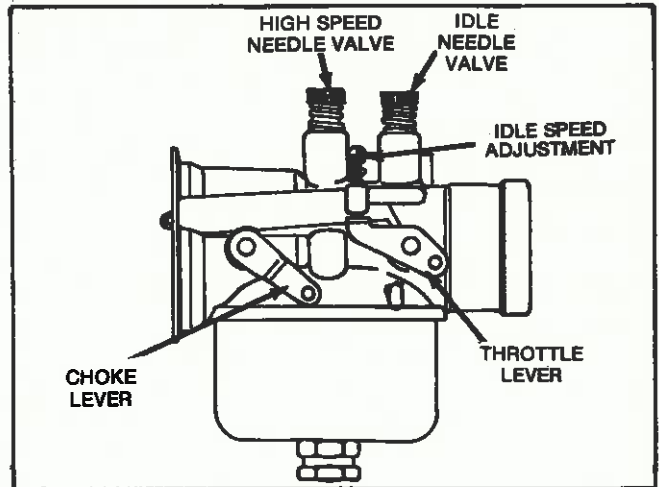


Fig. 99

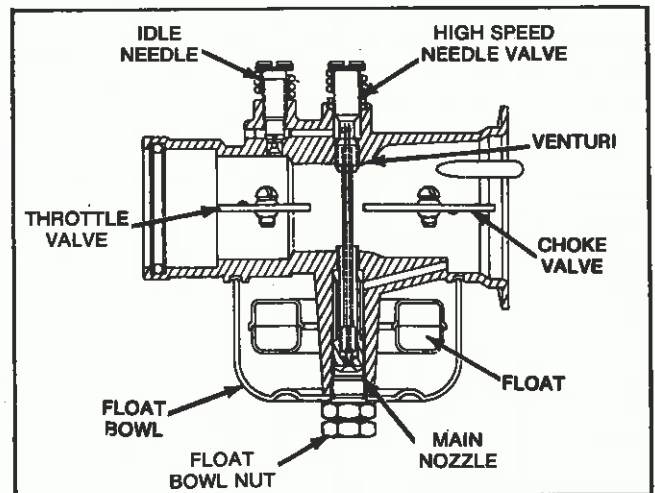


Fig. 100

Disassembly, Cross-Over Flo-Jet

Remove idle and high speed needle adjustment valves. Remove float bowl mounting screw, washer and float bowl. Using a large blunt screw driver, remove nozzle screw. Remove float hinge pin, float and float inlet needle. Use screw driver to remove two (2) screws from choke shaft. Then remove choke plate and choke shaft. Use screw driver to remove screw from throttle shaft. Then remove throttle plate and throttle shaft. Use screw driver to remove three (3) screws from fuel pump body. Remove fuel pump from carburetor taking care not to lose the pump valve springs.

CARBURETION

Cross-Over Flo-Jet

Inspection

Check idle and high speed needle valves for burrs, grooves or bent needle tips. Reject if damaged, Fig. 101. Check float for fuel in float, damage or leaks. If it contains fuel or is crushed it must be replaced. If carburetor leaks with new inlet needle valve, replace inlet needle seat. See next paragraph.

3

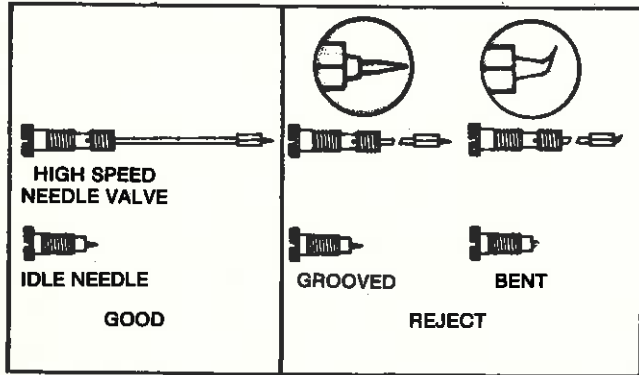


Fig. 101

Replacing Pressed-In Float Valve Seat

Use a #93029 self-threading screw or remove one self-threading screw from a #19069 flywheel puller and clamp head of screw in a vise. Turn carburetor body to thread screw into seat. Fig. 102. Continue turning carburetor body drawing seat out. Leave seat fastened to screw. Insert new seat #231019 into carburetor body. (Seat has starting lead.)

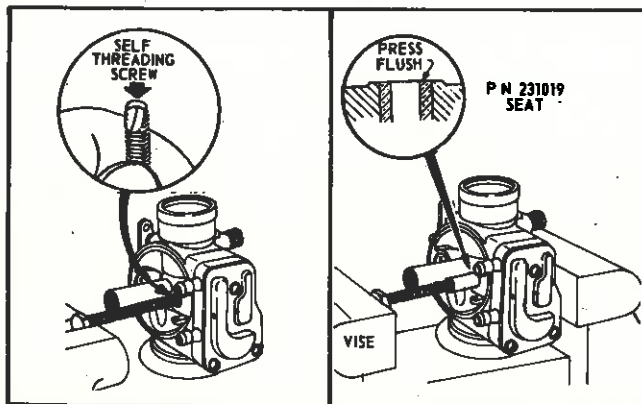


Fig. 102 — Replacing Float Valve Seat

Press new seat flush with body using screw and old seat as a driver. See Fig. 102. Use care to insure seat is not pressed below body surface or improper float to float needle valve contact will occur. Install float valve as shown in Fig. 103.

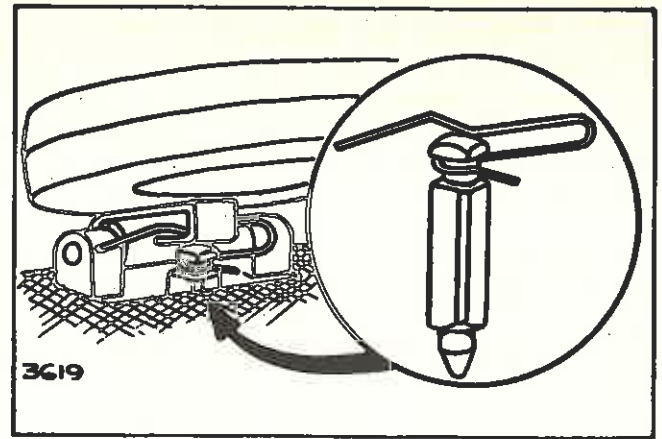


Fig. 103 — Float Needle Valve

Checking Float Level

With float needle valve, float and float hinge pin installed, hold carburetor upside down. The float should be parallel to the bowl mounting surface. If not, bend tang on float until they are parallel. DO NOT PRESS ON FLOAT TO ADJUST, Fig. 104.

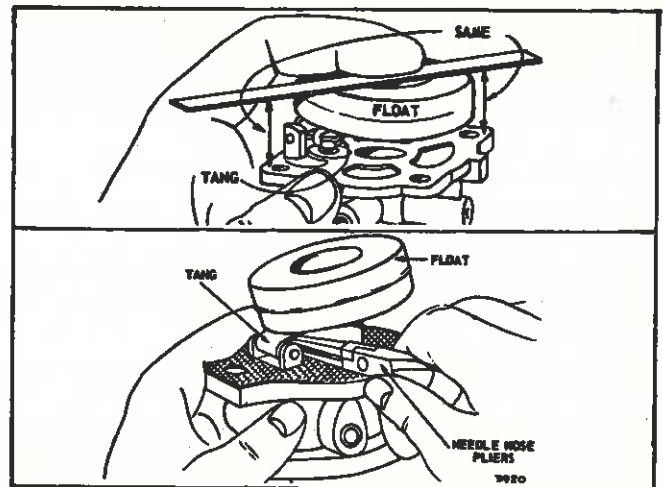


Fig. 104 — Checking Float Level

Repair Carburetor

Use new parts where necessary. Always use new gaskets. Old gaskets take a set or harden and may leak. Carburetor repair kits are available, see illustrated parts list for part numbers. These carburetors use a viton tip float needle and a pressed-in needle seat. The seat does not need replacement unless the seat is damaged or leaks with a new float needle.

*Assemble Carburetor

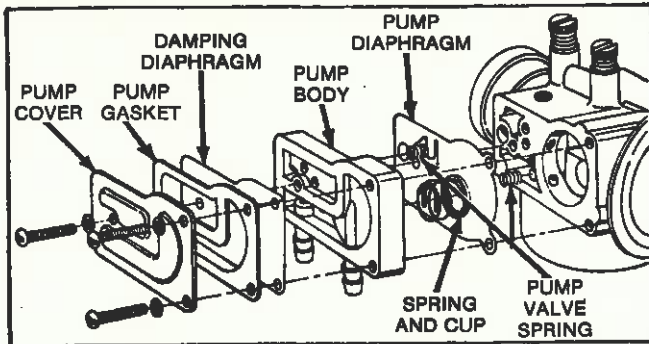


Fig. 105 — Assemble Fuel Pump

Install main nozzle using blunt screw driver to prevent damage to slot and metering hole. Place bowl on carburetor and install bowl nut and washer. Install one (1) pump valve spring on spring boss, Fig. 106, and then place diaphragm on carburetor. Put pump spring cup and pump spring on diaphragm, Fig. 105. Place a pump valve spring on spring boss in pump body, Fig. 106, and place pump body on carburetor. Place damping diaphragm, pump gasket and pump cover on pump body and install three (3) screws. A fuel pump repair kit is available, see illustrated parts list for part number.

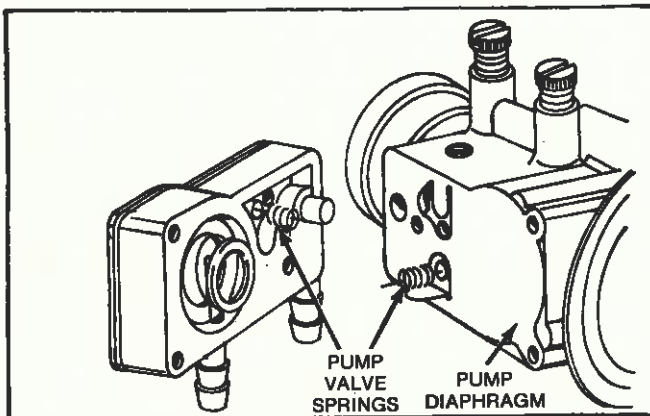


Fig. 106 — Pump Spring Location
(Valve Flap Bent Down for Clarity)

Place choke shaft in carburetor body and slide in choke valve with notch out and dimple down toward float bowl, Fig. 107A. Install two (2) screws using a screw driver. Slide in throttle shaft and then slide in throttle plate with two (2) dimples facing toward the idle valve. When valve is installed correctly, the dimples will be down and the number on the plate visible with the throttle in the closed or idle position, Fig. 107B. Install the idle and high speed needle valves.

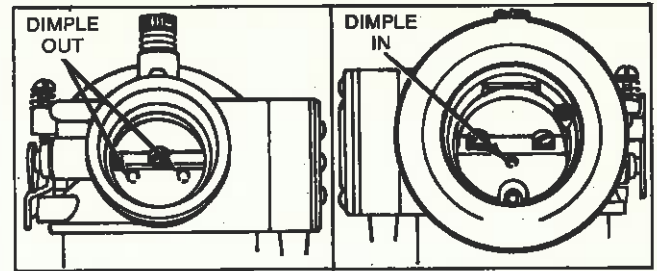


Fig. 107A

Fig. 107B

Carburetor Adjustments

INITIAL ADJUSTMENT — Turn idle and needle valves clockwise until they just close, Fig. 108.

CAUTION: Valves may be damaged by turning them in too far.

Now open high speed needle valve 1½ turns counterclockwise and idle valve one turn. This initial adjustment will permit the engine to be started and warmed up prior to final adjustment.

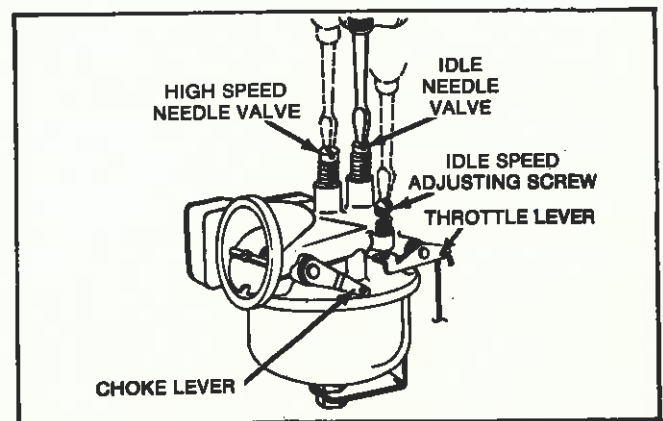


Fig. 108 — Carburetor Adjustment

NOTE: Carburetor adjustments should be made with the air cleaner on engine.

FINAL ADJUSTMENT PROCEDURE

Idle Valve Mixture

Place governor speed control lever in "IDLE" position. Set idle speed adjusting screw to obtain 1750 R.P.M. minimum while holding throttle lever again screw. Turn idle valve in until R.P.M. slows or misses (clockwise — lean mixture), then turn it out past smooth idling point until engine runs unevenly (rich mixture). Now turn idle valve to the midpoint between rich and lean so the engine runs smoothly. Release throttle lever.

CARBURETION

L.P. Fuel

Governed Idle

Turn idle speed adjusting screw to obtain 1600 R.P.M. while holding throttle lever against screw. Release throttle lever. Align holes in control bracket and inside lever with 1/8" diameter rod. Governor speed control lever of equipment should be in IDLE position. Adjust if necessary. Bend spring tang to obtain 1750 R.P.M. Remove 1/8" diameter rod, Fig. 109.

3

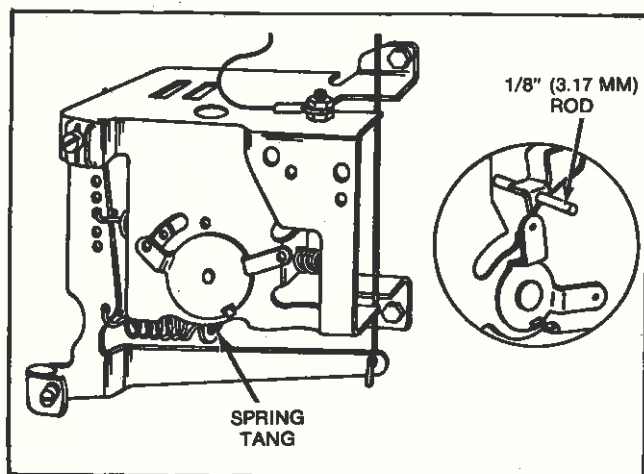


Fig. 109 — Governed Idle Adjustment

Needle Valve Mixture (High Speed)

Move governor speed control lever to "FAST" position. Turn needle valve in until engine slows or misses (lean mixture), then turn it out past the smooth operating point until engine runs unevenly (rich mixture). Now turn needle valve to the midpoint between rich and leans so the engine runs smoothly, Fig. 108.

Engine should accelerate smoothly. If engine does not accelerate properly, the carburetor should be re-adjusted usually to a slightly richer mixture.

L.P. GAS FUEL SYSTEM

The following information is provided to assist you in servicing LP gas fuel systems. This information applies only to Garretson Equipment Company systems installed by Briggs & Stratton. For parts information refer to MS-3915. Parts for the Garretson system must be obtained from a

Garretson parts distributor. For information about LP conversion kits, contact:

Garretson Equipment Co., Inc.
Box 111
Mount Pleasant, Iowa 52641
or
Beam Products Manufacturing Co.
3040 Rosslyn Street
Los Angeles, California 90065

For LP fuel systems not covered in this section contact the manufacturer of the fuel system.

WARNING: LP gas fuel system should only be worked on in a very well ventilated area. Many state, county and city governments require that service be performed only outdoors. Before loosening any fuel line connections, have a fan blowing directly across the engine.

Checking and Adjusting Fuel System

Loosen fuel line at primary regulator. Open valve on cylinder for an instant, to be sure there is pressure in fuel cylinder. Escaping gas can be heard. Shut off valve at cylinder, Fig. 110, page 32.

Remove fuel line between primary and secondary regulator (fuel controller). Attach pressure gauge to outlet of primary regulator, leaving gauge connection loose enough to permit a slight leakage of gas. (This will permit adjustment of regulator under conditions of actual gas flow.) Remove cap or top of primary regulator, Fig. 110.

Open fuel cylinder valve. Turn pressure regulating screw in primary regulator, until a pressure of 1-1/2 pounds is obtained at pressure gauge. Shut off fuel cylinder valve. Re-assemble cap. Remove pressure gauge. Loosen secondary regulator bracket from carburetor. Pull secondary regulator away from carburetor so that short rubber fuel line is disconnected. Assemble fuel line between primary regulator and secondary regulator (fuel controller). Secondary regulator must remain mounted so the diaphragm is in a vertical plane, Fig. 110.

Open fuel cylinder valve. Apply soap suds to outlet at the center of secondary regulator to which rubber fuel line has been attached. If a bubble forms, it indicates that the valve is leaking or not locking off. If no bubble appears, press the primer button. A bubble should appear,

indicating fuel is flowing into regulator. Put soap suds on the outlet again. Then slowly turn adjusting screw at bottom of secondary regulator counterclockwise until a bubble forms at the outlet. Then turn adjusting screw in (clockwise) slowly until soap bubbles on outlet no longer form. Hold adjusting screw at this point and tighten locknut. Press primer button to allow fuel to flow. Release and again put soap suds on outlet to make certain the fuel shuts off. Repeat several times. If bubble should form after primer button is released, the adjusting screw should be turned in until flow stops and soap bubble does not break or enlarge. Loosen fuel line between regulators. Reassemble secondary regulator to carburetor with short rubber fuel line in place. Tighten fuel line, Fig. 110.

Adjusting Carburetor, L.P. Fuel System

See Fig. 110.

Loosen locknut on load needle screw and turn needle screw in until it seats. Do not force; open 2-1/2 turns. Turn idle needle in until it seats, then open one turn. If engine will not be required to idle, leave idle needle closed. Depress the primer button momentarily, then start engine, run engine to allow it to warm up before final adjustment. With engine running at normal operating speed, turn the load needle screw in slowly (clockwise) until engine starts to miss (lean mixture). Then turn load screw out slowly past the point of best operation until engine begins to run unevenly (rich mixture). Then turn load screw in just enough so engine will run smoothly. Hold load screw and tighten locknut. Hold throttle at idle position, then release throttle. Engine should accelerate quickly and smoothly.

If engine will be required to run at idle, turn the idle speed adjusting screw on throttle until engine runs at proper idle speed for engine model. See Check Chart. Hold throttle at this point and turn the idle slowly in or out until engine runs at maximum idle speed. Then re-adjust idle speed screw until proper idle speed is obtained. Allow throttle to open. Engine should accelerate quickly and smoothly. If not, re-adjust load screw, usually to a richer mixture. To stop engine, turn off fuel supply valve at fuel cylinder.

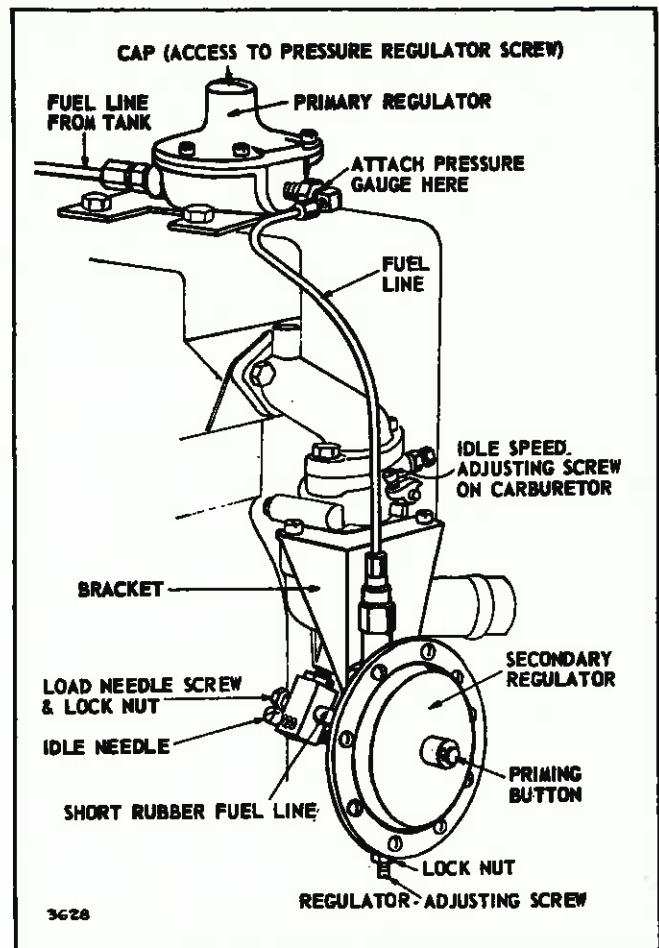


Fig. 110 — Adjusting Carburetor, L.P. Fuel System

Starting Engine

To start engine, do not use choke, but depress primer button momentarily, then start engine immediately. In cold weather, it may be necessary to partially close the carburetor choke valve to permit the engine to run smoothly until the engine warms up.

Cleaning L.P. Gas Filter (Optional)

Unscrew filter head from filter body. Remove element assembly from the head. Fig. 111. Wash the element in commercial solvent cleaner or gasoline. If the accumulated dirt is gummy, we suggest a short soaking period in solvent cleaner. The element should then be rinsed in clean gasoline and blown with compressed air.

ALWAYS USE REVERSE FLOW FROM THE INSIDE OUT. NEVER USE COMPRESSED AIR ON THE OUTSIDE SURFACE OF THE ELEMENT. NEVER DIP ELEMENT IN "BRIGHT DIP" OR OTHER ACID SOLUTION.

CARBURETION

Kerosene and Fuel Pumps

To re-assemble filter, insert element into filter head with the round washer entering first. The gasket is put on the filter body. The spring is located in the filter body so that when filter body and head are put together, the spring will hold the element against the head. Tighten body and head with 75 foot lbs. (10.4 Kg/m, 8.5 N/m) of torque. After filter has been re-assembled to engine, the point at the gasket and other line connections should be checked with soap suds, with fuel turned on, to be sure there are no leaks.

3

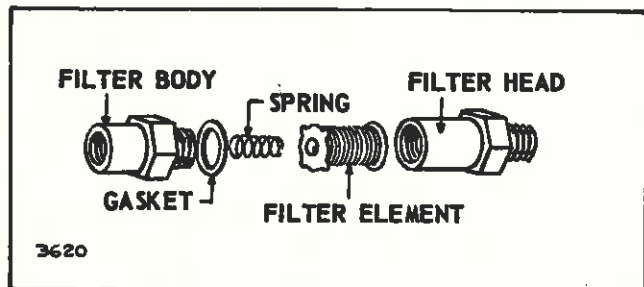


Fig. 111 — Element Assembly

KEROSENE OPERATION

Efficient engine performance will be obtained only when the following changes are accomplished:

1. A low compression cylinder head is required for models 23, 23A, 23C, 23D, 131400, 231000, 233000, and 243000. Other models may use two cylinder head gaskets.
2. A special spark plug — #291835 — must be used on models 23C, 23D, 233000, and 243000. Spark plug gap .030" all models.
3. A reduced breaker gap .015 is used on models 23C, 23D, 233000 and 243000. The engine must be retimed using the reduced breaker gap. Follow timing procedure in Ignition Section.

Power loss will vary between 15% to 25% and fuel consumption will be approximately 15% less while running on kerosene.

Fig. 112 through Fig. 115 illustrates various types of Briggs & Stratton combination fuel systems used.

Due to the low volatility of kerosene, engines operated on kerosene-gasoline fuel systems can be started on kerosene only when the engine is at operating temperature. Cold engines must be started on gasoline, and switched over to kerosene operation only after warmed up.

After warm-up and while operating on kerosene, adjust carburetor needle valves to a point where engine runs smoothest, and accelerates without hesitation when throttle is quickly opened. When shutting down engine, the carburetor must be emptied of kerosene so the engine can be started on gasoline when cold. Refer to Flo-Jet Carburetor for adjustment of carburetor and adjust carburetor while running on kerosene.

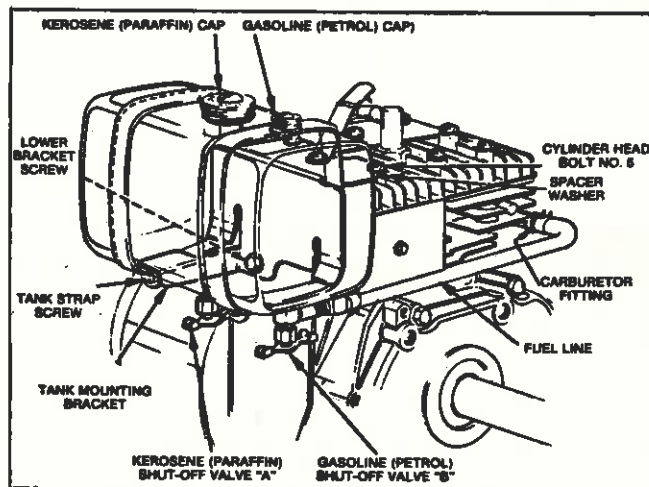


Fig. 112 — Combination Fuel Tank

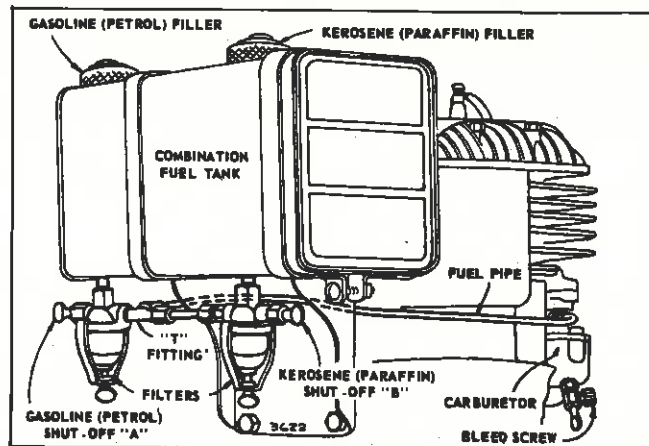


Fig. 113A — Combination Fuel Tank

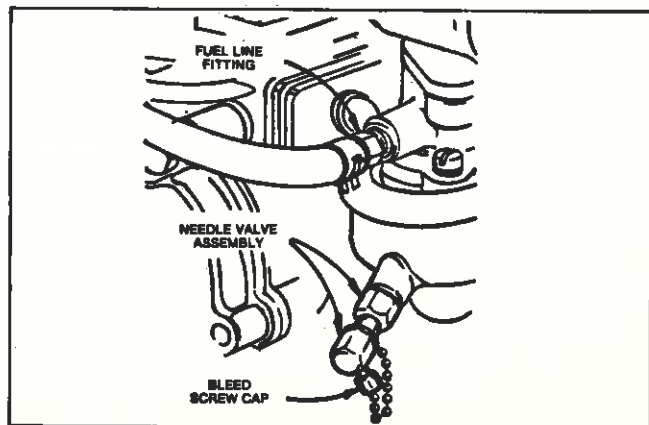


Fig. 113B — Combination Fuel Tank, Carburetor

Units equipped as per Fig. 114 and Fig. 115, close fuel filter valve and open bleed screw in needle valve to drain the carburetor. Close bleed screw. Remove wing plug to fill fuel line and carburetor with gasoline. Combination fuel tank units, Fig. 112 and Fig. 108, open gasoline shut-off valve "A," and close kerosene shut-off valve "B" two or three minutes before shutting off engine. This will stop the flow of kerosene to the carburetor, and will admit gasoline to the carburetor.

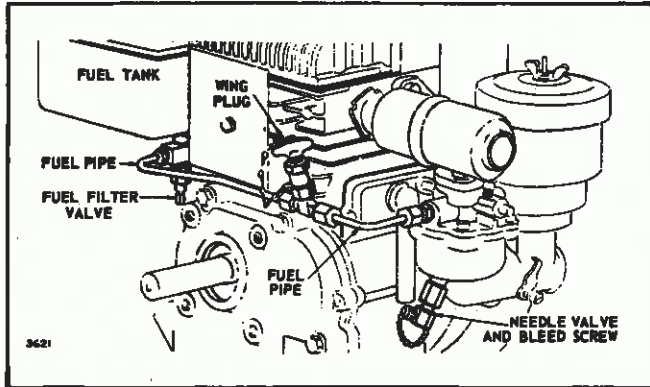


Fig. 114 — Kerosene Fuel System

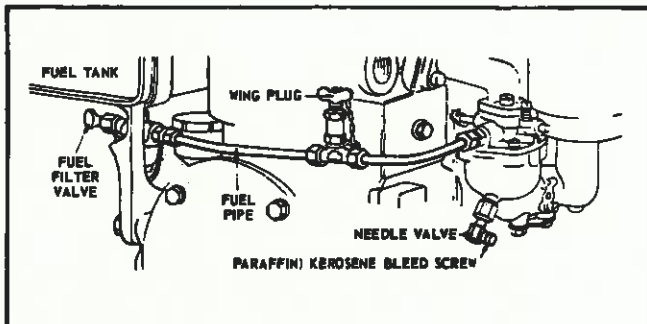
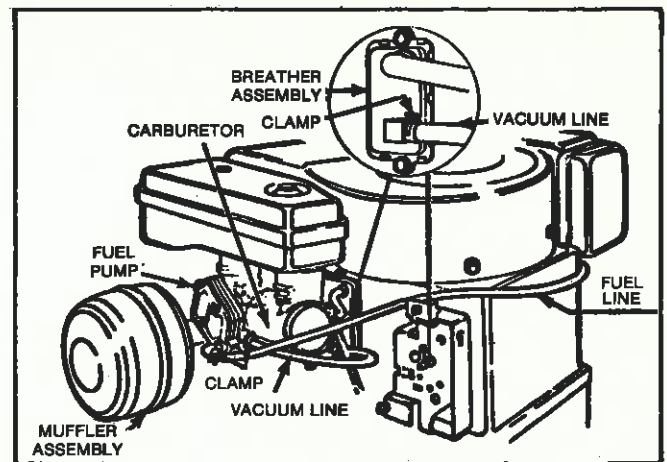


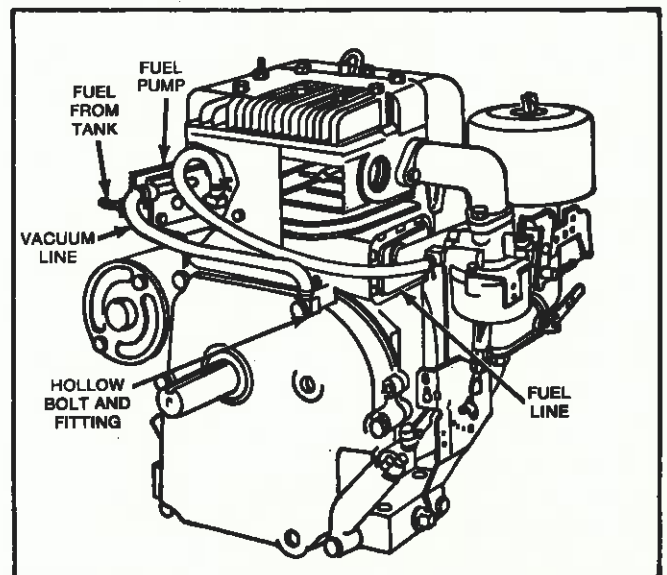
Fig. 115 — Kerosene Fuel System

Fuel Pumps (Crankcase Vacuum Operated)

Some models are factory or field equipped with fuel pumps operated by crankcase vacuum. Fuel pumps may be mounted directly to the carburetor or on a mounting bracket, Fig. 116 or Fig. 117. Crankcase vacuum is obtained by a fitting on the dipstick tube, Fig. 118, a hollow bolt and fitting, Fig. 117, or from the crankcase breather valve, Fig. 116.



**Fig. 116 — Pump on Carburetor,
Breather Valve Vacuum**



**Fig. 117 — Pump on Bracket,
Vacuum thru Hollow Bolt**

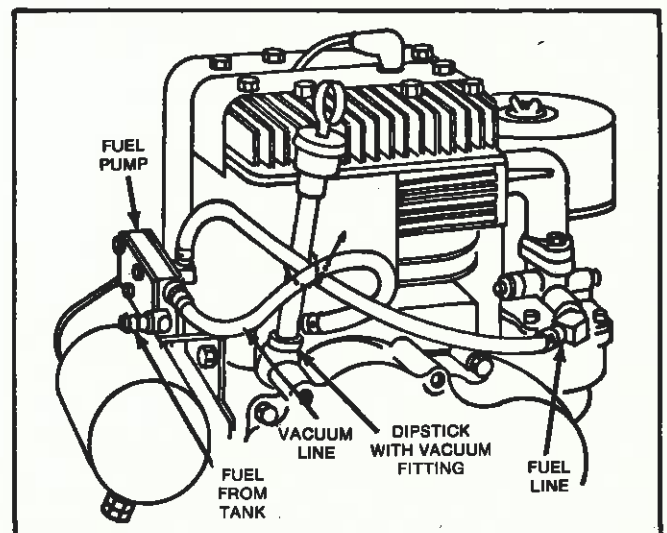


Fig. 118 — Vacuum from Dipstick Tube

CARBURETION

Fuel Pumps

Operation

Operation of the fuel pump is illustrated in Figs. 119, 120 and 121. Any restriction in the fuel or vacuum lines will affect operation. Also any leaks that cause air to get into the fuel line or reduce vacuum in the vacuum line will reduce performance.

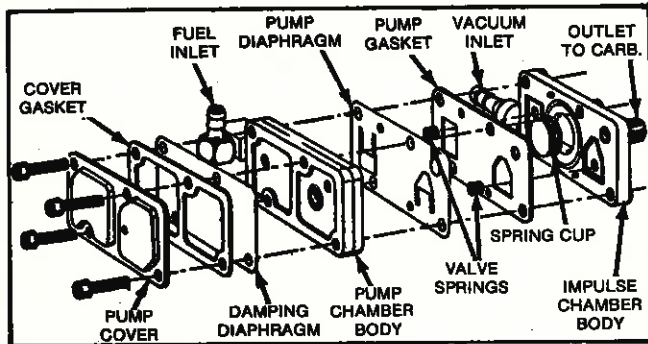


Fig. 119

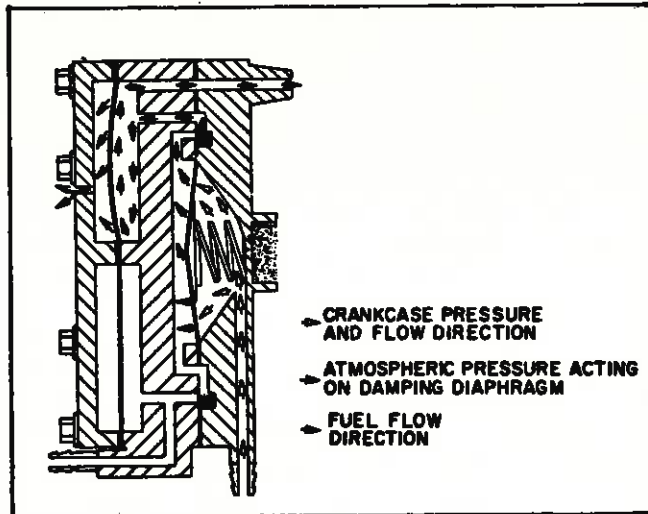


Fig. 120 — Fuel Flow with Crankcase Pressure

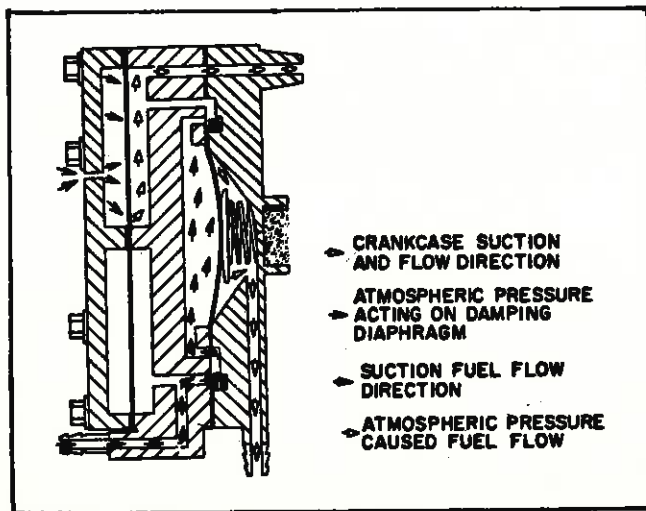


Fig. 121 — Fuel Flow Crankcase Vacuum

To service fuel pump, pump should be removed from carburetor or mounting bracket. When removing fuel supply line from tank to pump, be sure to plug fuel line or turn off fuel valve, if so equipped.

Disassemble fuel pump by removing four (4) 1/4" head cap screws from pump cover. Separate pump cover, pumping chamber and impulse chamber. Discard old gaskets, diaphragms and springs. Clean pump parts in carburetor solvent or lacquer thinner.

A repair kit is available. See Illustrated Parts Lists. The kit includes all parts needed. Install chamber gasket using locator pins. Place springs in spring recesses and install pump diaphragm locator pins. Place pump chamber body on impulse body using locator pins. Place damping diaphragm and cover gasket on pump body. Install cover and four (4) screws. Torque screws to 10-15 in. lbs. (.12-.17 mkp, 1.13-1.69 Nm). See Fig. 119 for exploded view.

FUEL PUMPS, ECCENTRIC OPERATED To Replace Pump Diaphragm

Remove pump from cylinder and then remove four screws to separate pump head from pump body.

With a narrow punch, drive lever pin out until pump lever is loose. Pin may then be driven in either direction, but need not be removed entirely. Remove old diaphragm, but leave diaphragm spring in pump body.

Place new diaphragm into pump body with the slot in shaft at right angles to the pump lever. Diaphragm spring should fit into the cup under the diaphragm. Without the lever spring, insert the pump lever into body holding the diaphragm down. Fit the hook at the end of lever into the slot in diaphragm shaft. Fig. 122.

Assemble Fuel Pump

Align holes in lever and body, then drive lever pin into place. Place lever spring into body with inner end of spring over the projection in pump body, then use a screw driver to force outer end of spring into body until it slips over the projection on lever. Fig. 122, Illus. 2. Place pump head on body and partially insert the four screws. Press pump lever down as far as possible and then tighten the four screws.

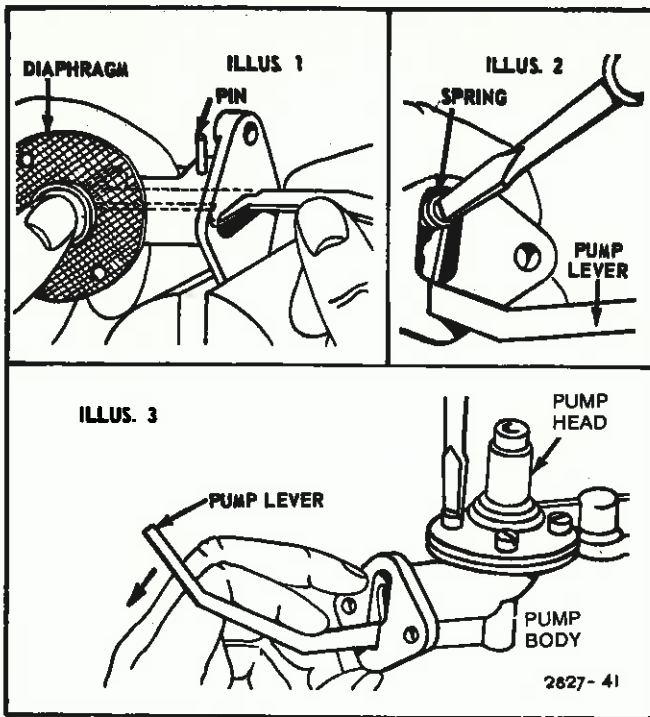


Fig. 122 — Fuel Pump

To Install Fuel Pump

Place a liberal supply of grease or gear lubricant on the portion of fuel pump lever that contacts the crankshaft. Fig. 123. Assemble fuel pump to cylinder using new gasket. Keep mounting face of fuel pump parallel to mounting face of cylinder while inserting lever of fuel pump. The lever must ride in the narrow groove which is located on the crankshaft between the gear and the counterweight. Revolve crankshaft to be sure that fuel pump is correctly installed. Assemble fuel pipe from outlet of carburetor. Fuel supply pipe should be connected to the inlet of the fuel pump.

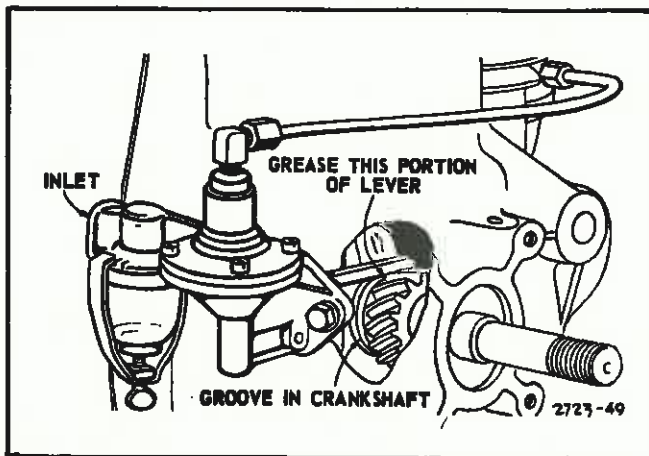


Fig. 123 — Installing Fuel Pump

AUTOMATIC CHOKE

Automatic Choke Adjust

Hold choke shaft so thermostat lever is free. At room temperature the screw in the thermostat collar should be in the center of the stops, if not, loosen stop screw and adjust.

Loosen set screw on lever of thermostat assembly. Slide lever to right or left on shaft to insure free movement of choke link in any position. Rotate thermostat shaft clockwise until stop screw strikes tube. Fig. 124. Hold in position and set lever on the thermostat shaft so that choke valve will be held open about 1/8" from closed position. Then tighten set screw in lever.

Rotate thermostat shaft counterclockwise until stop screw strikes the opposite side of tube. Fig. 124. Then open choke valve manually until it stops against the top of the choke link opening. The choke valve should now be open approximately 1/8" as before.

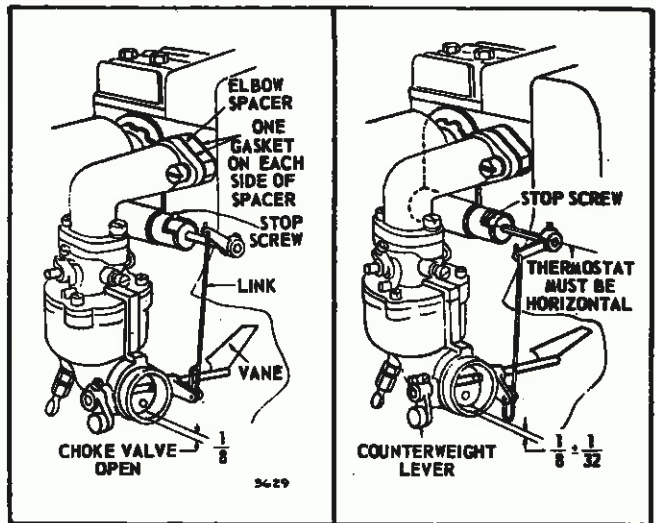


Fig. 124 — Adjust Automatic Choke

Check position of counterweight lever. With the choke valve in wide open position (horizontal) the counterweight lever should also be in a horizontal position with free end toward the right.

Operate the choke manually to be sure that all parts are free to move without binding or rubbing in any position.

