# ROCHESTER 2GC TRIPLE TWO-BARREL CARBURETOR

## DESCRIPTION

In the triple two-barrel installation three Rochester 2 jet carburetors are mounted in tandem. The center carburetor of the trio, called the primary carburetor, contains all the conventional systems of carburetion. These are the float, idle, part throttle, power, pump and choke systems. The front and rear carburetors, called the secondary carburetors, contain only the float, pump and main metering systems.

The center carburetor also incorporates a hot idle air by-pass circuit to avoid over rich idle mixtures on hot idle. When under-hood temperatures are high, the hot idle air valve, mounted vertically on the front of the carburetor, opens allowing additional air to enter the manifold below the throttle valves. To ensure that only filtered air enters the manifold, this valve is sealed off by a cover and gasket, and can, therefore, only draw air from the air horn area.

When adjusting idle, it is necessary that the valve be in the closed position. To accomplish this, a spring-loaded plunger is located in the valve cover. Depressing this plunger holds the valve closed.

The primary carburetor is the only one used during idle, warm-up, and part throttle operation. During cold engine operation, the secondary carburetors are locked out of operation by shutting off the vacuum supply. This is accomplished in the following manner:

A temperature-controlled vacuum valve (automatic transmission only) mounted at the front of the engine manifold in the water jacket, is controlled by water temperature. The thermo-controlled vacuum valve shuts off all vacuum supplied to the vacuum switch on the center carburetor, until the engine is thoroughly warmed up. When engine temperature reaches approximately 165°F., the temperature controlled vacuum valve opens, allowing vacuum to be supplied to the vacuum switch.

When the primary throttle valves are opened approximately 50° (automatic transmission only), a lever on the pump arm actuates a vacuum switch which opens a vacuum line to a vacuum diaphragm mounted on the front carburetor. The vacuum diaphragm is connected mechanically by a link to the front carburetor throttle shaft and when the diaphragm moves the throttle valves open fully. The throttle shaft on the rear carburetor is connected mechanically to the shaft on the front carburetor. Therefore, movement of the front throttle shaft is transmitted directly to the rear carburetor.

On deceleration the vacuum switch closes, shutting off all vacuum at the diaphragm. Air is then bled from inside the carburetor air horn at the front carburetor, through another line through the vacuum switch, allowing the diaphragm to return to its normal position under spring tension. This closes the throttle valves on the front and rear carburetors.

Synchro-mesh transmission-equipped vehicles have a mechanical throttle linkage. With this type of link-

age, the end carburetors can be adjusted to open at four pre-selected throttle angles of the center carburetor (Fig. 6B-101). The factory setting is $30^{0}$; however, this can be changed to suit individual preferences. A detent feel will be noted in the accelerator pedal linkage at the point the end carburetors start to open.

Since the mechanical throttle linkage does not use a temperature-controlled vacuum valve, the vehicle should be at normal operating temperature before the end carburetors are brought into use to prevent stalling.

## OVERHAUL

The three Rochester carburetors used in this installation can be overhauled, using essentially the same procedure as that followed on a standard Rochester 2GC carburetor. Operations concerning the choke, idle and part throttle systems would, of course, be omitted on the front and rear carburetors. When replacing jets and other parts, use the Master Parts Catalog for correct parts information.

## ADJUSTMENTS

### *MECHANICAL THROTTLE LINKAGE (Fig. 6B-101)*

1. Disconnect the end of throttle actuating rod which connects the throttle levers on the front and rear carburetors. With both throttle valves closed on the front and rear carburetors, the rod should center in the slot in the throttle lever. Bend the throttle rod to adjust. Connect throttle rod after adjustment.

2. Set connecting link (Fig. 6B-101) between center and rear carburetor.

3. Loosen lock nut.

4. With center carburetor manually held to wide open throttle, turn adjusting nut to give wide open throttle on rear carburetor.

5. Tighten lock nut.

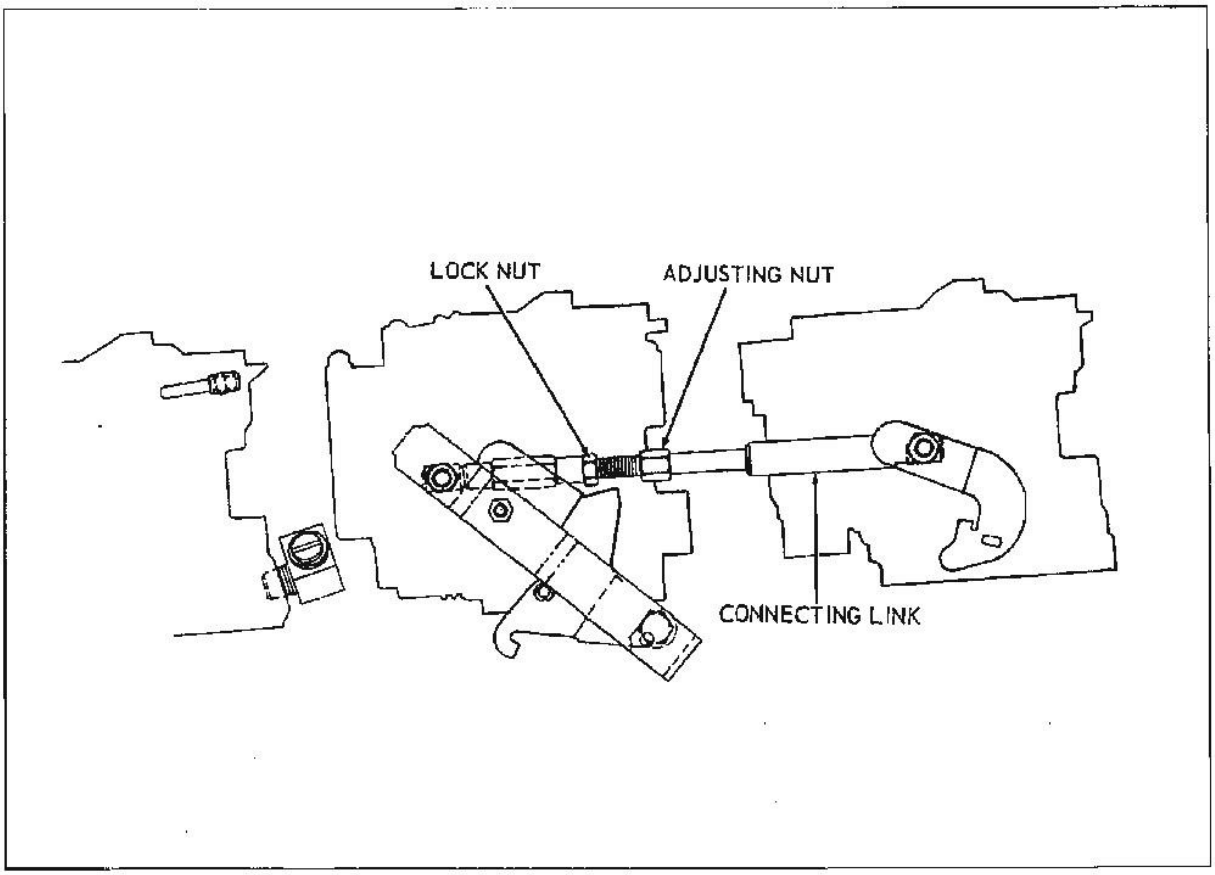


Fig. 6B-101 Mechanical Throttle Linkage - Tri-Power Synchro-mesh

### FLOAT LEVEL ADJUSTMENT—(Fig. 6B-102)

*NOTE: All float adjustments should be made with bowl cover gasket in place.*

1. Remove air horn with gasket from carburetor bowl.

2. With bowl cover inverted in a flat surface, place float level gauge on bowl cover as shown.

3. With one edge of the float gauge lying flat across the air horn gasket, the other edge should just touch the "sharp" edge of the float seam. Dimensions: center carburetor 11/16" ± 1/16"; end carburetors 21/32 ± 1/16".

### FLOAT DROP ADJUSTMENT (Fig. 6B-103)

With the air horn right side up so that float can hang free, the distance from the gasket surface to the lowest point of the float should be adjusted to the following specifications:

Minimum Drop -- 1-3/4".

Maximum Drop -- can be any amount that will retain needle for installation. Needle must not wedge at maximum drop. To adjust, bend tang at rear of float toward needle seat to decrease float drop and away from needle seat to increase float drop.

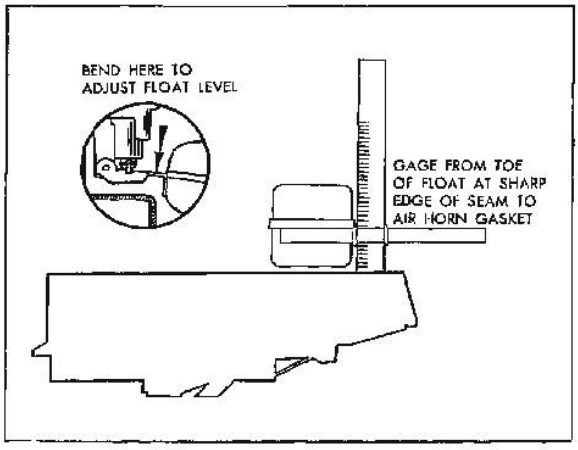


Fig. 6B-102 Float Level Adjustment

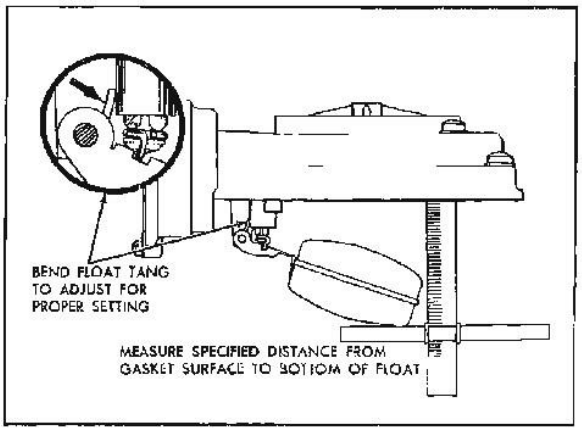


Fig. 6B-103 Float Drop Adjustment

### PUMP ROD ADJUSTMENT (Fig. 6B-104)

1. On the center carburetor, back off idle speed adjustment screw until throttle valves are completely closed.

*NOTE: When checking the pump rod adjustment, make sure that the throttle valves are completely closed.*

2. Place gauge across top of air horn ring with leg marked "pump" next to top of pump rod (Fig. 6B-104).

3. With the throttle valves closed, check the distance from top of air horn ring to top of pump rod. Gauge should just touch top of pump rod. This scale dimension should be 55/64" ± 1/16" on the end carburetors with pump rod in inner hole and 1-1/8" ± 1/16" on center carburetor.

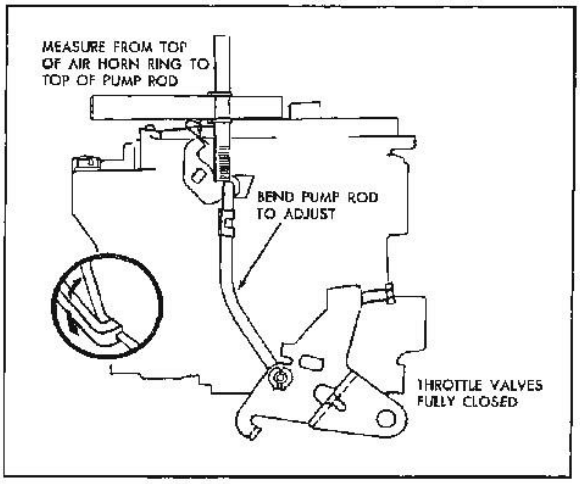


Fig. 6B-104 Pump Rod Adjustment

4. If adjustment is required, bend lower section of pump rod to obtain proper adjustment.

*NOTE: Both "center" and "end" carburetor pump rod settings can be made with the combination float, pump and vent gauge. Use side of leg marked "center" for center pump rod setting and side of gauge leg marked "end" for end carburetor pump setting.*

### IDLE VENT VALVE ADJUSTMENT CENTER CARBURETOR--(Fig. 6B-105)

1. To check and adjust the atmospheric idle vent valve, always make the accelerator pump rod adjustment first.

2. Slowly open the throttle valves to the point where the idle vent just closes.

3. With the throttle held in this position, place gauge on the top of the air horn ring as shown in Fig. 6B-105. The bottom of the gauge should just touch the top of the pump rod. The scale dimension should be 1-1/32" ± 1/64".

4. To adjust, bend vent valve-actuating tang on pump lever up or down to obtain specified dimension.

### VACUUM SWITCH ALIGNMENT AND ADJUSTMENT CENTER CARBURETOR (Fig. 6B-106) (Auto Transmission Only)

1. Open throttle to the wide open position and measure the distance from the top of the post to the top of the vacuum switch (Fig. 6B-107). This distance should be 1-9/32" ± 1/64".

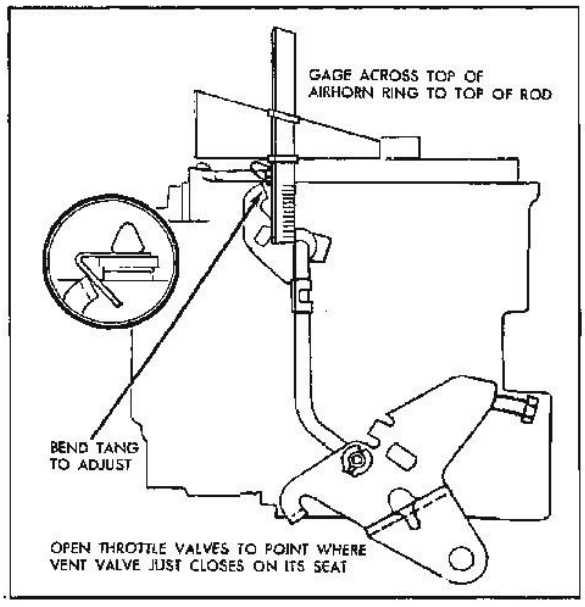


Fig. 6B-105 Idle Vent Valve Adjustment (Center Carburetor)

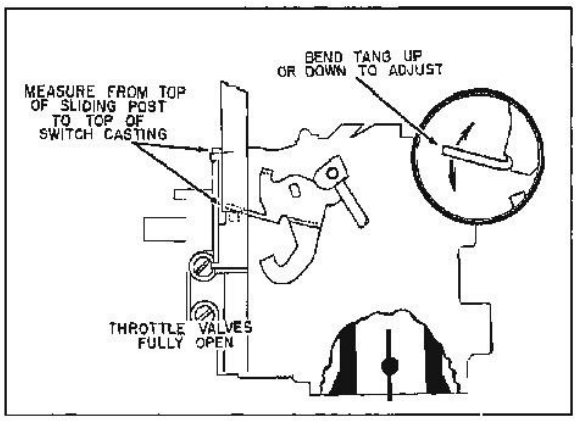


Fig. 6B-106 Vacuum Switch Adjustment (Center Carburetor)

2. If adjustment is required, loosen switch attaching screws and move switch up or down to correct.

*CAUTION: Be careful not to bump or bend lever after adjustment has been made.*

3. Open and close throttle to make sure that arm on pump lever does not bind the post on the vacuum switch.

### ADJUST CHOKE ROD CENTER CARBURETOR ONLY (Fig. 6B-107)

Place the idle screw on the second stop of the fast idle cam and against the shoulder of the high step

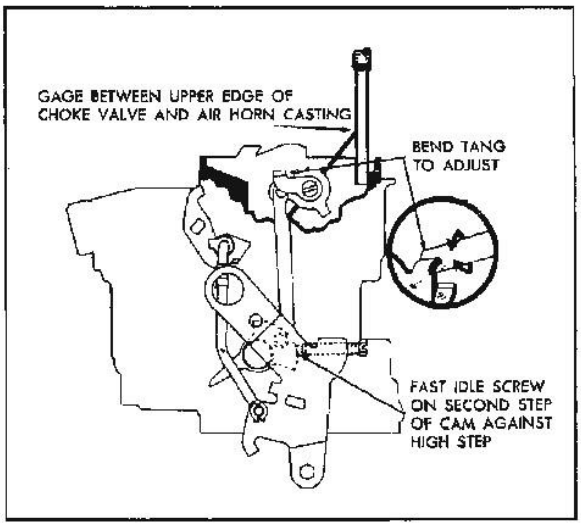


Fig. 6B-107 Adjust Choke Rod (Center Carburetor)

as shown in Fig. 107. Make sure that choke trip lever is in contact with the choke counterweight lever. Bend counterweight tang so that wire gauge just fits between the upper edge of the choke valve and the air horn wall. The adjustment specification is .055" ± .010".

### *ADJUST UNLOADER CENTER CARBURETOR ONLY (Fig. 6B-108)*

With the throttle valves held wide open (preferably by person sitting in driver's seat and depressing accelerator pedal), the choke valve should be open enough so that gauge will fit freely between wall of air horn and choke valve. Bend the unloader tang on the throttle lever to adjust. The adjustment specification is .160" (specifications .130" to .190").

### *ADJUST THROTTLE-ACTUATING ROD*

Disconnect the end of throttle-actuating rod which connects the throttle levers on the front and rear carburetors. With both throttle valves closed on the front and rear carburetors the rod should center in the slot in the throttle lever. Bend the throttle rod to adjust. Connect throttle rod after adjustment.

### *ADJUST IDLE SPEED AND AIR MIXTURE*

With the engine at operating temperature, adjust the idle speed on the center carburetor only to the following specification.

*NOTE: Depress hot idle compressor (spring loaded valve) while making idle adjustment on automatic transmission-equipped cars.*

### *HOT IDLE SPEED SPECIFICATIONS*

| | V-389 GTO |
|---|---|
| A-Automatic transmission in Drive Position | 580-600 rpm |

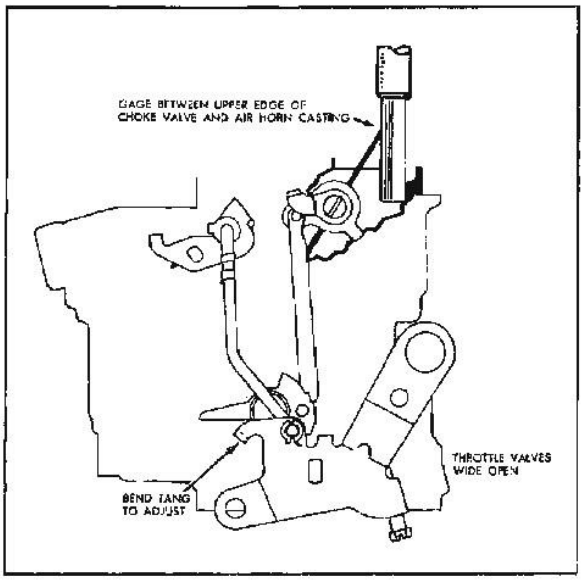


Fig. 6B-108 Adjust Unloader (Center Carburetor)

| | | |
|---|---|---|
| B-Automatic transmission with Air Conditioning in Drive position A/C Off | 640-660 rpm | |
| C-Synchromesh | 580-600 rpm | |
| D-Synchromesh with Air Conditioning A/C Off | 640-660 | 690-710 rpm |

Adjust mixture on center carburetor to give smoothest possible idle specified idle speed.

## CARBURETOR—GENERAL

## TROUBLE DIAGNOSIS AND TESTING

When carburetor troubles are encountered they can usually be corrected by making the adjustments outlined under ADJUSTMENTS ON CAR. The following list of common troubles and their causes will frequently save considerable time in locating the cause of the difficulty.

*NOTE: Before any work is performed on the carburetor, make sure trouble is not due to poor compression, or in the ignition system due to improper timing, defective spark plugs, burned ignition points, etc. Always diagnose performance trouble by using the Pontiac Tune-N-Test Guide before adjusting or repairing the carburetor.*

When the cause of trouble is not located by the Tune-N-Test, check for trouble in the carburetor system as follows:

### POOR FUEL ECONOMY

*NOTE: Before any attempt is made to improve fuel economy, the actual gasoline mileage should be determined, using a tenth of a gallon tester. If*

*the mileage obtained during this test compares favorably with that found on other normal cars, the poor mileage must be attributed to the driving conditions or driving habits of the owner. Also consider factors such as dragging brakes, soft tires, improper tire size, and improper speedometer driven gear.*

1. Check automatic choke to see that it operates properly and that it is correctly indexed.

2. Inspect manifold heat valve to see that it operates freely and thermostat is installed properly.

3. Check for leaks in fuel line fittings, at fuel tank, or at fuel pump bowl.

4. Check for dirty or restricted air cleaner.

5. Test for high fuel pump pressure.

6. Disassemble carburetor and check for evidence of vacuum leaks.

7. Check float level.

### SURGING CONDITION WITH HOT ENGINE

1. Lean carburetor adjustment. Check idle mixture setting.

2. Check fuel pump pressure and output.

3. Check needle and seat on leak-down tester.

4. Check float adjustment.

5. Check for dirty or obstructed jets or fuel passages.

6. Check for loose cluster or jets.

### FLAT SPOT OR POOR ACCELERATION

1. Check manifold heat control valve thermostat for correct operation.

2. Check accelerator pump output visually to see if operating.

3. Check accelerator pump adjustment.

4. Check accelerator pump inlet and outlet valves for leakage.

5. Check for seating of accelerator pump plunger vent ball.

6. Check accelerator pump passages for dirt or obstructions.

### ROUGH IDLE

1. Check speed and mixture adjustment.

2. Check mixture screws for wear or burrs.

3. Check for manifold gasket leaks.

4. Check vacuum and choke heat connection.

5. Check operation and setting of choke system.

6. Check idle passage and throttle bore for carbon and dirt.

7. Check float adjustment.

8. Check for secondary throttle sticking (4 barrel).

9. Check engine compression.

10. Check spark plug gaps.

### IMPROPER HIGH SPEED PERFORMANCE

1. Check spark plugs for correct gap and condition.

2. Check distributor points.

SERVICE SPECIFICATIONS

| Carburetor Model | Float Level | Float Drop | Idle Vent | Vacuum Break | Choke Rod | Unloader | Stat Setting | Pump Rod | Secondary Throttle Lever |
|---|---|---|---|---|---|---|---|---|---|
| BV | | | | | | | | | |
| 7025167 | 1-9/32" ±1/32" | 1-3/4" Min. | .040" ±.010" | .140" ±.015" | .060" ±.015" | .230" ±.030" | | | |
| 7025168 | 1-9/32" ±1/32" | 1-3/4" Min. | .040" ±.010" | .140" ±.015" | .060" ±.015" | .230" ±.030" | | | |
| 2GC | | | | | | | | | |
| 7025082 | 5/8" ±1/16" | 1-3/4" Min. | 1-9/32" ±1/64" | | .085" ±.010" | .160" ±.030" | Index | 1-11/32" ±1/32" | |
| 7025071 | 5/8" ±1/16" | 1-3/4" Min. | 1-9/32" ±1/64" | | .085" ±.010" | .160" ±.030" | Index | 1-11/32" ±1/32" | |
| 7024178 | 33/32" ±1/16" | 1-3/4" Min. | | | | | | 27/32" ±1/16" | |
| 7025175 | 23/32" ±1/16" | 1-3/4" Min. | 1-1/32" ±1/64" | | .055" ±.010" | .160" ±.030" | Index | 1-1/8" ±1/16" | |
| 7025177 | 23/32" ±1/16" | 1-3/4" Min. | 1-1/32" ±1/64" | | .055" ±.010" | .160" ±.030" | Index | 1-1/8" ±1/16" | |
| 7024179 | 23/32" ±1/16" | 1-3/4" Min. | | | | | | 27/32" ±1/16" | |
| 7025179 | 23/32" ±1/16" | 1-3/4" Min. | | | | | | 27/32" ±1/16" | |
| AFB | | | | | | | | | |
| 3890S 3900S | 5/16" ±1/32" | 23/32" Min. | | | Choke Piston Flush To 1/64 Below Cylinder Outer Lip | .150" ±.030" | One Notch Rich | In Center Hole | .020" ±.010" |
| 3895S 3899S | 3/8" ±1/32" | 23/32" Min. | | | | .150" ±.030" | | .300" ±.030" | |

3. Check fuel pump output and pressure.

4. Check filter for restriction or plugging.

5. Check carburetor for evidence of internal vacuum leaks.

6. Check float level adjustment.

7. Check high speed passages for dirt or obstruction.

### *FLOODING OR LEAKING*

1. Check for foreign material in needle and seat area.

2. Check needle and seat on leak-down tester.

3. Check float adjustment (make sure float is not binding or rubbing).

4. Check for leaking or collapsed float.

5. Check for cracked bowl or loose passage plugs.

# FUEL PUMP

## 6 CYL. AND V-8

### DESCRIPTION (Figs. 6B-109 & 6B-110)

The rocker arm spring keeps the rocker arm in constant contact with the eccentric (behind the third lobe of the camshaft, 6-cyl.; bolted to the front of the camshaft, V-8) so that the rocker arm moves up and down as the camshaft rotates. As the 6 cyl. pump rocker arm is moved upward and V-8 pump rocker arm downward, it bears against a link which is also pivoted on the rocker arm pin. The link is hooked to the diaphragm pull rod so that the diaphragm is moved away from the fuel chamber and the diaphragm spring is compressed. The enlarging fuel chamber moves gasoline from the tank through the tubing inlet valve and into the space below the diaphragm.

As the rotating eccentric permits the rocker arm to move away from contact with the link, the compressed diaphragm spring is free to move the diaphragm upward, 6 cyl.; downward V-8 to expel the fuel through the outlet valve to the carburetor bowl.

Because the diaphragm is moved upward, 6 cyl.; downward V-8 only by the diaphragm spring, the pump delivers fuel to the carburetor only when the pressure in the outlet line is less than the pressure maintained by the diaphragm spring. Fuel is delivered to the carburetor only when the needle valve is open. When the needle valve is closed by pressure of fuel on the float, the pump builds up pressure in the space below the diaphragm and in the outlet tube until the diaphragm spring is compressed. The diaphragm then remains stationary until more fuel is required.

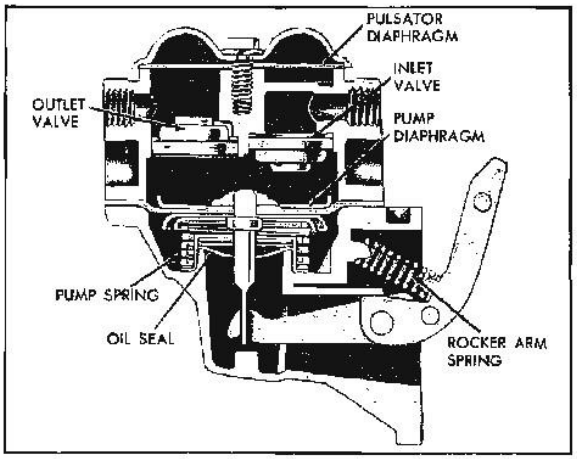


Fig. 6B-109 Schematic View of Fuel Pump 6 Cylinder

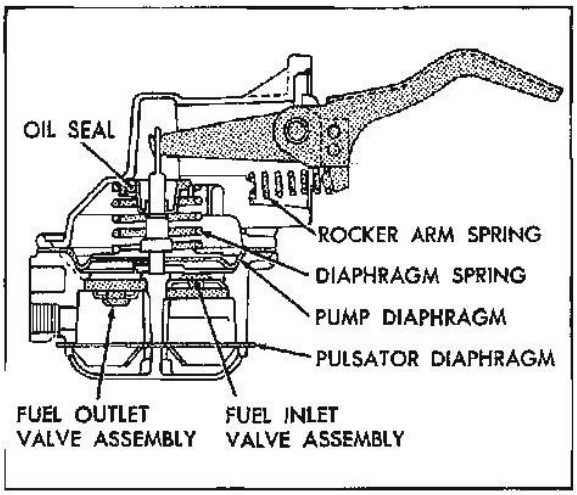


Fig. 6B-110 Schematic View of Fuel Pump V-8

### OVERHAUL AND ADJUSTMENT (Fig. 6B-111)

*DISASSEMBLY*

1. Scratch locating marks on fuel cover and pump body so that inlets and outlets will be properly located when pump is reassembled.

2. Place pump in soft jawed vise.

3. Remove bolt and washer from pulsator cover plate. Remove pulsator cover and diaphragm from pump cover.

4. Remove pump cover screws except any two that are diametrically opposite.

5. Press down firmly on the cover to hold the diaphragm spring compressed and remove the remaining two screws. Release the cover slowly and remove cover assembly.

6. Drive out rocker arm pin with a tapered drift after removing sufficient staked metal from the pin. Be sure to leave sufficient metal for restaking.

7. Remove rocker arm, rocker arm spring and link.

8. Remove diaphragm assembly and diaphragm spring.

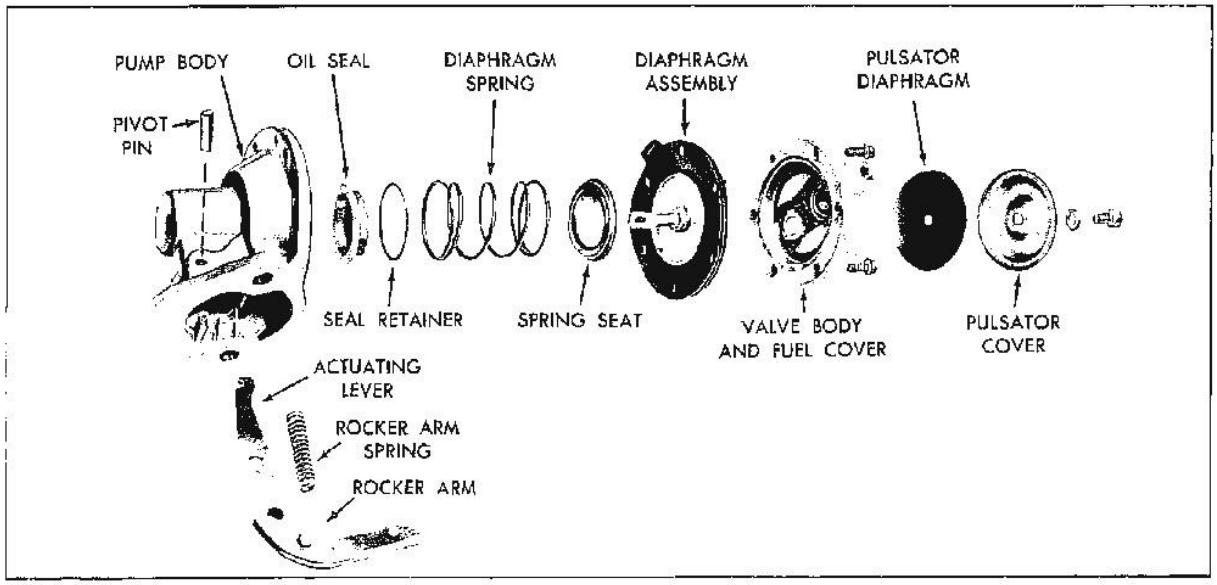


Fig. 6B-111 Typical Fuel Pump - Exploded View

9. Using a small chisel, round file or small grinding wheel, remove metal from around oil seal retainer which was displaced by staking during assembly. Pull out seal and seal retainer, using a hooked-shaped tool.

*CAUTION: Use care not to damage oil seal seats.*

10. Remove metal displaced by staking around inlet and outlet valves. Pry valves and cages out with screwdriver blade. Lift out gaskets.

### CLEANING AND INSPECTION

1. Clean and rinse all metal parts in solvent. Blow out all passages with compressed air.

2. Inspect pump body, cover and pulsator cover for cracks, breakage or distorted flanges. Examine all screw holes for stripped or crossed threads. If any of these three parts are damaged, the pump should be replaced.

3. Inspect rocker arm, link and pin for wear.

### ASSEMBLY

1. Install new oil seal and retainer in pump body and press firmly in place.

2. Stake die cast lip in four places to retain seals.

3. Position link and rocker arm in pump body with hook of link pointing toward top of pump.

4. Align holes and drive rocker arm pin through rocker arm.

5. Install small washer on rocker arm pin and restake pin securely.

6. Install inlet and outlet gaskets and valves in pump cover. Press valve and cage assembly against gasket and stake in position.

7. Soak pump diaphragm in clean kerosene. Fuel oil may be used, but do not use shellac or sealing compound.

8. Place pump body in soft jawed vise.

9. Place diaphragm on bench with pull rod pointing up. Position spring over pull rod.

10. Pick up diaphragm and spring as an assembly and push pull rod through oil seal into body. Be sure diaphragm spring is seated in body. Have flat of pull rod parallel to flat of link with the diaphragm flush with the body. With palm of hand, turn the diaphragm 90°, or until flat of pull rod is perpendicular to pump link. This motion should engage the pull rod "eye" with the link hook. If not, repeat this procedure until the connection is made.

*CAUTION: Extreme care should be used to avoid damaging oil seal.*

11. Position rocker arm spring between projection on rocker arm and conical projection on body.

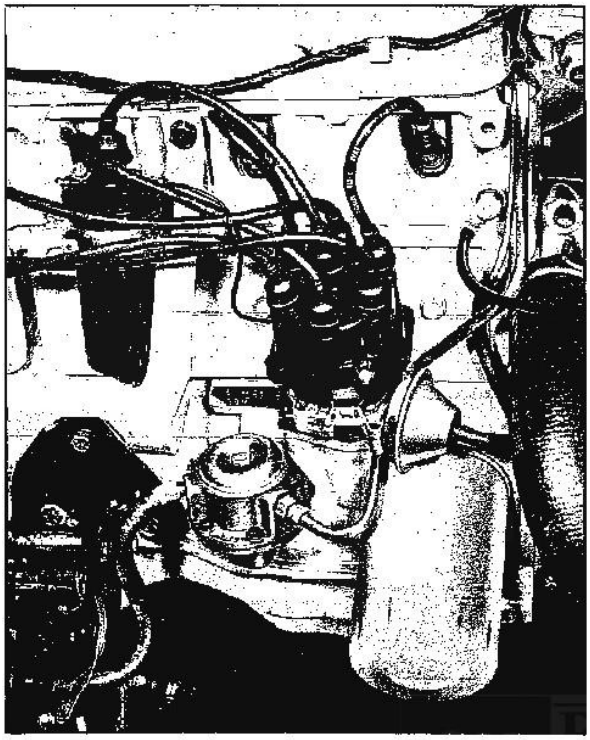

Fig. 6B-112 Fuel Pump Installed 6 Cylinder

12. Install pump cover on body making sure that scratch marks on cover and body line up. Push on rocker arm until diaphragm is flat across body flange. Install cover screws and lockwashers loosely until screws just engage lockwashers. Push rocker arm through its full stroke and hole in that position while tightening cover screws securely.

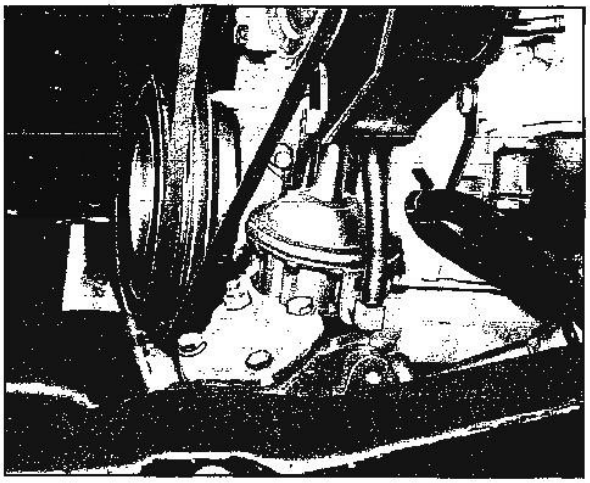

Fig. 6B-113 Fuel Pump Installed V-8

*NOTE: Diaphragm must be flexed before tightening cover screw or pump will deliver too much pressure.*

13. Place new pulsator diaphragm on pump body. Install pulsator cover with bolt and lockwasher.

## TROUBLE DIAGNOSIS AND TESTING

Always check fuel pump while it is mounted on the engine (Figs. 6B-112, 113) and be sure there is gasoline in the tank.

The line from the tank to the pump is the suction side of the system. The line from the pump to the carburetor is the pressure side of the system. A leak on the pressure side of system would be visible because of dripping fuel. A leak on the suction side would not be apparent except for its effect of reducing the volume of fuel on the pressure side.

1. Tighten any loose line connections and look for bends or kinks in lines which could reduce the flow of fuel.

2. Tighten diaphragm flange screws.

3. Disconnect fuel pipe at carburetor. Disconnect distributor to coil primary wire so that the engine can be cranked without firing. Place suitable container at end of pipe and crank engine a few revolutions. If little or no gasoline flows from open end of pipe, then fuel pipe is clogged or pump is inoperative. Before removing pump, disconnect fuel pipe at inlet of pump and at gas tank outlet pipe and blow through them with an air hose to make sure they are clear. Reconnect pipes to pump and retest while cranking engine.

4. If fuel flows from pump in good volume from pipe at carburetor, check fuel delivery pressure to be certain that fuel pump is operating within specified limits as follows:

a. Attach a fuel pump pressure test gauge to disconnected end of pump to carburetor pipe.

b. Run engine at approximately 1000 rpm on gasoline in carburetor bowl and note reading on pressure gauge.

c. If pump is operating properly, the pressure will be between 3-1/2 to 4-1/2 psi at 1000 rpms on 6 cyl.; 5-1/4 to 6-3/4 at 1000 rpm on V-8. If pressure is too low or too high, or varies materially at different speeds, the pump should be removed for repair.