

FUEL SYSTEM

CARBURETOR (GASOLINE)

Downdraft and sidedraft carburetors are used on the two cylinder engines. Carburetors are adjusted in the factory, and under normal conditions, require no further adjustment unless one of the following conditions is noted: Before readjusting carburetor, check condition of air cleaner--an "over-rich" mixture is often caused by a poorly serviced, clogged air cleaner element. Also check for leaking intake manifold or poor ignition which could also cause some of the conditions.

<u>CONDITION</u>	<u>POSSIBLE CAUSE/PROBABLE REMEDY</u>
A. Black, sooty exhaust smoke, engine sluggish.	A. Mixture too rich - readjust main fuel needle.
B. Engine misses and backfires at high speed.	B. Mixture too lean - readjust main fuel needle.
C. Engine starts, sputters and dies under cold weather starting.	C. Mixture too lean - turn main fuel adjustment 1/4 turn counterclockwise.
D. Engine runs rough or stalls at idle speed.	D. Idle speed too low or improper idle adjustment - readjust speed then idle fuel needle if needed.

Two types of sidedraft carburetors are used. One type has external adjustments for Main Fuel and Idle Fuel. The other is a fixed main jet type which has an external adjustment for the Idle Fuel needle only. On fixed jet carburetors, main fuel adjustment is possible only by changing to a discharge jet of different size. If an engine with fixed jet carburetor is to be operated at high altitudes (above 6000 feet) the standard jet should be replaced by a special 6000' jet. Another special jet is available for operating at 12,000 feet above sea level. See parts manual for correct part numbers.

Carburetor Adjustment: Maximum power and efficiency are possible only with proper carburetion. Improper carburetor adjustment can lead to overheating, fouled spark plug, excessive valve wear and other problems. Do not neglect carburetor if any of the above problems persist. The following adjustment procedure is for sidedraft and downdraft gasoline carburetors--see Special Fuel System Section for procedure on other types of carburetors.

STEP 1 - Stop engine and carefully turn Main Fuel and Idle Fuel Needle adjusting screws all the way in (clockwise direction) until they bottom gently--DO NOT FORCE SCREWS as this will damage the needle valves.

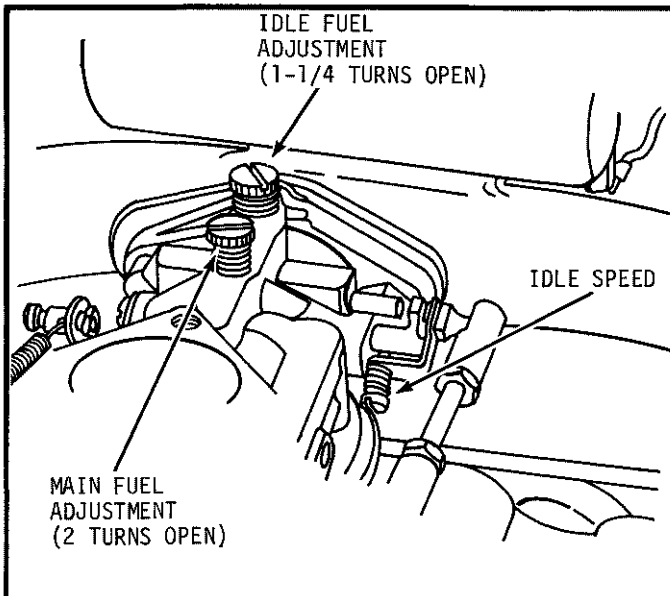


FIGURE 4-1 -- ADJUSTMENTS, TYPICAL SIDEDRAFT CARBURETOR (K482, K532)

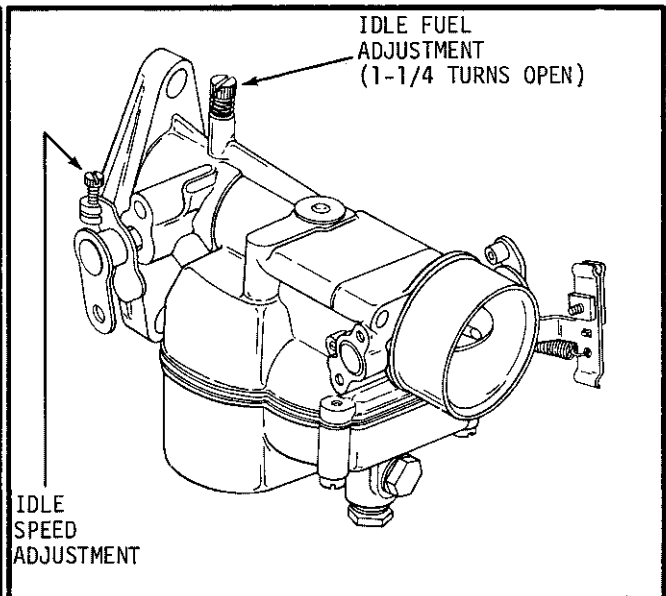


FIGURE 4-2 -- ADJUSTMENTS, FIXED MAIN JET CARBURETOR

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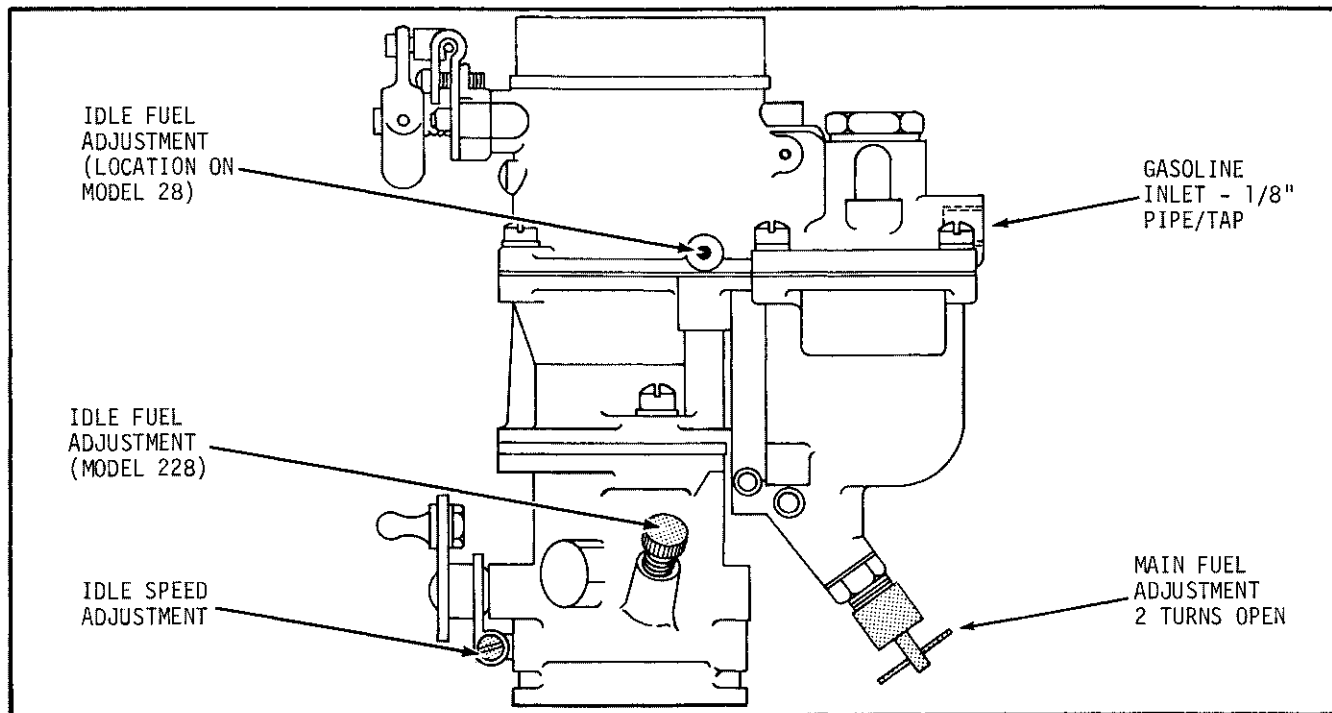


FIGURE 4-3 -- ADJUSTMENTS, DOWNDRAFT CARBURETOR MODELS 28 AND 228, K662 ENGINES

- STEP 2 - For preliminary adjustment, turn Main Fuel needle 3 turns in a counterclockwise direction, turn Idle Fuel needle 1-1/4 turns in a counterclockwise direction.
- STEP 3 - Start engine and operate at normal speed until normal operating temperatures are reached.
- STEP 4 - Main Fuel Adjustment - With engine operating at full throttle and full load, turn Main Fuel Needle in (clockwise) until engine slows down (lean), note position of screw, then turn needle out (counterclockwise) until engine regains speed and then again slows down (overrich). Turn needle back in until it is positioned halfway between lean and overrich settings. If adjusted properly, the engine should accelerate smoothly and operate with steady governor action.
- STEP 5 - Idle Fuel Adjustment - Operate engine at idle speed of about 1000 RPM (adjust Idle Speed screw until this speed is attained - check with tachometer). Turn Idle Fuel Needle in (clockwise) until engine slows down and idles rough then turn screw out until engine speeds up and idles smoothly at the desired idle speed.
- STEP 6 - Final Adjustment - Since main fuel and idle fuel adjustment have some effect on each other, recheck engine and make final adjustments as necessary to achieve smoothest operation.
- NOTE: If the preceding steps do not remedy problems attributed to carburetor, carburetor reconditioning may be necessary.

Carburetor Reconditioning: Hard starting, loss of power and rough idle are some of the problems that can be attributed to improper adjustment or dirt, gum or varnish deposits within the carburetor. If a problem still exists after carburetor is readjusted, the carburetor should be disassembled and thoroughly cleaned. This should also be done as a regular pre-season service after engine has been stored for a considerable length of time.

All parts should be cleaned in solvent. Gum is easily removed with alcohol or acetone solvent. Be sure carbon deposits are removed from bore especially in area where throttle plate seats in casting. Blow out all passages with compressed air. DO NOT use wire brush or drill to clean out jets. Replace all worn and damaged parts. Always use new gaskets. Carburetor repair kits are available for most carburetors--kits include bowl nut gaskets (when required) bowl ring gasket, float pin, bowl baffle gasket, and fuel inlet needle and seat.

Disassembly - Side Draft Carburetor (A-277061)

1. After removing carburetor from engine, remove bowl nut and separate bowl from carburetor body. Remove and discard bowl ring and bowl baffle gaskets.
2. Remove float pin and float. Check for dents, leaks and excessive wear on float in needle valve contact area. Check pin brackets for wear. Replace float as necessary.
3. Remove and discard fuel inlet needle, needle seat and gasket. Any wear on needle or seat can cause improper fuel level--always use new parts.
4. Remove idle and main fuel adjusting needles and springs. Inspect needle points--replace needle if chipped or grooved.
5. DO NOT REMOVE choke and throttle plates and shafts. If these parts are worn or damaged, replace carburetor.
6. Thoroughly clean carburetor per instructions in reconditioning paragraph.

Reassembly - Side Draft Carburetor (A-277061)

1. Install new fuel inlet needle seat, gasket and fuel inlet needle.
2. Install float and float pin. Invert casting so that float lip rests lightly against fuel inlet needle. There should be 1/64" (plus or minus 1/32") clearance between machined surface of casting and free end of float (side opposite needle seat). Adjust clearance by carefully bending float lip with needle nose pliers.
3. Install new baffle gasket, bowl ring gasket then install bowl and secure with bowl nut (with bowl nut gasket in place and centered properly).
4. Install idle fuel and main fuel needles and springs. Turn needles in until they bottom gently then back out 2 turns on main fuel needle and 1-1/4 turns on idle fuel needle for preliminary adjustment. DO NOT use force on needles.

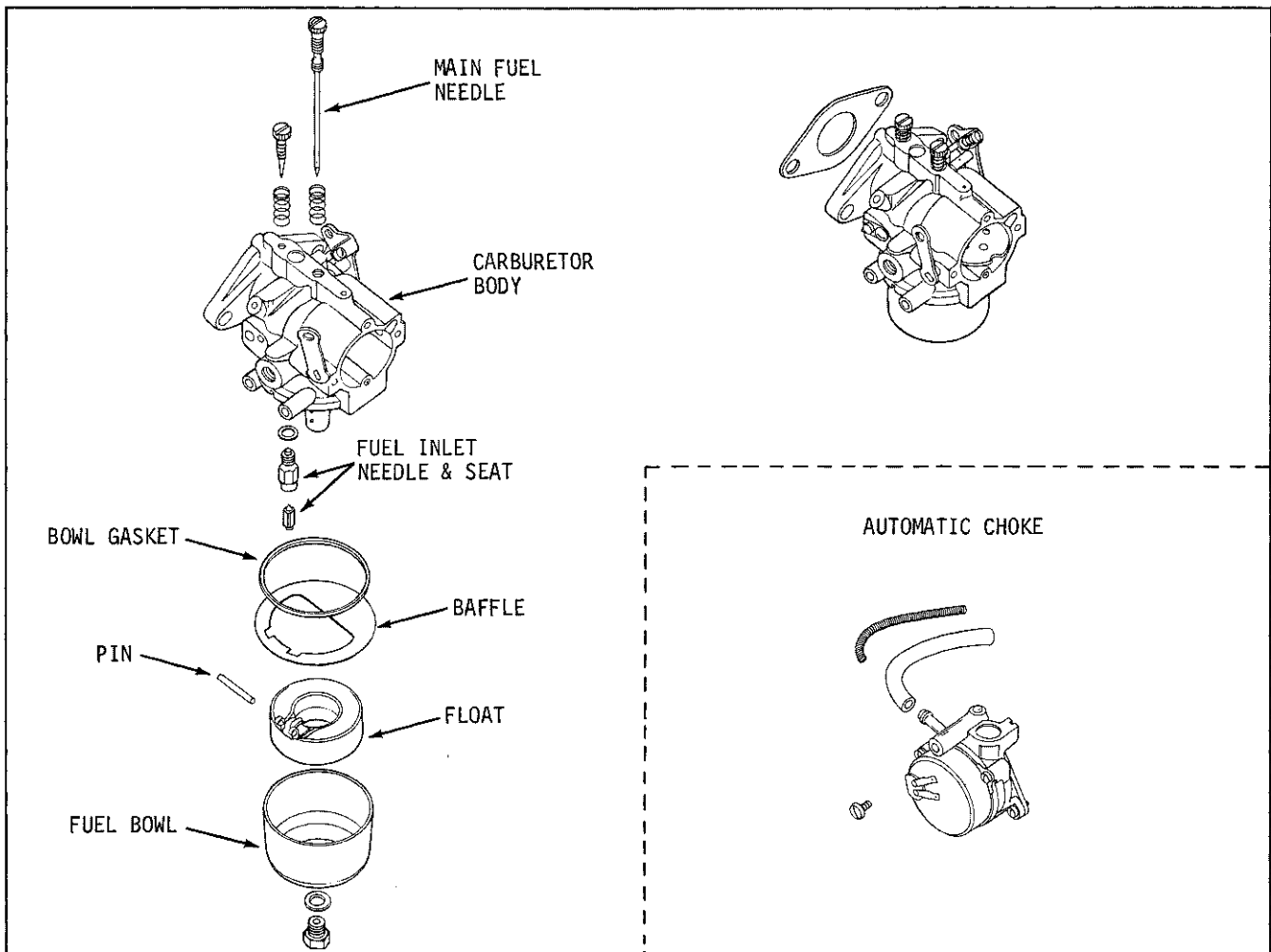


FIGURE 4-4 -- DISASSEMBLED VIEW -- SIDEDRAFT CARBURETOR

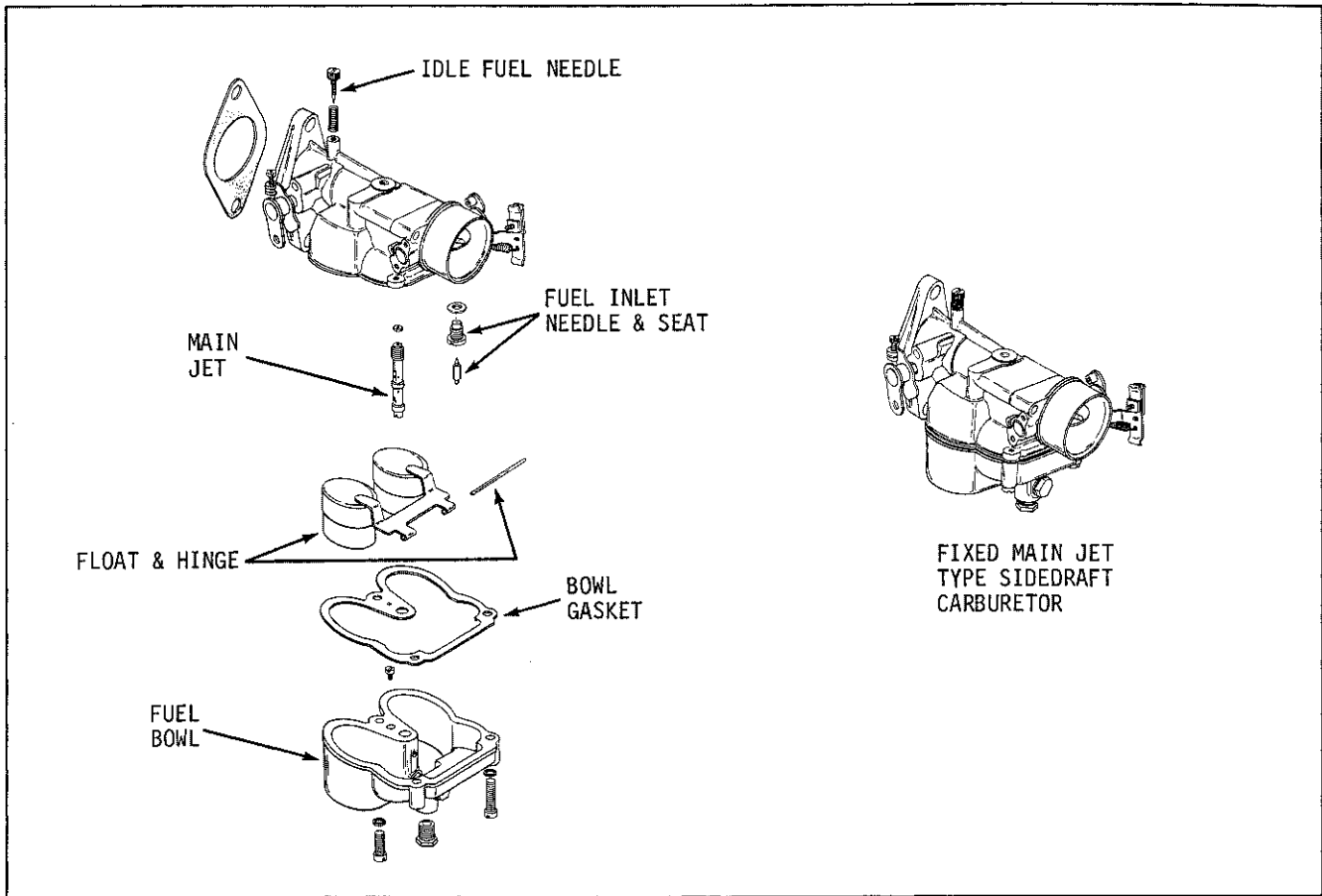


FIGURE 4-5 -- DISASSEMBLED VIEW -- TYPICAL FIXED MAIN JET CARBURETOR

Disassembly - Fixed Main Jet Type Side Draft Carburetor

1. After removing carburetor from engine, remove capscrews on bowl and remove bowl assembly. Remove and discard bowl gasket.
2. Remove float pin and float. Replace float if dented, leaking or if worn excessively in area where fuel inlet needle seats against bowl bracket.
3. Carefully remove discharge tube and rubber (or fibre) seal.
4. Remove idle fuel needle and spring. Replace needle if nicked or grooved.
5. Do not remove throttle or choke plate and shaft assemblies. Replace carburetor if these parts worn or damaged.
6. Clean carburetor as directed in reconditioning paragraph.

Reassembly - Fixed Jet Type Side Draft Carburetor

1. Position seal and install main discharge tube.
2. Install gasket and fuel inlet needle seat and fuel inlet needle.
3. Invert carburetor body and install float and float pin. Hold in inverted position and measure distance between machined surface (no gasket) and top of floats. This should be $31/32''$ (plus or minus $1/32''$) at highest point. If float position off more than $1/16''$, replace float. To adjust, use long nose pliers and bend bracket close to float body--each float must be set individually.
4. Install new bowl gasket then install bowl. Secure bowl with three capscrews--install shorter screw at throttle plate end of carburetor.
5. Install idle fuel needle and spring. Turn needle all the way in until it bottoms gently. Then back out $1-1/4$ turns for initial adjustment. **DO NOT FORCE IDLE ADJUSTMENT SCREW** as this will damage needle point.

Disassembly - Fixed Jet Type Side Draft Carburetor (B-272041)

1. Remove carburetor from engine. Remove bowl assembly from body.
2. Remove float pin, float and needle. Check float for dents, leaks and wear on float lip or in float pin holes.
3. Remove discharge tube being careful not to lose rubber or fibre seal. Remove idle adjusting needle and spring. Do not remove choke and throttle valves and shafts.

Reassembly - Carburetor (B-272041)

1. Replace discharge tube. Be sure seal is in place.
2. Place bowl gasket in position.
3. Install needle float and float pin. Set float level with carburetor body inverted and float resting lightly against needle in its seat. There should be 1-1/4" between machined surface of casting (no gasket) and top of float. Float should be level from one side to the other. Adjust by bending float lever close to body with needle-nose pliers.
4. Assemble fuel bowl to body.
5. Install idle mixture screw. Back out 1-1/4 turns after seating.

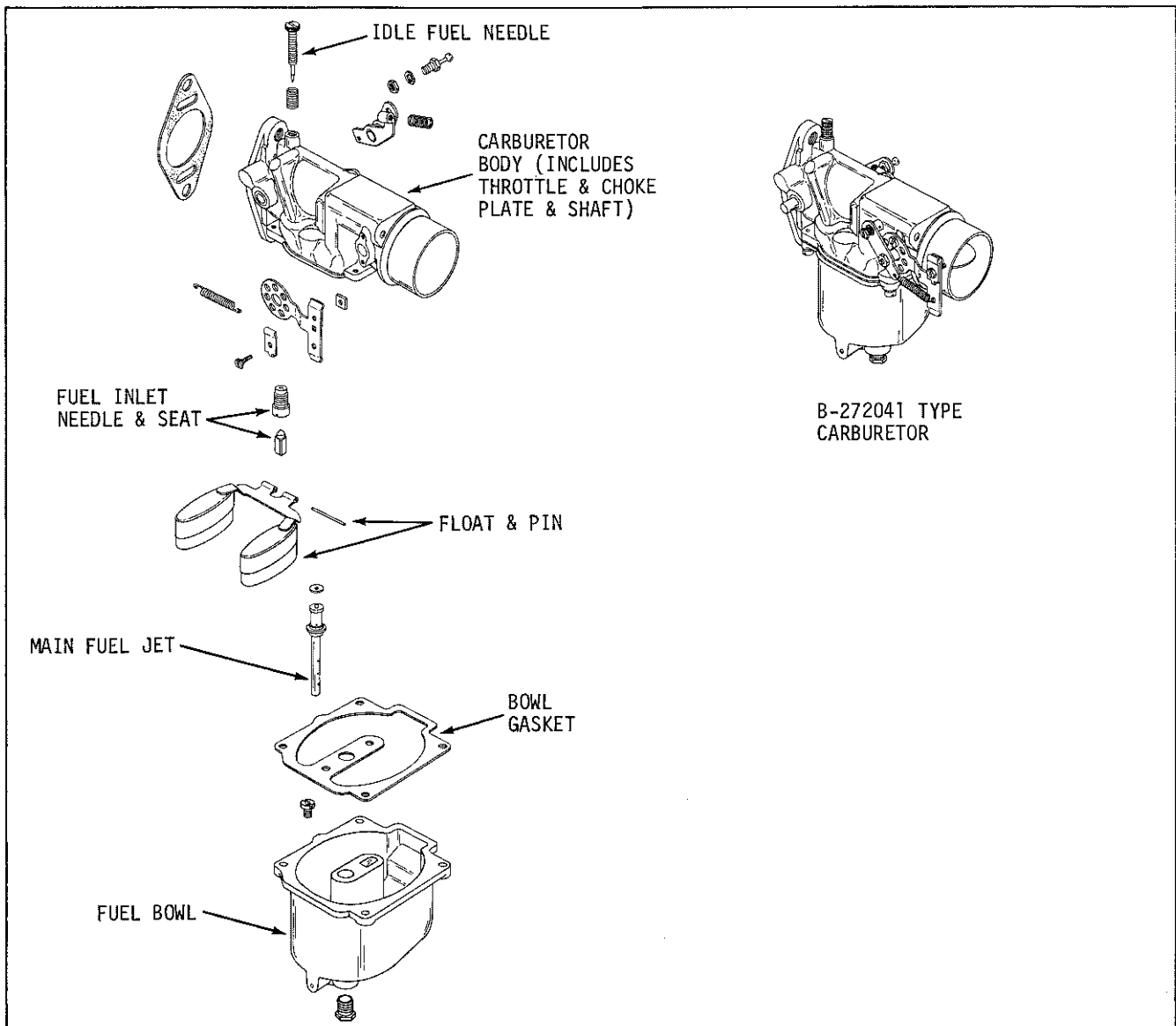


FIGURE 4-6 -- DISASSEMBLED VIEW -- B-272041 TYPE FIXED JET CARBURETOR

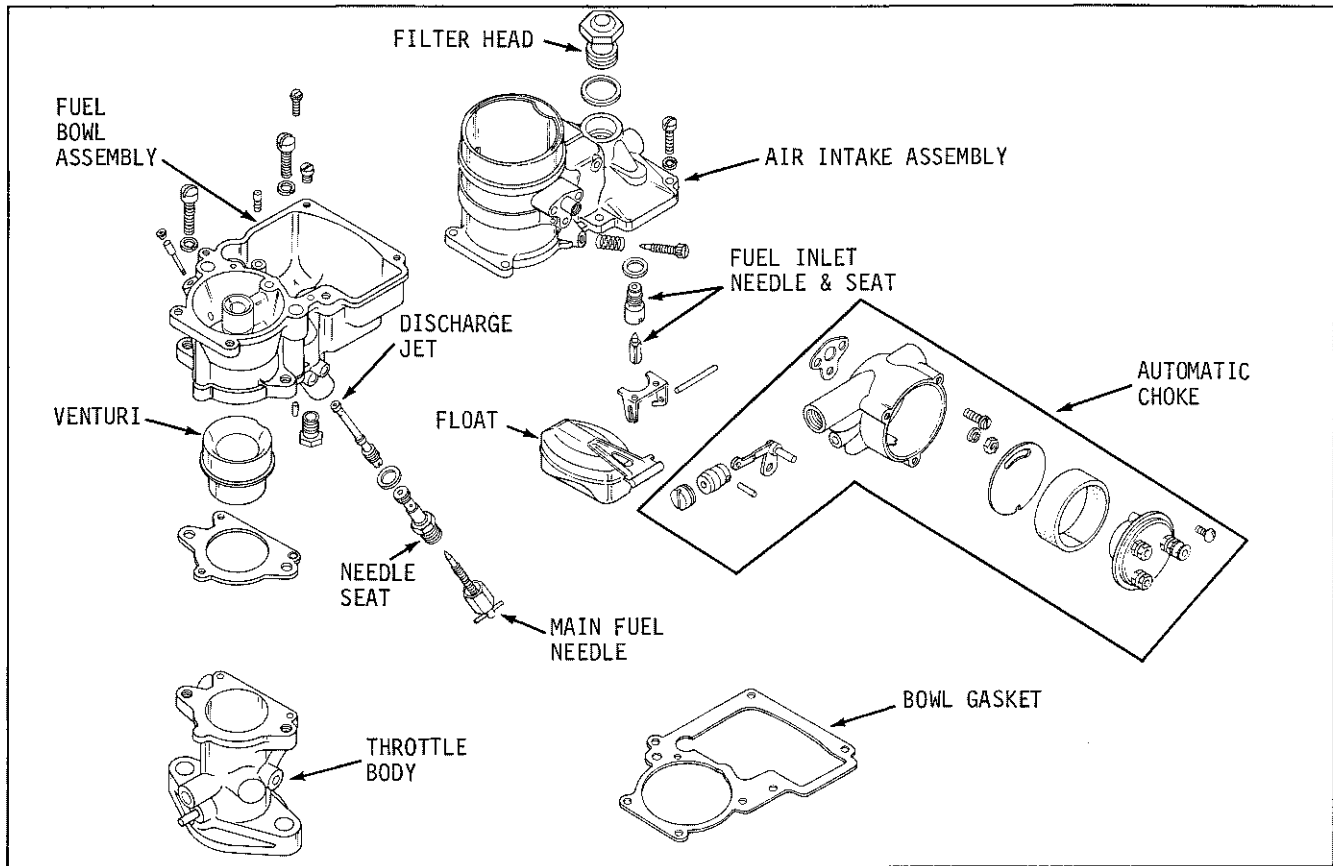


FIGURE 4-7 -- DOWNDRAFT CARBURETOR -- K662 (ZENITH TYPE)

Disassembly - Down Draft Carburetor

Several different types of down draft carburetors are in use on K662 engines. The most common are the Zenith Model 28 (Kohler 270374) and Model 228 (Kohler 270864) carburetors. The main difference between these two models is that the idle fuel adjusting screw is on the air intake (choke) segment of the Model 28, while this same adjusting screw is located in the throttle segment of the Model 228. The 228 uses a two hole idle system which calls for the lower position of the idle needle. The same general reconditioning procedure can be followed for both carburetor models. Use service repair kit when reconditioning. After carburetor is disconnected and removed from engine, disassemble as follows:

1. Remove capscrews holding air intake assembly to fuel bowl assembly. Lift air intake assembly off--use care to avoid bending float as assembly is removed. Remove and discard gasket.
2. Remove capscrews and separate fuel bowl assembly from throttle assembly.

Service each assembly separately per the following instructions:

Air Intake Assembly:

1. Remove float pin and float. Inspect float--discard if dented, cracked or leaking.
2. Remove and discard fuel valve, seat and gasket. (Always replace these parts.)
3. Remove and inspect idle fuel needle--replace if nicked or if ridges are present.
4. Remove and clean filter head.
5. Do not remove choke plate or shaft--if worn or damaged, replace air intake assembly.
6. If automatic choke is used, partially disassemble this unit to allow cleaning along with air intake assembly. (see Choke instructions for procedure.)
7. Thoroughly clean assembly then reverse procedure and reassemble--use new gaskets, fuel valve, etc. Fuel float level should be adjusted just prior to reassembly of carburetor sub-assemblies.

Fuel Bowl Assembly:

1. Remove main jet adjusting needle and main fuel needle seat. Inspect these parts and replace if nicked, grooved or otherwise damaged.
2. Wash assembly in clean solvent, blow out ports, venturi, etc. with compressed air.
3. Reinstall main fuel needle seat and needle--turn needle all the way in with fingers then back off about 1-1/2 turns for preliminary adjustment.

Throttle Assembly:

1. Remove and inspect venturi for damage. Clean venturi.
2. Remove gasket (throttle body to bowl) make sure all trace of gasket material is removed from face of throttle body.
3. Do not remove throttle plate or shaft--if these parts are worn, replace with new throttle body.

After cleaning and renewing parts where required, reassemble as follows:

1. After installing new gasket, place large venturi in throttle body.
2. Position bowl assembly on throttle body and secure with capscrews.
3. Just before final assembly, set float level: Turn intake assembly upside down so that float rests lightly against fuel valve. Measure distance between machined surface of assembly and top of float--this should be 1-1/2". If adjustment is necessary, use needle-nose pliers and bend float lever up close to float body.
4. Insert gasket on fuel bowl assembly then carefully guide air intake assembly into position on fuel bowl--be careful not to hook float when installing as this may alter float setting.
5. Securely tighten air intake with capscrews to complete assembly. Adjust carburetor per previous instructions.

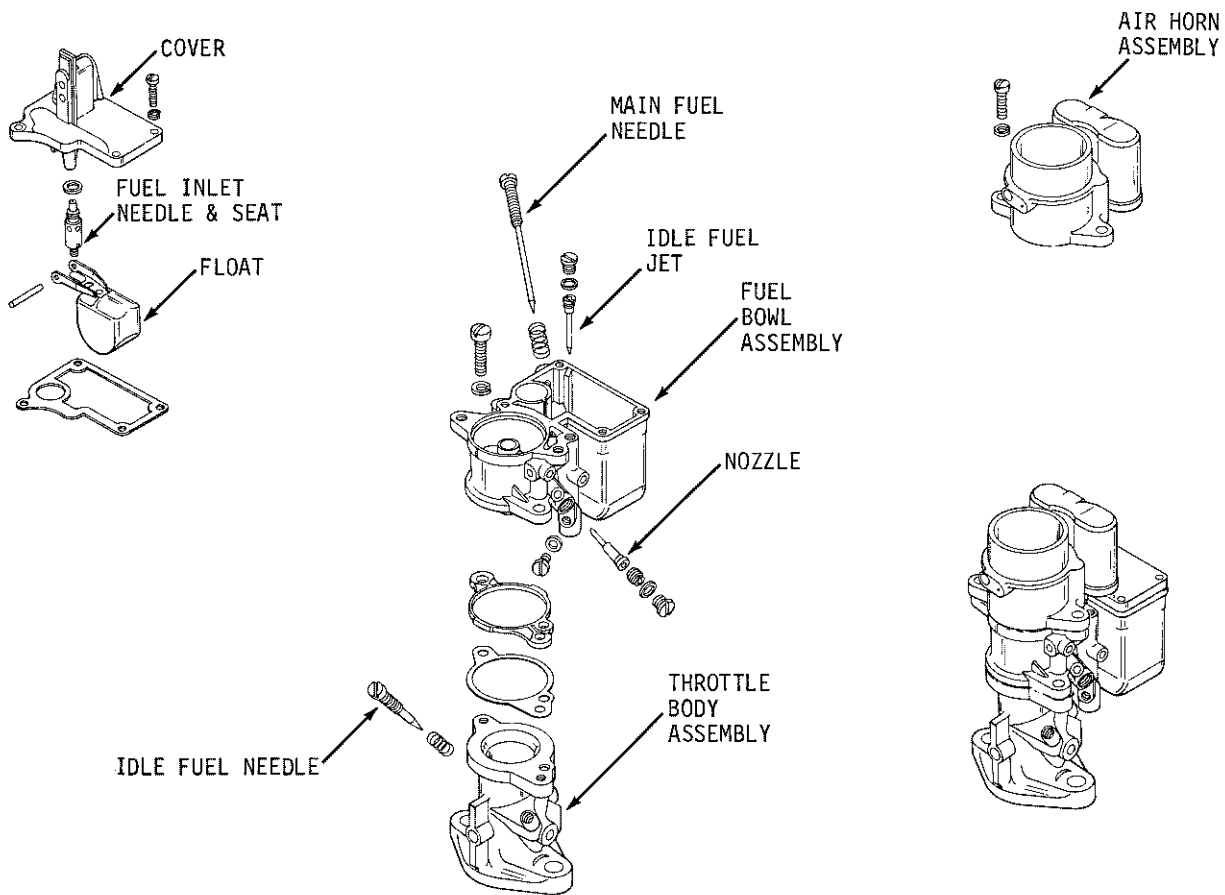


FIGURE 4-8 -- DOWNDRAFT CARBURETOR -- K662

AUTOMATIC CHOKES

Two different electric - thermostatic type automatic chokes are used on the K662 models. One type is an integral part of a special down draft carburetor while the other type is mounted on the exhaust manifold and connected through external linkage to the choke plate in carburetor.

Both types operate on the same basic principles. The electrical lead to the choke is connected so that current flows to the thermostatic element only when the ignition is turned on. Tension of the thermostatic spring is set to allow full choke at starting. Current through a heating element furnishes heat to control tension of the thermostatic spring which causes the choke plate to be gradually returned to the open position as the engine warms up.

The automatic chokes are adjusted in the factory, however, slight readjustment may be necessary initially to accommodate different starting conditions. Adjust chokes as follows:

Carburetor Unit: Choke unit is set for average conditions. To readjust to local starting conditions, loosen screws on outside of cover plate then shift cover in clockwise direction (arrow) for richer setting or in counterclockwise direction for leaner setting. Tighten cover screws after final adjustment.

Exhaust Manifold Mounted Unit: Remove air cleaner from carburetor to observe position of choke plate. Choke adjustment must be made on cold engine. If starting in extreme cold, choke should be in full closed position before engine is started. A lesser degree of choking is needed in milder temperatures. If adjustment is needed, proceed as follows:

1. Move choke arm until hole in brass shaft lines up with slot in bearings.
2. Insert #43 drill (.089) and push all the way down to engine manifold to engage in notch in base of choke unit (See Figure 4-9B).
3. Loosen clamp bolt on choke lever, push arm upward to move choke plate toward closed position. After desired position is attained, tighten clamp bolt then remove drill.
4. After replacing air cleaner, check for evidence of binding in linkage--correct if necessary. Be sure chokes are fully open when engine is at normal operating temperature.

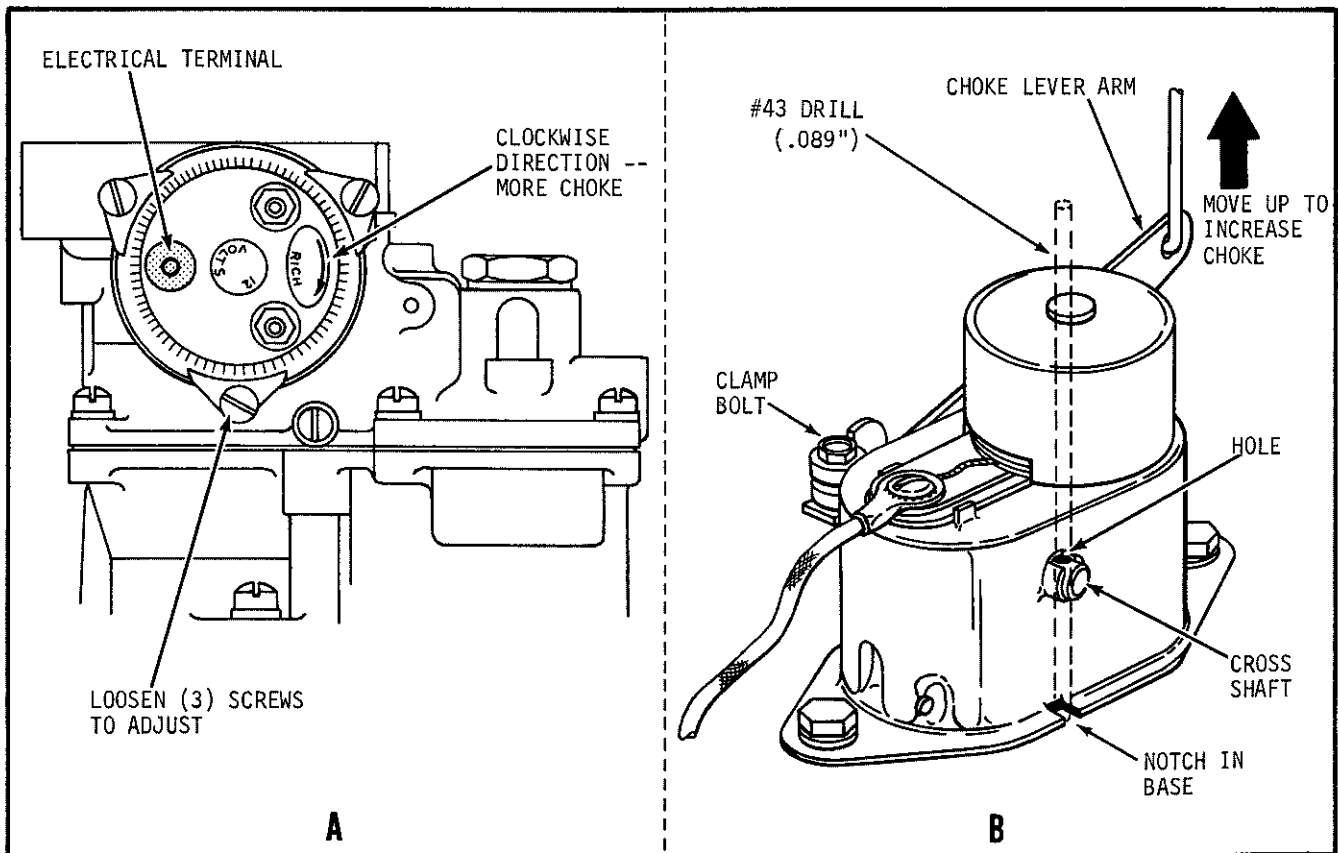


FIGURE 4-9 -- AUTOMATIC CHOKES (A) CARBURETOR UNIT -- (B) MANIFOLD UNIT

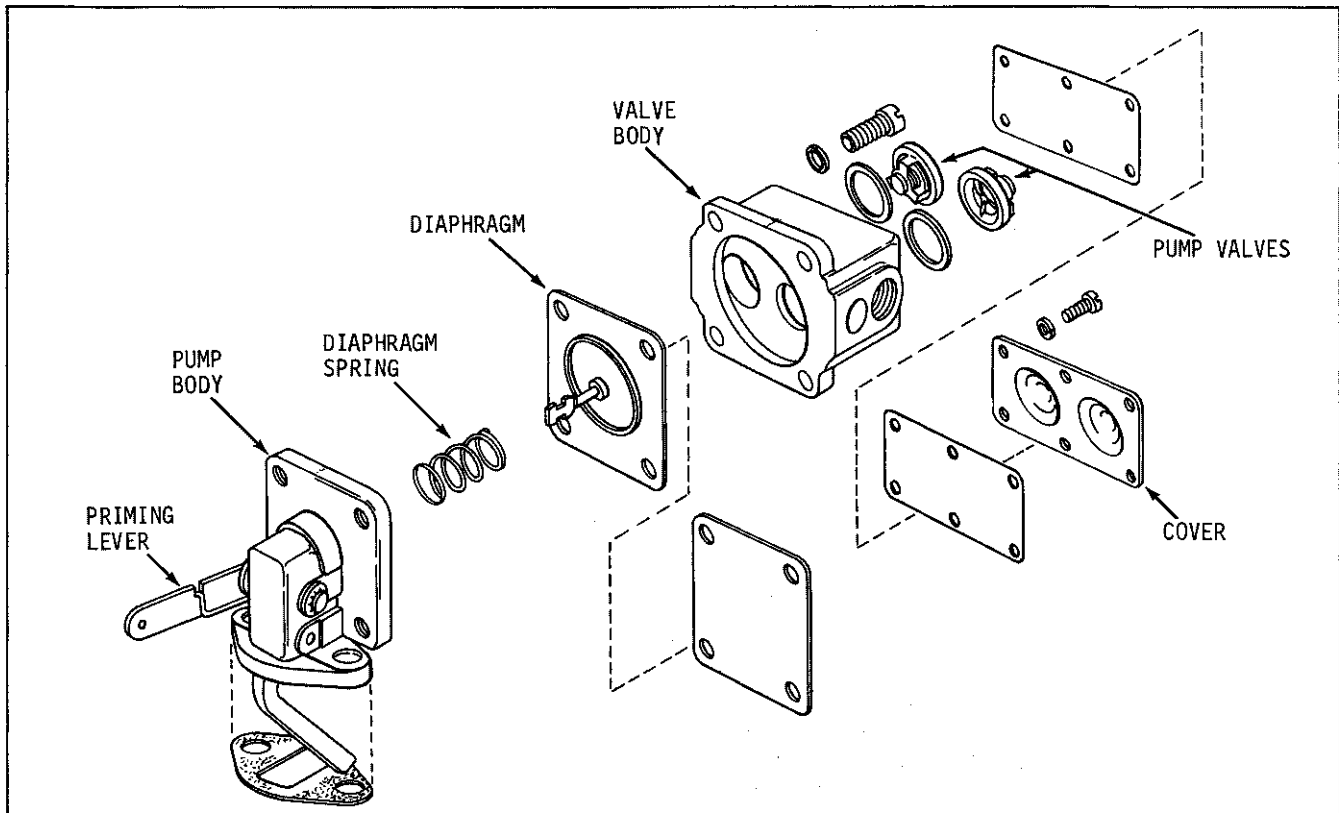


FIGURE 4-10 -- DISASSEMBLED VIEW, FUEL PUMP (K662)

FUEL PUMPS

All Kohler Two Cylinder Engines have a mounting pad and provision on top of crankcase for a mechanically operated fuel pump. Mechanical fuel pumps are furnished by Kohler--certain applications use pulse pumps which are furnished by the equipment manufacturer. The mechanical pump operates off a cam on the camshaft. The fuel pump lever rides on the cam and transmits this mechanical action to a diaphragm within the pump body. Most mechanical pumps have an external lever for priming. Repair kits are available for reconditioning fuel pumps.

Reconditioning Procedure

1. Remove fuel lines and mounting screws holding pump to engine.
2. With a file, make an indicating mark across a point at the union of fuel pump body and cover. This is a positive marking to assure proper reassembly. Remove assembly screws and remove cover.
3. Turn cover over and remove valve plate screw and washer. Remove valve retainer, valves, valve springs and valve gasket, noting their position. Discard valve springs, valves and valve retainer gasket.
4. Clean fuel head thoroughly with solvent and a fine wire brush.
5. Holding pump cover with diaphragm surface up, place new valve gasket into the cavity. Now assemble the valve spring and valves into the cavity and reassemble valve retainer and lock in position by inserting and tightening fuel pump valve retainer screw.
6. Place pump cover assembly in a clean place and rebuild the lower diaphragm section.
7. Holding mounting bracket, press down on the diaphragm to compress spring under it, then turn bracket 90° to unhook diaphragm so it can be removed.
8. Clean mounting bracket with a solvent and a fine wire brush.
9. Replace the diaphragm operating spring, stand new spring in casting, position diaphragm and press down on diaphragm to compress spring and turn it 90° to reconnect diaphragm.
10. Hold mounting bracket, then place the pump cover on it (make sure that indicating marks are in line) and insert the screws. **DO NOT TIGHTEN**. With the hand on the mounting bracket only, push the pump lever to the limit of its travel and hold in this position while tightening the four screws. This is important to prevent stretching the diaphragm.
11. Mount the fuel pump on engine, using the new mounting gaskets. Reconnect the fuel lines.

FUEL FILTERS

A sediment bowl filter may be used to trap solid impurities in the fuel. Before servicing, turn fuel off at valve located on top of filter assembly, then loosen retaining bail at bottom of fuel bowl, remove and clean bowl. If filter element is used, swish element in clean solvent. After reinstalling and opening fuel valve, use primer (if so equipped) on fuel pump to pump fuel back into bowl.