ENGINE FUEL

CONTENTS OF THIS SECTION

GENERAL DESCRIPTION

HEAT CONTROL

All models have an automatically operated heat control, mounted in the right bank manifold, which utilizes the exhaust gases of the engine to heat the incoming fuel air charge during warm-up so as to improve vaporization and distribution. The heat control valve is regulated by a coiled thermostatic spring (Fig. 6B-1). A counterweight is mounted on the other end of the heat control valve shaft and this counterweight in conjunction with the thermostatic spring operates to close and open the heat control valve. The assembly is kept from rattling by an anti-rattle spring mounted next to the thermostatic spring.

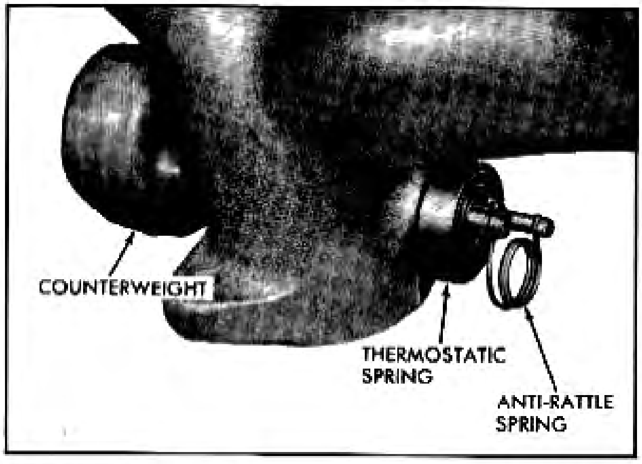


Fig. 6B-1 Heat Control Valve Thermostatic Spring and Counterweight

A detailed description of the operation of the heat control valve will be found in section 6.

CARBURETOR AIR CLEANER AND SILENCER

Combined air cleaners and silencers are used on all models. These units filter air entering the carburetor to keep abrasive dust from being carried into the engine, and reduces air and induction noises.

Two types of air cleaners are available; standard and heavy duty. The heavy duty model is intended for dusty territories where the standard air cleaner is inadequate.

Filtering is done in the heavy duty air cleaner (Fig. 6B-2) by an oil reservoir in its base in addition to mesh filter. Air entering the air cleaner passes downward, strikes the oil in the reservoir, and reverses direction. Thus, the heavier particles are trapped in the oil. The high velocity of the air stream picks up some of the oil and carries it upward into the filter mesh so that it is continually being washed and

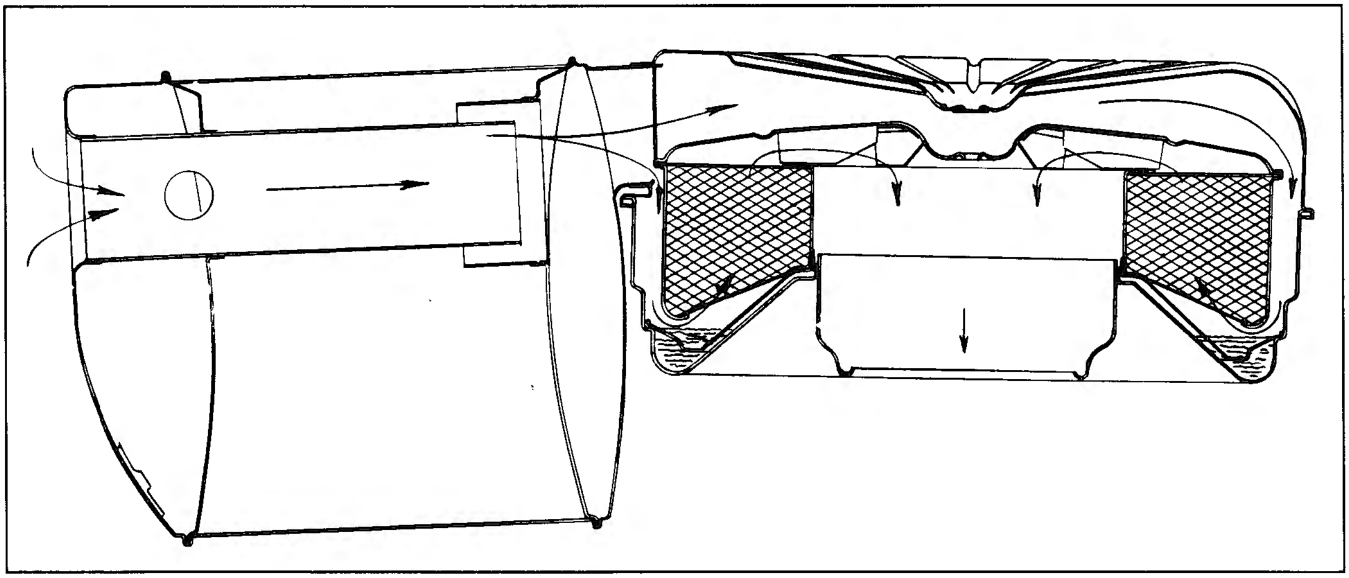


Fig. 6B-2 Heavy Duty Air Cleaner

moistened with oil. The remaining lighter dust particles are filtered by the screen.

It is extremely important that only SAE 50 oil (for temperatures above 32°F.) or SAE 20 W (for temperatures below 32°F.) are used in the reservoir and that it be filled to the level marked at the base of the cleaner. If an oil lighter than recommended viscosity is used, the high velocity of the air will carry oil through the filter and into the carburetor. A heavier oil lacks the filtering characteristics and will not keep the screen moistened. An excessive amount of oil will be carried to the filter and possibly the carburetor if the oil level is too high. If too low, larger dust particles will not be filtered out.

The standard air cleaner contains an oil moistened wire screen filter element which "catches" the dust particles as the air passes through.

DESCRIPTION

ROCHESTER 2GC 2-JET CARBURETOR

The Rochester 2GC Carburetor incorporates the calibrated cluster design.

The cluster casting is the heart of the carburetor; it embodies the small or secondary venturi, the high speed passages, the main well tubes and nozzles, the idle tubes, and the calibrated air bleeds for both the low and high speed metering systems, as well as the accelerating pump jets.

When the cluster is removed for service purposes, all of these vital parts can be readily seen, cleaned and examined because the main well tubes and idle tubes are permanently installed in the cluster body by means of a precision pressed fit.

The cluster fits on a platform provided in the body casting of the carburetor so that the main well and idle tubes are suspended in the fuel.

A gasket is used between the cluster casting and the body platform.

This method of design and assembly serves to insulate the main well tubes and idle tubes from engine heat thus preventing heat expansion and percolation spill-over during hot idle periods of operation and during the time the hot engine is not operating.

An external vent with a protective cover to keep out dirt and other foreign matter is located in the center of the bowl cover to provide adequate venting of the unit under all types of operating conditions. An internal vent is also provided.

The Model 2GC Carburetor is of side bowl construction. It is designed, however, with fuel supply jets and passages submerged below the liquid level to provide efficient engine operation under all driving conditions.

The carburetor choke housing is located on the throttle body assembly and is connected to the choke valve through an intermediate choke rod.

A center stud mounting provides for the secure attachment of the carburetor air cleaner assembly.

Six "Systems" are utilized in the Rochester 2GC

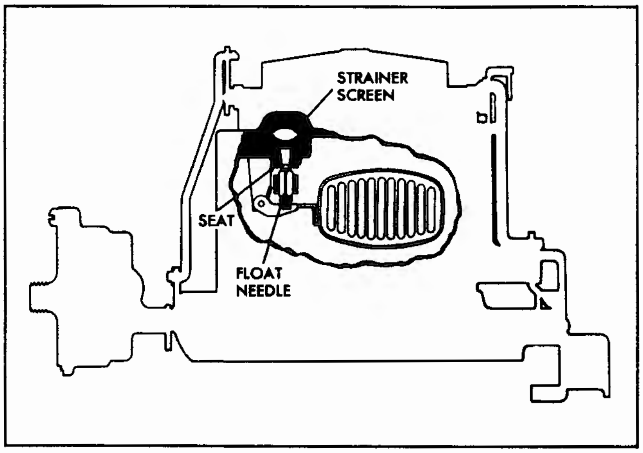


Fig. 6B-3 Float System

carburetor. They are:

Float System
Idle System
Part Throttle System
Power System
Pump System
Choke System

These systems are described and illustrated schematically in the following text.

FLOAT SYSTEM (FIG. 6B-3)

The float system controls the level of fuel in the carburetor bowl.

Entering fuel first travels through the inlet strainer to remove particles which might block jets or passages. Then the fuel passes through the needle and seat into the carburetor bowl; flow continues until the rising liquid level raises the float to a position where the valve is closed. Thus the fuel level can be regulated by setting the float to close the valve when the proper level is reached.

The float tang prevents the float from traveling too far downward. A float needle pull clip connecting the float arm to the needle valve keeps the needle from sticking closed in the seat.

IDLE SYSTEM (FIG. 6B-4)

The idle system consists of the idle tubes, idle passages, idle air bleeds, idle adjustment needles and idle discharge holes.

In the curb idle speed position, the throttle valve is cracked slightly open, allowing a small amount of air to pass through between the wall of the carburetor bore and the edge of the throttle valve.

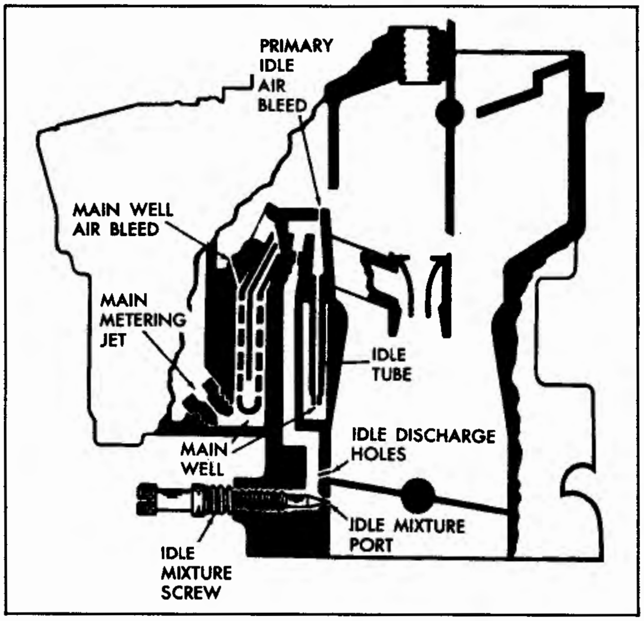


Fig. 6B-4 Idle System

The idle needle hole is in the high vacuum area below the throttle valve, while the fuel bowl is vented to atmospheric pressure. Vacuum can be called a lack of pressure, so a high vacuum area can be spoken of as an area of low pressure. Thus it can be said that there is considerable *pressure difference* between the normal *atmospheric pressure on the fuel* in the bowl and the *low pressure* (or high vacuum) *at the idle needle hole.*

The fuel and fuel-air mixture will be forced by atmospheric pressure to occupy any low pressure area. It will flow from the fuel bowl to the manifold in the following manner:

The atmospheric pressure acting on the fuel in the bowl forces fuel through the main metering jets into the main well. It is metered by the idle fuel metering orifice at the lower tip of the idle tube and travels up the idle tube. When the fuel reaches the top of the idle tube, it mixes with air entering through the primary idle air bleed and the mixture moves through the horizontal idle passage and down through a restriction in the vertical passage which serves to further break up the fuel. More air is picked up at the secondary idle air bleed (not shown on schematic).

The fuel-air mixture next moves down the vertical idle passage to the three idle discharge holes located just above the throttle valve. Through these holes further air is added to the mixture, which then passes through the idle needle hole.

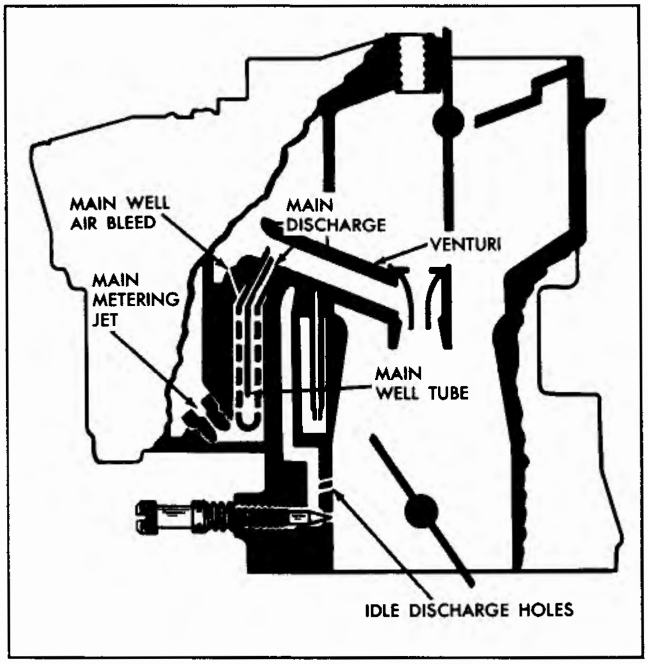


Fig. 6B-5 Part Throttle System

In addition to this mixture of fuel and air, there is air entering the bore through the slightly open throttle valve; for smooth operation, the air from the bore and the fuel-air mixture from the idle needle hole must combine to form the correct final mixture for curb idle engine speed.

The position of the idle adjustment needle governs the amount of fuel-air mixture admitted to the carburetor bore.

Except for this variable at the idle adjustment needle, the idle system is specifically calibrated for low engine speeds.

PART THROTTLE SYSTEM (FIG. 6B-5)

As the throttle valve is opened, there is a change in pressure differential points.

Opening of the valve progressively exposes the three idle discharge holes to manifold vacuum and the air stream with the result that they deliver additional fuel-air mixture for fast idle engine requirements.

Further opening of the throttle valve increases the speed of the air stream passing through the venturi, thus lowering the pressure (or raising the vacuum) in the small venturi area of the carburetor bore. At the same time, the edge of the throttle valve is moved away from the wall of the bore, progressively reducing the vacuum and thus the mixture flow at the idle discharge holes.

Since the low pressure point is now in the small venturi area, fuel and fuel-air mixture will be forced from the fuel bowl through the main metering system to the venturi as follows:

The fuel passes through the main metering jet into the main well, where it rises in the main well tube. Air entering through the main well air bleeds in the cluster is mixed with the fuel through the main well tube vents. The mixture continues up the main well tube through the nozzle, where more air is added. The mixture flows through the high speed passage to the small venturi, mixes with additional air and moves on to the bore of the carburetor, through the intake manifold, and into the cylinder as a final mixture for part throttle operation.

As the throttle opening is increased and more fuel is drawn through the main well tubes the fuel level in the main well drops. More holes in the main well tubes are then exposed to the air in the upper well area and become air bleeds. This maintains the proper fuel-air mixture to the engine throughout the part throttle range.

Permanent jets and air bleeds calibrate the main metering system for efficient part throttle operation.

POWER SYSTEM (FIG. 6B-6)

As was pointed out under part throttle operation, the fuel level in the main well area drops as the throttle valves are opened. This is due to the fact that

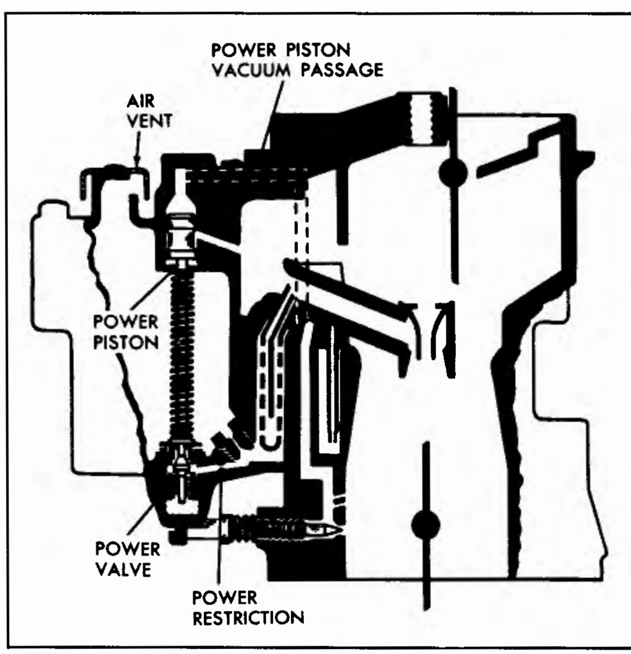


Fig. 6B-6 Power System

more fuel is drawn through the main well tubes, but the supply to the main well is held constant by the opening in the main metering jet. For high speed and/or heavy load conditions an additional source of fuel for the main well area is required. The power system accomplishes this purpose.

A spring loaded power piston, controlled by vacuum, regulates the power valve to supply the additional fuel.

The power piston vacuum channel is open to manifold vacuum in the carburetor bore beneath the throttle valves; thus the vacuum in the channel rises and falls with manifold vacuum.

During idle and part throttle operation, manifold vacuum in the channel is high. Therefore, air pressure in the passage beneath the power piston holds the piston in the fully raised position against the tension of the spring. As the load or speed is increased the throttle valves open wider and manifold vacuum drops. The calibrated spring forces the power piston down against power valve to open it and allow fuel to flow through the power restrictions into the main wells. The amount of fuel is controlled by the main metering jet and the power restriction.

A two-step valve allows a gradual increase in fuel flow as the power valve is opened; at full throttle position, the power valve is fully opened to permit maximum calibrated fuel flow from the power system.

When the load is decreased the throttle valves close and manifold vacuum is increased. Therefore, air pressure below the power piston gradually overcomes the piston spring tension and forces the piston upward to its original position with the power valve fully closed.

PUMP SYSTEM (FIG. 6B-7)

Extra fuel for smooth, quick acceleration is supplied by a double spring pump plunger. A rapid opening of the throttle valves, as is the case when accelerating from low speeds, causes an immediate increase in air velocity. Since fuel is heavier than air it requires a short period of time for it to "catch up" with the air flow. To avoid a leaneness during this momentary lag, the accelerator pump furnishes a quantity of liquid fuel sprayed into the air stream to mix with incoming air and maintain the proper fuel-air mixture.

The pump is operated by the combined action of two springs which are calibrated to move the plunger in such a manner that a sustained charge of fuel is delivered for smooth acceleration.

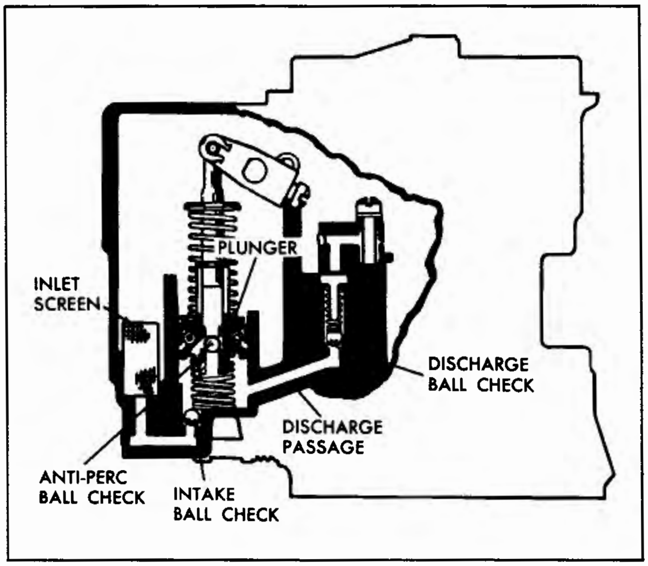


Fig. 6B-7 Pump System

The pump is attached by linkage to the accelerator so that when the throttle valves are closed the pump plunger moves upward in its cylinder creating a low pressure area (partial vacuum) in the cylinder below the plunger. Atmospheric pressure acting on the fuel in the bowl forces fuel into the cylinder through the intake ball check. The discharge ball is seated at this time to prevent air being forced into the cylinder.

When the plunger is moved downward for acceleration, the force of the stroke seats the intake ball check to prevent flow to the fuel bowl, and the fuel is forced up the pump discharge passage. The pressure of the fuel lifts the pump outlet ball check from its seat and the fuel passes on through the pump jets in the cluster, where it is sprayed into the venturi and delivered to the engine.

At higher speeds pump discharge is no longer necessary to insure smooth acceleration. When the throttle valves are opened a predetermined amount the pump plunger bottoms in the cylinder eliminating pump discharge.

An "antipercolator" check valve, contained inside the plunger, provides relief for any vapors which might form during hot idle or when a hot engine is not operating. The ball check is designed so that it can move up and down in its passage. Throughout the above periods it is seated by gravity and vapors in the pump well rise and by-pass the ball check through small holes in the plunger head.

The "anti-perc" ball check also acts as an extra inlet during the upstroke of the pump plunger, but is seated by fuel when the plunger moves down.

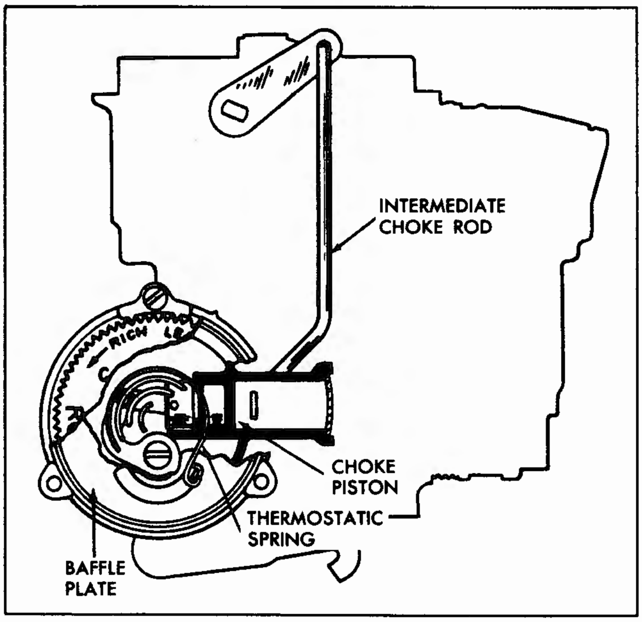


Fig. 6B-8 Choke System

CHOKE SYSTEM (FIG. 6B-8)

The purpose of the choke system is to provide a very rich mixture for cold engine operation. It is necessary to have an extra rich mixture because fuel vapor has a tendency to condense on the cold engine parts; thus decreasing the amount of combustible mixture available at the combustion chamber.

The choke system subjects all fuel outlets in the bore of the carburetor to manifold vacuum while restricting the intake of air.

The choke system includes a thermostatic coil, housing, choke piston, choke valve, and fast idle cam and linkage. It is controlled by a combination of manifold vacuum, air velocity against the offset choke valve, and tension of the thermostatic spring.

When the engine is cold, tension of the thermostatic coil holds the choke valve closed. Starting the engine causes air velocity to strike the offset choke valve. This tends to open it along with the action of intake manifold vacuum on the choke piston. After a slight opening of the choke valve, the tension of the thermostatic coil spring balances the force of air on the valve and the pull of vacuum at the piston.

As the engine warms up manifold vacuum exists in the choke housing. Hot air from the choke stove is forced into this low pressure area through a passage in the side of the choke housing to heat the thermostatic coil.

A secondary baffle plate serves to distribute the heat from its entering point at the side of the coil throughout the choke housing, to prevent a "hot spot" in the coil center, which would cause a rapid opening of the choke valve. The thermostatic coil "relaxes" gradually until the choke is fully open.

If the engine is accelerated during warm up, the corresponding drop in manifold vacuum allows the thermostatic coil to momentarily close the choke, providing a richer mixture.

During warm up it is necessary to provide a fast idle to prevent engine stalling. This is accomplished by a fast idle cam connected to the choke shaft. The idle screw on the throttle lever contacts the fast idle cam and prevents the throttle valves from returning to a normal warm engine idle position until the choke is open.

If the engine becomes flooded during the starting period, the choke valve can be partially opened manually to allow increased air flow through the carburetor. This is accomplished by depressing the accelerator pedal to the floor and engaging the starter. The unloader projection on the throttle lever contacts the unloader lug on the fast idle cam and in turn partially opens the choke valve.

ADJUSTMENTS ON CAR ROCHESTER 2GC CARBURETOR

All Rochester 2GC Adjustments can be performed on the car. With the exception of the idle speed and mixture adjustment and the unloader adjustment, all adjustments are included in the "Overhaul and Adjustments" procedure. Following are the idle speed and mixture adjustments and the unloader adjustment.

IDLE SPEED AND MIXTURE ADJUSTMENT

With the engine at operating temperature adjust idle speed to the following specifications.

Synchro-Mesh	450-470 R.P.M.
All Hydra-Matic Except Air Conditioning	430-450 R.P.M. in drive range
All Air Conditioning	500-520 R.P.M. in drive range, air conditioner off

The idle mixture adjustment should be adjusted to give a smooth idle at the specified idle speed. Missing is a sign of too lean an idle mixture, while "rolling" or "loping" indicates too rich a mixture. Turning in the idle mixture adjusting screw leans out the idle mixture. One and one-half turns out from the lightly seated position may be used as a preliminary setting of the idle mixture adjusting screw before making the final setting.

Setting the idle speed and mixture will also give the correct fast idle speed.

UNLOADER ADJUSTMENT

1. Remove carburetor air cleaner assembly.

2. Depress accelerator pedal forcibly to floor. (This should be done by person sitting in driver's seat of car to simulate actual driving conditions.) Check to see that accelerator pedal is not hitting "hump" over transmission. Move upper end of pedal to left if necessary by enlarging left hand hole in accelerator pedal bracket, and rotating bracket counterclockwise.

3. With accelerator pedal depressed as in step 2, bend tang on throttle lever to give a clearance of .143" to .183" (Large end of gauge J-5920) between the top of the choke valve and the inside of the air horn.

4. Replace air cleaner assembly.

The above procedure will eliminate variance in linkage, floor mat, pedal location, etc., and should ensure correct unloader action.

PERIODIC SERVICE
ROCHESTER 2GC CARBURETOR

There are no periodic services required on the Rochester 2GC Carburetor.

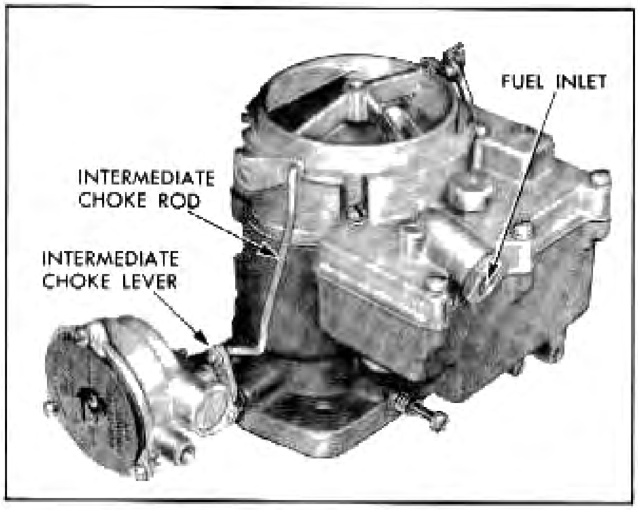


Fig. 6B-9 Rochester 2GC Carburetor

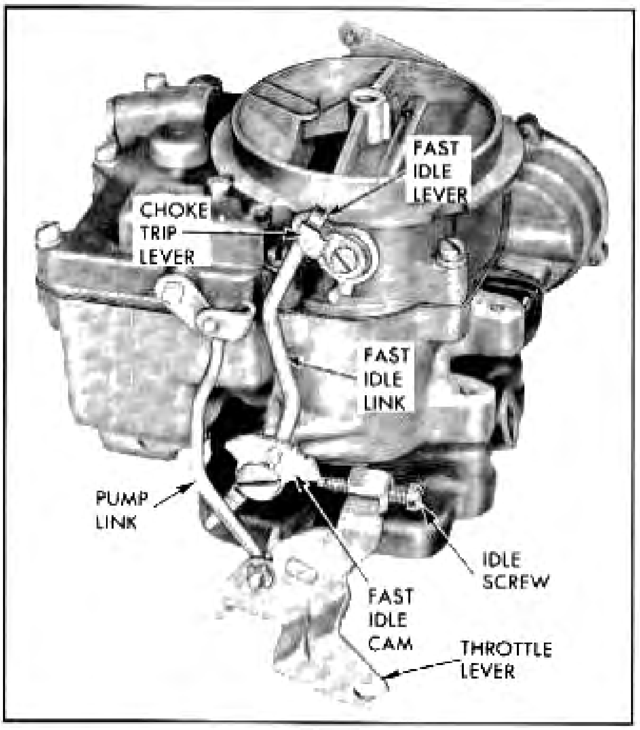


Fig. 6B-10 Rochester 2GC Carburetor

OVERHAUL AND ADJUSTMENT

Flooding, stumble on acceleration and other performance complaints are, in many instances, caused by the presence of dirt, water or other foreign matter in the carburetor. To aid in diagnosing the cause of the complaint, the carburetor should be carefully removed from the engine without draining the fuel from the bowl. The contents of the fuel bowl may then be examined for contamination as the carburetor is disassembled.

The following is a step-by-step sequence by which the Rochester 2GC Carburetor may be completely disassembled and reassembled. Adjustments may be made and various parts of the carburetor may be serviced without completely disassembling the entire unit.

DISASSEMBLY

DISASSEMBLY OF BOWL COVER

1. Remove fuel inlet screen retainer nut and gasket with ¾" wrench and remove the screen (Fig. 6B-9).

2. Disconnect the pump link (Fig. 6B-10) from the throttle lever by removing retainer. Link can be removed completely by rotating until it clears pump lever.

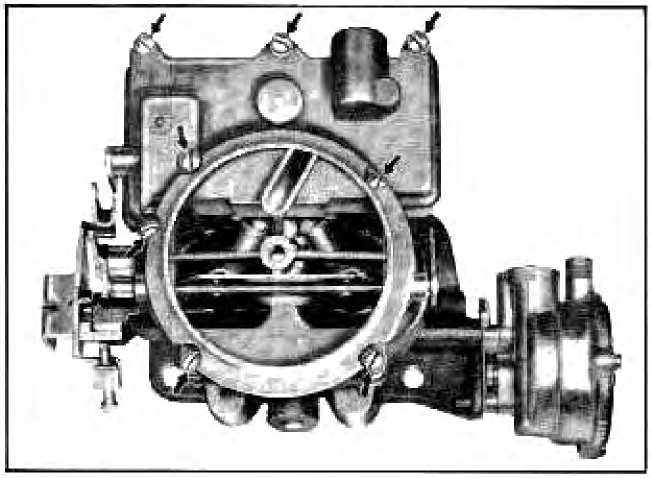


Fig. 6B-11 Location of Cover Attaching Screws

3. Detach choke intermediate lever (Fig. 6B-9) at lower end by removing horseshoe clip, then detach choke intermediate rod from choke shaft by rotating until the rod clears the lever.

4. Remove retaining screw at the end of the choke shaft and carefully pry off choke trip lever and fast idle link and lever (Fig. 6B-10). Lever can be removed from link by turning until slot in lever will pass over tang on link. Rotate link until it will slip out through slot in fast idle cam.

5. Remove eight cover screws (Fig. 6B-11) and lift cover from bowl (Fig. 6B-12).

6. Place upended cover on flat surface. Remove float hinge pin and lift float assembly from cover (Fig. 6B-13). Float needle may now be removed from float.

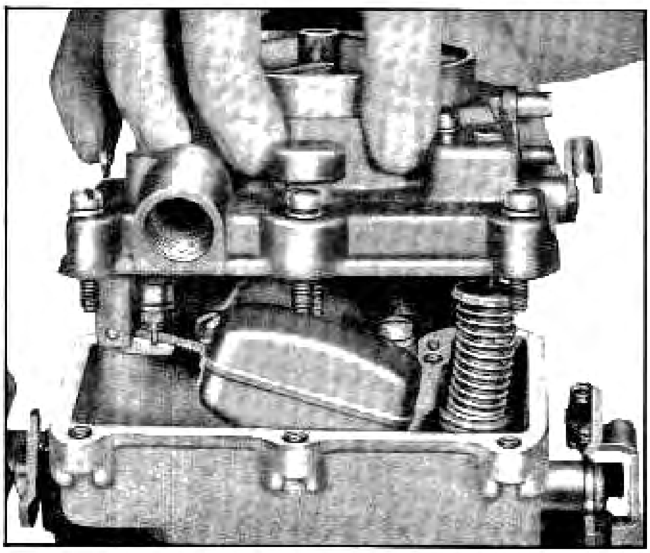


Fig. 6B-12 Removing Air Horn Assembly

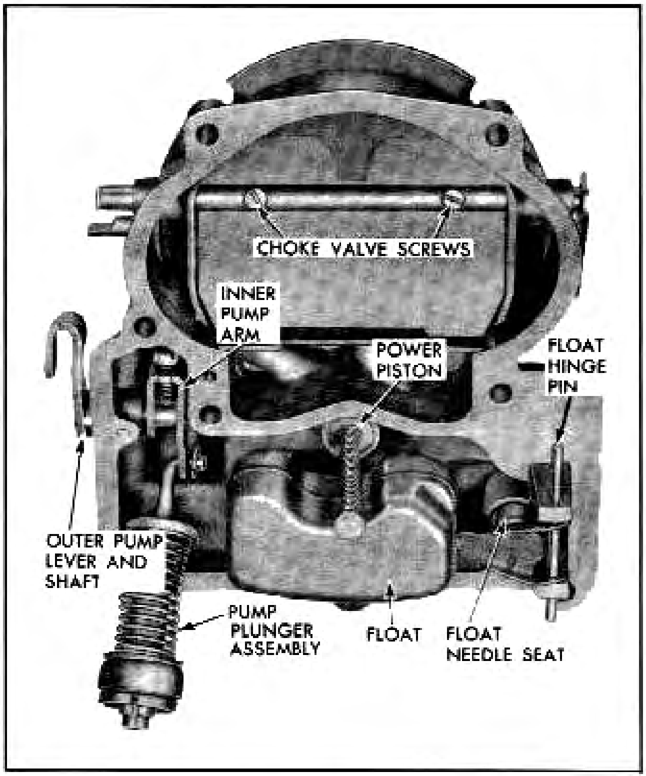


Fig. 6B-13 Air Horn and Attached Parts

7. Remove float needle seat (Fig. 6B-13) and gasket with wide blade screw driver.

8. Remove power piston (Fig. 6B-13) by depressing piston stem and allowing it to snap free or by holding stem and tapping lightly on air horn with a non-metallic object. Use care not to bend piston stem.

9. Remove retainer on pump plunger shaft, remove plunger assembly from pump arm (Fig. 6B-13). The pump lever and shaft may be removed by loosening

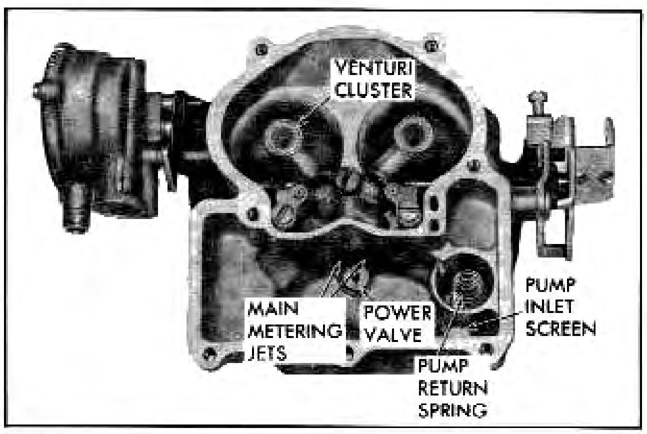


Fig. 6B-14 Carburetor Body Assembly

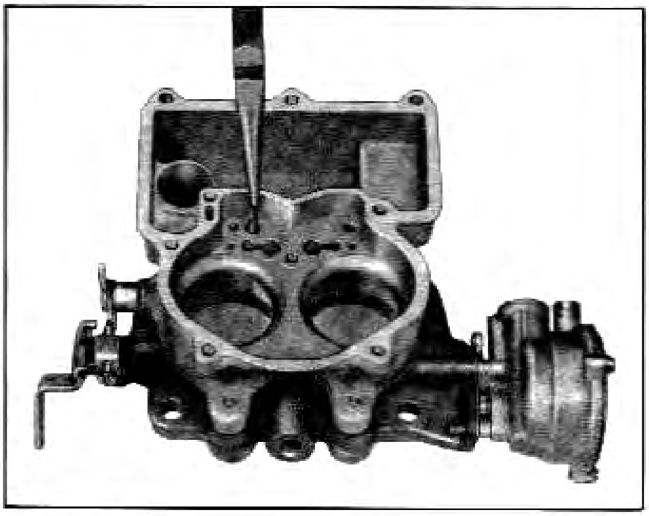


Fig. 6B-15 Removing Pump Discharge Spring Retainer

set screw on inner arm and removing outer lever and shaft (Fig. 6B-13).

10. The cover gasket may now be removed.

11. Remove two choke valve attaching screws, then remove choke valve (Fig. 6B-13).

12. Remove choke valve shaft from bowl cover.

DISASSEMBLY OF BOWL

1. Remove pump inlet filter screen and pump plunger return spring, and remove check ball from bottom of pump well (Fig. 6B-14).

2. Remove main metering jets and power valve (Fig. 6B-14).

3. Remove three screws on top of cluster, after which cluster and gasket may be removed (Fig. 6B-14).

4. Using a pair of long nose pliers, remove the pump discharge spring retainer (Fig. 6B-15). Then the spring and check ball may also be removed.

5. Upend carburetor and remove three large bowl to throttle body attaching screws. Throttle body and gasket may now be removed.

6. Remove fast idle cam (Fig. 6B-10).

DISASSEMBLY OF THROTTLE BODY

1. Remove idle adjusting needles and springs.

2. Remove idle screws from throttle lever if necessary to replace.

3. Remove the three choke cover attaching screws

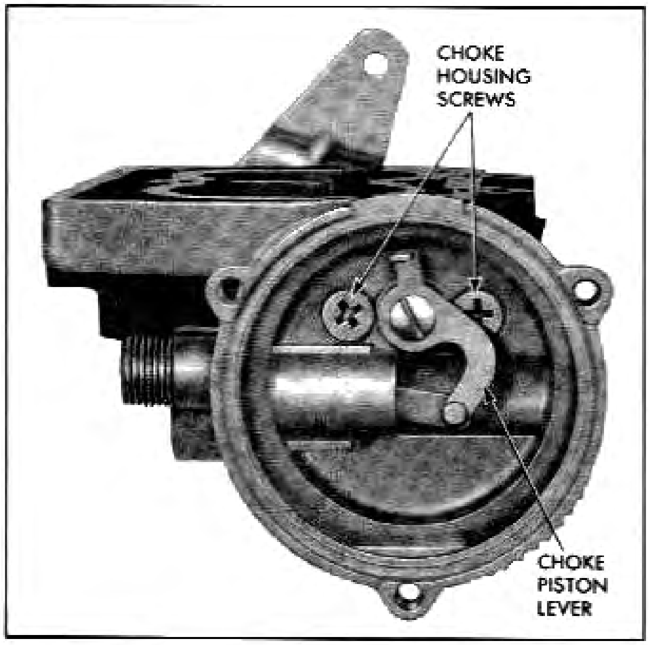


Fig. 6B-16 Choke Housing Screws

and retainers, then remove choke cover and coil assembly from choke housing.

4. Remove choke over gasket and baffle plate.

5. Remove choke piston lever attaching screw (Fig. 6B-16).

6. Remove piston link and lever assembly from carburetor. NOTE: Piston can be removed from link by dropping out piston pin.

7. Remove the two choke housing attaching screws and detach choke housing from throttle body.

8. Remove intermediate choke shaft and lever from choke housing assembly.

CLEANING AND INSPECTION OF PARTS

Dirt, gum, water or carbon contamination in or on the exterior moving parts of a carburetor are often responsible for unsatisfactory performance. For this reason, efficient carburetion depends upon careful cleaning and inspection while servicing.

1. Thoroughly clean carburetor castings and metal parts in clean cleaning solvent. CAUTION: *Choke coil and housing, and pump plunger should not be immersed in solvent. Clean pump plunger in clean gasoline only.*

TO AVOID DAMAGE TO GASKET BETWEEN CHOKE HOUSING AND THROTTLE BODY DO NOT SOAK THROTTLE BODY ASSEMBLY IN

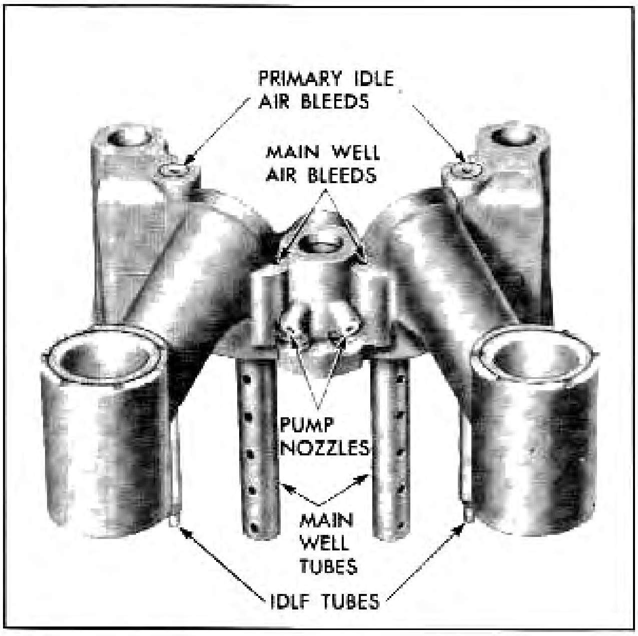


Fig. 6B-17 Passage Identification—Venturi Cluster

CLEANER OR SOLVENT IF CHOKE PISTON HOUSING HAS NOT BEEN REMOVED.

2. Blow all passages in castings (Figs. 6B-17 through 6B-21) dry with compressed air and blow off all parts until they are dry. CAUTION: *Do not pass drills or wires through calibrated jets or passages as they may enlarge orifices and seriously affect carburetor calibration.*

3. Check all parts for wear. If wear is noted, defective parts must be replaced. Note especially the following:

a. Check float needle and seat for wear. If wear is noted the assembly must be replaced.

b. Check float lip for wear and float for dents. Check floats for leaks by shaking.

c. Check throttle and choke shaft bores in throttle body and cover castings for wear or out of round.

d. Inspect idle adjusting needle for burrs or ridges. Such a condition requires replacement.

e. Inspect fast idle cam if wear is noted on steps of cam it should be replaced as it may upset engine idle speed during the warm up period.

f. Inspect pump plunger leather. Replace plunger if leather is damaged.

4. Inspect gaskets to see if they appear hard or brittle or if the edges are torn or distorted. If any such condition is noted they must be replaced.

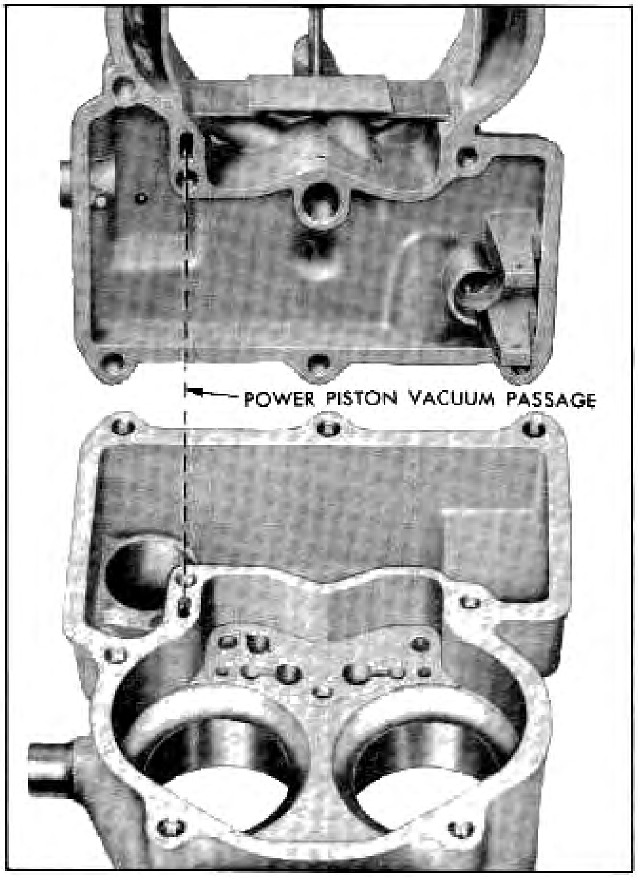


Fig. 6B-18 Passage Identification—Body to Air Horn

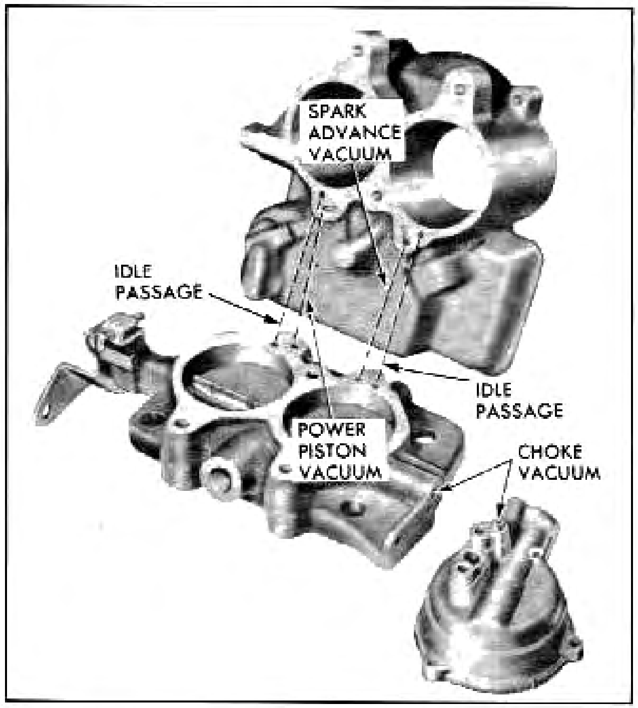


Fig. 6B-19 Passage Identification Flange—Bowl—Choke Housing

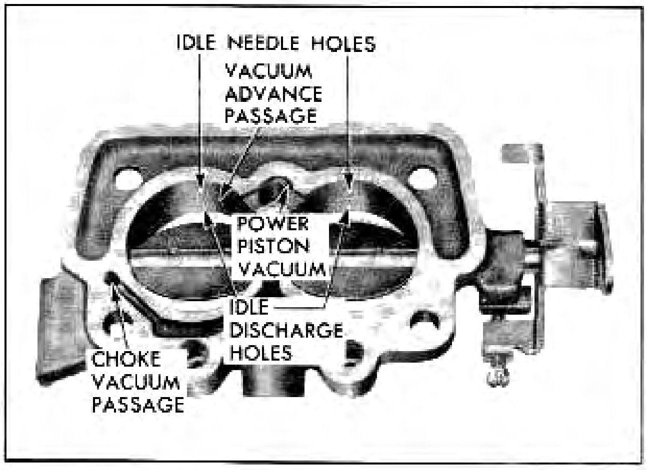


Fig. 6B-20 Passage Identification—Throttle Flange

5. Check both filter screens for dirt or lint. Clean and if they are distorted or remain plugged, replace.

6. Inspect cluster casting. If any parts in casting are loose or damaged, cluster assembly must be replaced.

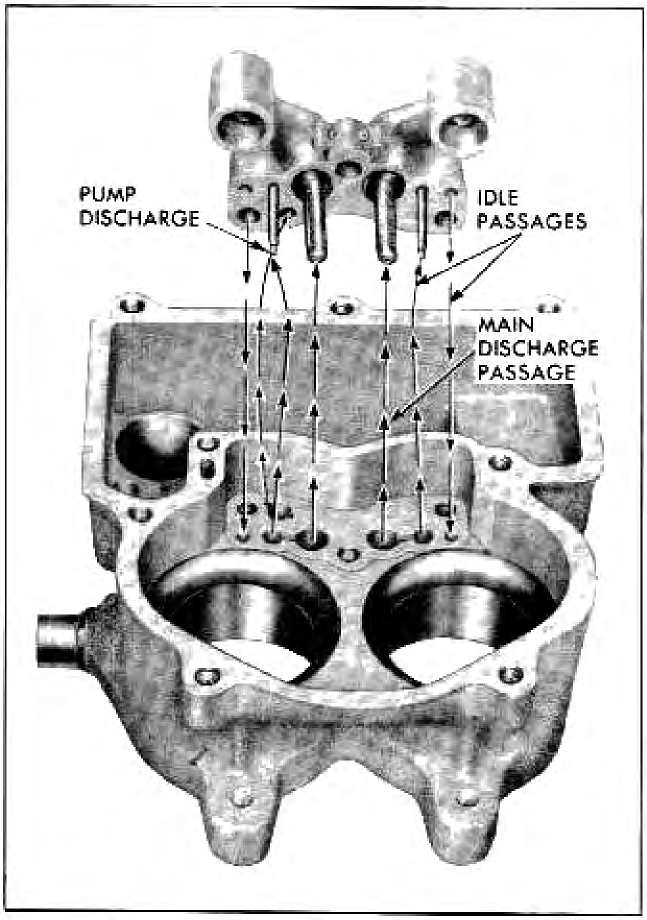


Fig. 6B-21 Passage Identification—Body to Cluster

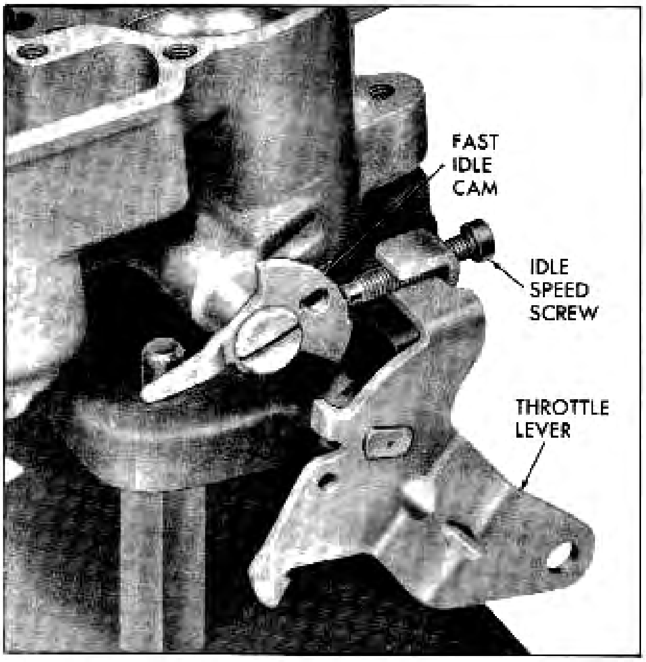


Fig. 6B-22 Fast Idle Cam Installed

ASSEMBLY AND ADJUSTMENT

ASSEMBLY OF THROTTLE BODY

1. Install idle screw in throttle lever.

2. Screw idle adjusting needles and springs into throttle body until finger tight. Back out screw 1½ turns as a preliminary idle adjustment.

3. Upend bowl, place new throttle body gasket in position and attach throttle body. Tighten screws evenly and securely.

NOTE: Choke housing should be reassembled to throttle body after installing air horn.

ASSEMBLY OF BOWL

1. Install fast idle cam (Fig. 6B-22).

2. Drop steel pump discharge check ball into discharge hole. Ball is 3/16" diameter (do not confuse with aluminum intake ball). Replace spring and retainer.

3. Replace cluster and gasket, tighten screws evenly and securely. Make certain center screw is fitted with gasket to prevent pump discharge leakage.

4. Replace main metering jets and power valve.

5. Drop pump intake ball check into hole in pump well. Ball is aluminum. Install pump return spring, pressing with finger to center it in pump well.

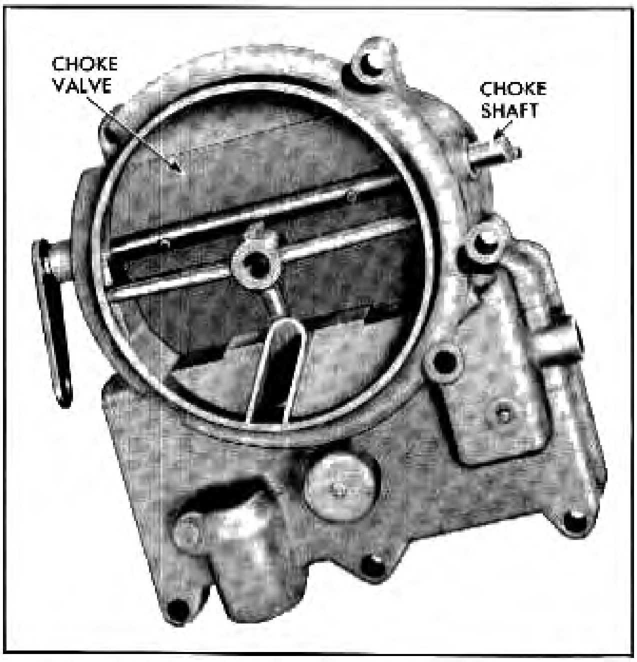


Fig. 6B-23 Choke Valve and Shaft Installed

6. Replace pump inlet strainer, pressing carefully into position.

ASSEMBLY OF BOWL COVER

1. Install choke shaft in air horn, then install choke valve on choke shaft with letters RP facing upward (Fig. 6B-23). Center choke valve before tightening screws. NOTE: Install fast idle lever, choke trip lever and tighten attaching screws temporarily while centering choke valve. Then remove choke trip lever and fast idle lever.

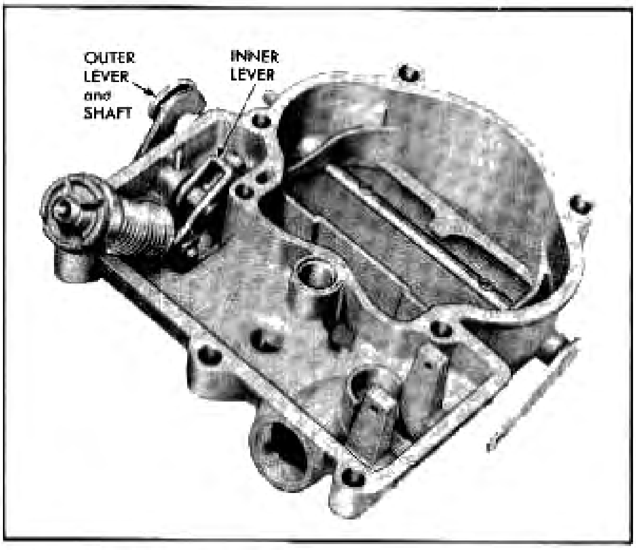


Fig. 6B-24 Pump Plunger Installed on Air Horn

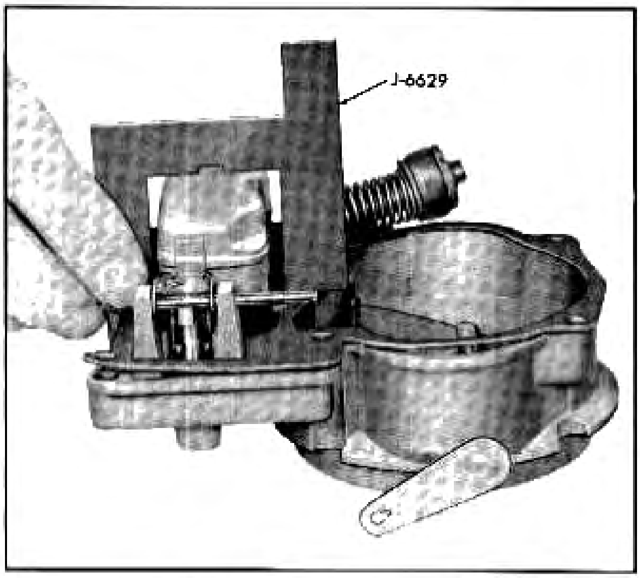


Fig. 6B-25 Checking Float Level

2. Replace pump outer lever and shaft assembly and inner lever (Fig. 6B-24).

3. Install float needle seat and gasket, using wide blade screw driver.

4. Attach pump plunger shaft with retainer, with shaft end pointing inward.

5. Install cover gasket.

6. Attach needle to float, carefully position float and insert hinge pin.

7. Adjust float as follows:

a. Float level—

Place float gauge J-6629 in position over float and resting on gasket surface. Highest point of float should just touch gauge (Fig. 6B-25). Adjust by bending the float arm. Measurement from gasket surface to high point of float should be 1 13/64" ± 1/32".

b. Float Drop—

With 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 1 29/32" ± 1/8" and can be measured using the float gauge (Fig. 6B-26). To adjust bend float tang.

8. Replace power piston in vacuum cavity; piston should travel freely in cavity. Stake vacuum piston retainer washer.

9. Place cover on bowl, making certain that accelerator pump plunger is correctly positioned and will move freely.

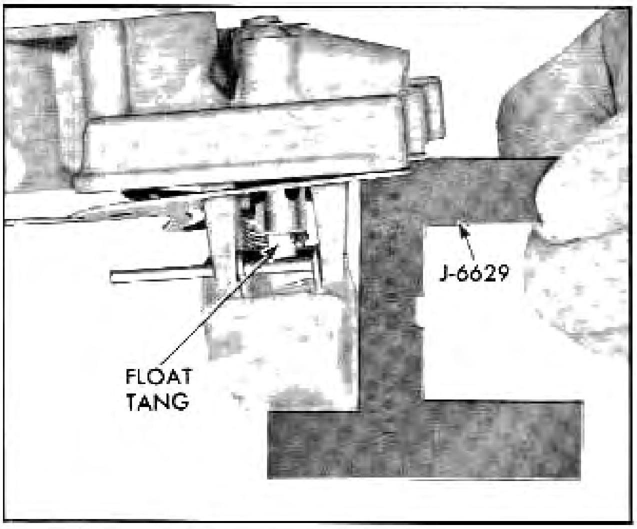


Fig. 6B-26 Checking Float Drop

10. Install and tighten 8 cover screws evenly and securely.

11. Install filter screen, with closed end toward air horn. Install strainer nut and gasket assembly in cover.

12. Install pump link and retainer.

13. To adjust pump link, place float and pump gauge on air horn next to air intake, with single leg of gauge toward pump link. With throttle stop screw backed off so that throttle valves are tightly closed, the top surface of the pump rod should just touch the end of the gauge (Fig. 6B-27). Measurement should be $^{53}/_{64}$" ± $^{1}/_{64}$". Bend pump link to adjust.

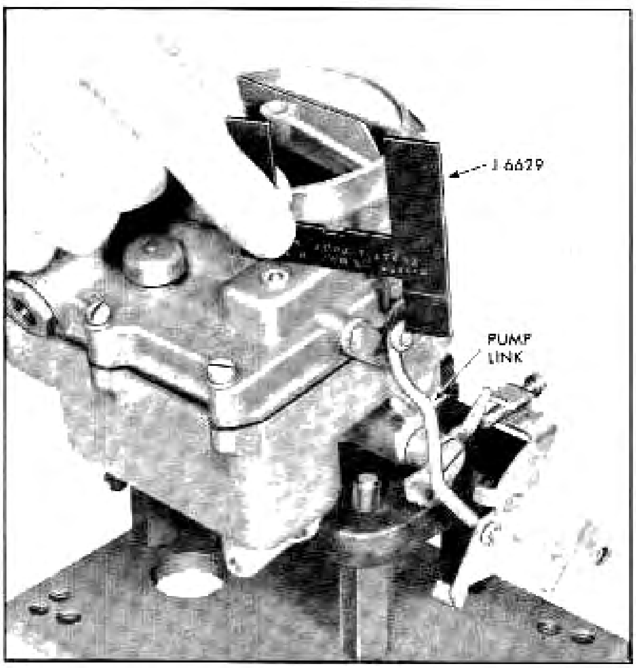


Fig. 6B-27 Pump Link Adjustment

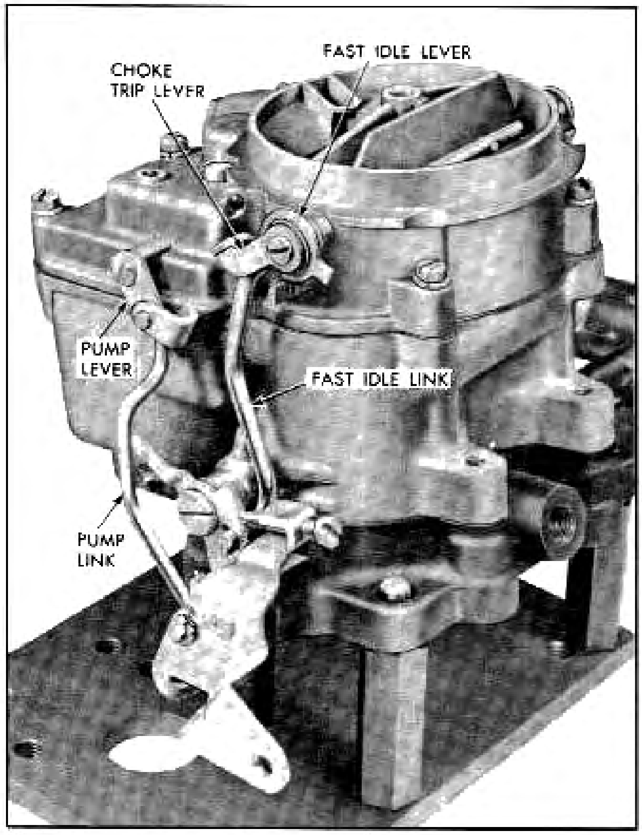


Fig. 6B-28 Carburetor Linkage Installed

14. Install fast idle link in fast idle cam and install choke lever on other end of link. Place choke lever on choke shaft with the tang facing outward and toward the pump lever. Install spacer washer and trip lever so that tang of trip lever is under tang of choke lever, and install retaining screw (Fig. 6B-28).

15. Assemble intermediate choke shaft and lever and new gasket to choke housing. Attach to throttle body with two attaching screws.

16. Assemble choke piston and linkage to choke housing and attach to intermediate choke shaft. Insert intermediate choke rod into lever on air horn and attach to intermediate choke lever with retainer.

17. Hold choke valve completely closed and adjust intermediate choke rod as necessary so that choke piston is flush with end of choke housing bore.

18. Install choke baffle plate.

19. Install choke coil and cover and rotate cover counterclockwise until the index marks on cover and

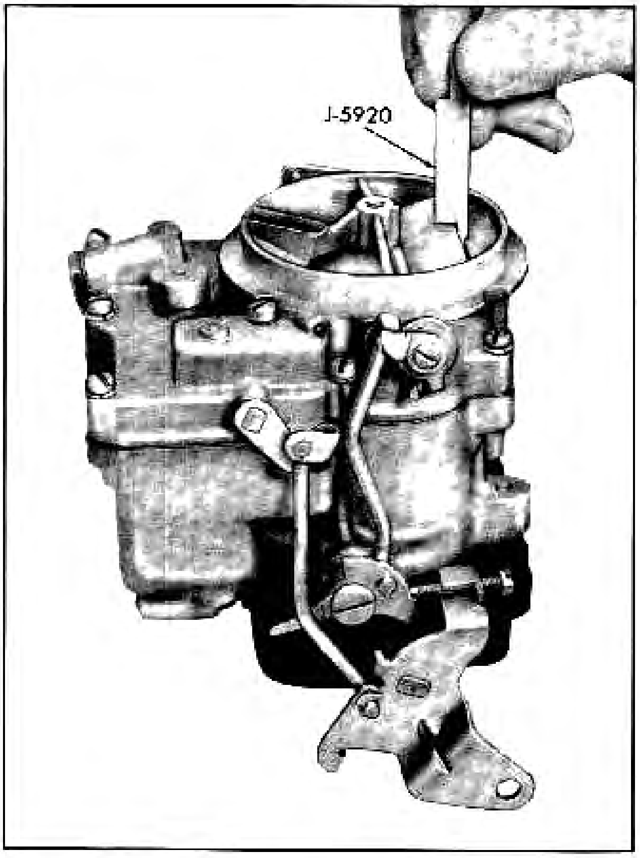


Fig. 6B-29 Choke Rod Adjustment

housing are aligned. Attach the three retainers and screws to choke housing, tighten securely. NOTE: Choke valve should be lightly closed at room temperature (75°F) when index marks on cover and housing are aligned.

20. Adjust choke rod as follows: With the thermostat cover set at index and choke trip lever in contact with choke rod lever locate the idle stop screw against the second step of the fast idle cam, next to the shoulder of the highest step. Bend the choke trip lever tang so that the small end of gauge J-5920 or 1/16" drill just fits between the inner side of the air horn and the upper edge of the choke valve (Fig. 6B-29). Specification .051" to .071".

TROUBLE DIAGNOSIS AND TESTING—ROCHESTER

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 carburetion 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 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 inspect throttle body to bowl gasket and air horn gasket for evidence of leaks in vacuum passages. Check float level.

7. Check jets and passages for dirt or obstructions.

8. Check for loose cluster.

9. Check for damaged main well tubes.

10. Check power piston for wear or damage.

11. Check actuating spring for distortion.

12. Check ball checks and valves for leakage.

13. Check for free movement of power piston.

14. Check for loose power valve assembly.

SURGING CONDITION AFTER SHORT STOP WITH HOT ENGINE

1. Check for weak fuel pump.

2. Check seat for tightness in casting.

3. Check float needle for smoothness and proper seating.

4. Check float for leaking or collapsed condition.

5. Check for binding float arm and pin.

6. Check float adjustment.

7. Check for dirty or obstructed jets and fuel passages.

8. Check for loose cluster.

9. Check for damaged main well tubes.

FLAT SPOT OR POOR ACCELERATION

1. See that manifold heat valve operates freely and that thermostat is properly installed.

2. Check pump leather for hardness or distortion.

3. Check inlet and outlet valves for leakage.

4. Check for proper seating of plunger vent ball.

5. Check pump channels for dirt or obstruction.

6. Check pump discharge holes in cluster for dirt or obstruction.

ROUGH IDLE WHICH CANNOT BE CORRECTED BY MIXTURE AND SPEED ADJUSTMENT

1. Check fast idle cam to choke valve adjustment.

2. Check vacuum and heat connections.

3. Check choke cover indexing setting.

4. Check choke valve for freeness.

5. Check choke piston for dirt or carbon.

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

7. Check idle adjustment screws.

8. Check float adjustment.

IMPROPER HIGH SPEED PERFORMANCE

1. Check spark plug gap.

2. Check distributor points.

3. Test fuel pump output and pressure as outlined on page 6B–59.

4. Check gaskets for leakage.

FLOODING OR LEAKING

1. Test for excessive fuel pump pressure.

2. Check float needle and seat for roughness or foreign material.

3. Check float adjustment (make sure float is centered so it does not rub side of bowl).

4. Check for leaking or collapsed float.

5. Inspect bowl for cracks or loose passage plugs.

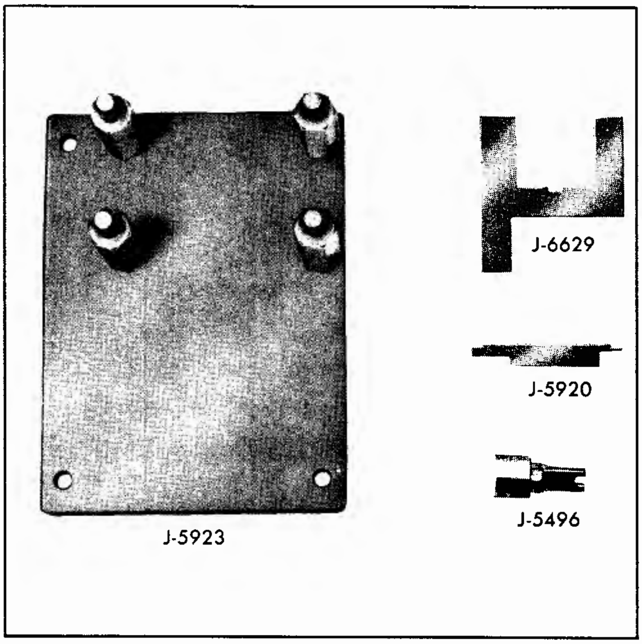
STALLING DURING WARM-UP, DUE TO ICING

Check exhaust gas passage for carbon build up. Clean hole to manifold and manifold flange surface. Always use new manifold to carburetor gaskets to ensure against leak.

SPECIFICATIONS

ROCHESTER 2GC CARBURETOR

Float Level	1 15/64" ± 1/32"
Float Drop	1 29/32" ± 1/8"
Fast Idle Cam Index	.051"–.071"
Unloader	.143"–.183"
"Stat" Setting	Index
Pump Rod	53/64" ± 1/64"



ROCHESTER 2-JET SPECIAL TOOLS

J-5496	Bending Tool
J-6629	Float Level Gauge
J-5920	Choke Unloader Gauge
J-5923	Holding Stand

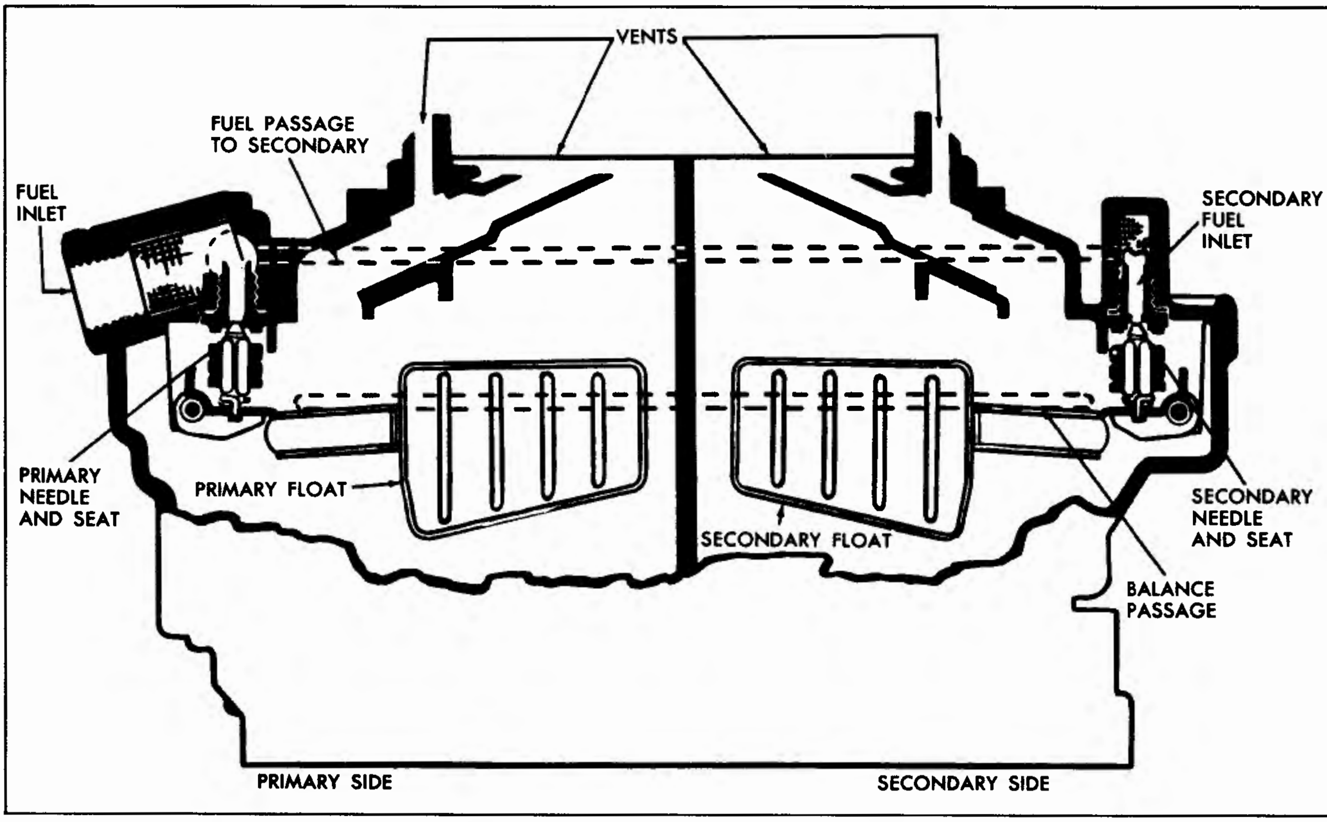


Fig. 6B-30 Float System

GENERAL DESCRIPTION

ROCHESTER 4GC 4-JET CARBURETOR

The Rochester 4GC Carburetor is essentially two 2-Jet carburetors in a single casting. The "Primary Side" contains all six carburetor systems—FLOAT, IDLE, PART THROTTLE, POWER, PUMP, AND CHOKE; the "Secondary Side" supplements the "Primary Side" with separate FLOAT and POWER SYSTEMS.

This carburetor uses the Rochester Calibrated Cluster Design, which places in a removable assembly the main well tubes, idle tubes, mixture passages, air bleeds, and the pump jets.

When the cluster is removed for service purposes, all of these vital parts can be readily seen, cleaned and examined because the main well tubes and idle tubes are permanently installed in the cluster body by means of a precision pressed fit.

The cluster fits on a platform provided in the body casting of the carburetor so that the main well and idle tubes are suspended in the fuel.

A gasket is used between the cluster casting and the body platform.

This method of design and assembly serves to insulate the main well tubes and idle tubes from engine heat thus preventing heat expansion and percolation spillover during hot idle periods of operation and during the time the hot engine is not operating.

The choke housing is located on the bowl assembly and is connected to the choke valve through an intermediate choke rod.

A center stud mounting provides for secure attachment of the carburetor air cleaner assembly.

The following material describes and illustrates the details and operation of the six "Systems" of FLOAT, IDLE, PART THROTTLE, POWER, PUMP AND CHOKE, as used in the Rochester 4GC.

FLOAT SYSTEM (FIG. 6B-30)

The float system controls the fuel level in the carburetor bowls under all conditions of operation.

Both sides of the Rochester 4GC incorporate individual float systems for maintaining the proper fuel level in each float bowl. All fuel enters the carburetor through a common inlet located at the front of the bowl cover.

Cast baffles are used in the fuel bowl to eliminate any tendency towards spillage.

As the fuel level on the primary side drops, the twin floats also drop pulling the inlet needle off its seat. Pressure from the fuel pump will then force fuel through the filter screen into the inlet passage, then through the small cylindrical filter screen and past the needle and seat into the float bowl. As the fuel level in the bowl rises the floats also rise seating the float needle and shutting off the flow of fuel.

Float balance springs between the float hangers on both the primary and secondary sides ensure positive seating of the needle valve and eliminate float bounce. These springs will not be removed in disassembly.

Float action on the secondary side is identical with that of the primary side. As the secondary floats drop and the needle is pulled from its seat fuel is forced from the fuel inlet on the primary side through a channel cored in the air horn to the inlet passage on the secondary side.

A passage in the float bowl slightly above the normal fuel level connects the primary and secondary float bowls. In this way any abnormal rise in level on one side will be absorbed by the other without disrupting engine operation.

Both sides of the carburetor are externally and internally vented to allow even pressure of fuel and air at all times and to allow the escape of fuel vapors during hot idle operation.

To aid in the venting of the carburetor bowl, an idle vent valve and spring assembly is installed in the bowl cover and air horn assembly. The idle vent valve is actuated by a tang that is part of the accelerator pump actuating lever. With the throttle valves in their idle position, the idle vent valve is held open against its spring. When the throttle valves are opened the pump actuating lever tang no longer contacts the idle vent valve and the spring forces the valve to shut. The function of the idle vent valve assembly is to improve idle when the engine is warm by venting fumes outside the carburetor rather than into the air cleaner area. A flapper valve located below the idle vent valve minimizes fuel spillage on turns with the throttle valve closed.

IDLE SYSTEM (FIG. 6B-31)

At small throttle openings the vacuum created by the main venturi is not sufficient to cause fuel to flow from the nozzles. Therefore, an additional system is provided to furnish the proper mixture ratios required throughout the low speed range.

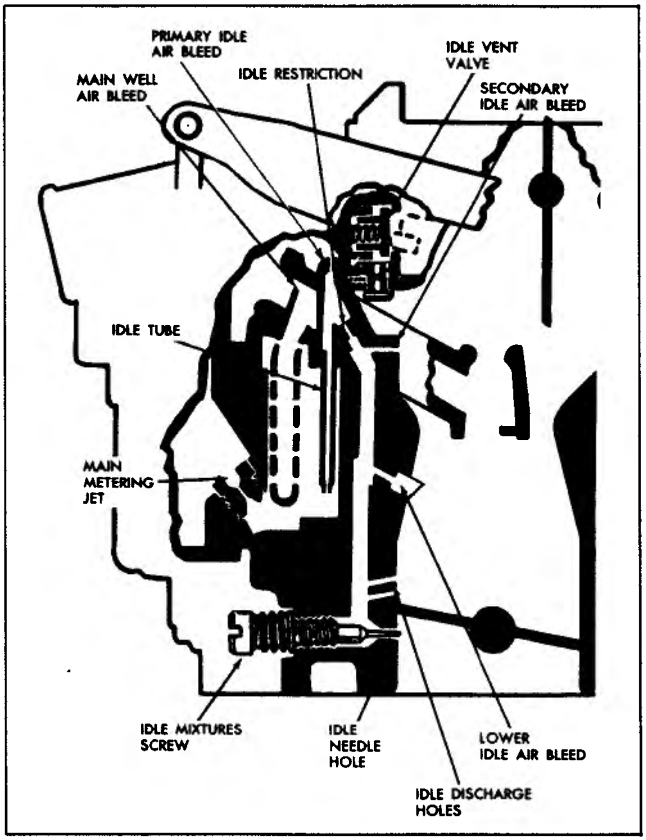


Fig. 6B-31 Idle System

An adjustable idle system is provided on the primary side of the carburetor only. Idle passages will be observed in some areas on the secondary side of the carburetor but in all instances they are blocked by gaskets and are not operational.

In the curb idle speed position, the throttle valve is cracked slightly open, allowing a small amount of air to pass through between the wall of the carburetor bore and the edge of the throttle valve.

The idle needle hole is in the high vacuum area below the throttle valve, while the fuel bowl is vented to atmospheric pressure. Vacuum can be called a lack of pressure, so a high vacuum area can be spoken of as an area of low pressure. Thus it can be said that there is considerable *pressure difference* between the normal *atmospheric pressure on the fuel* in the bowl and the *low pressure* (or high vacuum) *at the idle needle hole.*

The fuel and fuel-air mixture will be forced by atmospheric pressure to occupy the low pressure area. Atmospheric pressure acting on the fuel in the

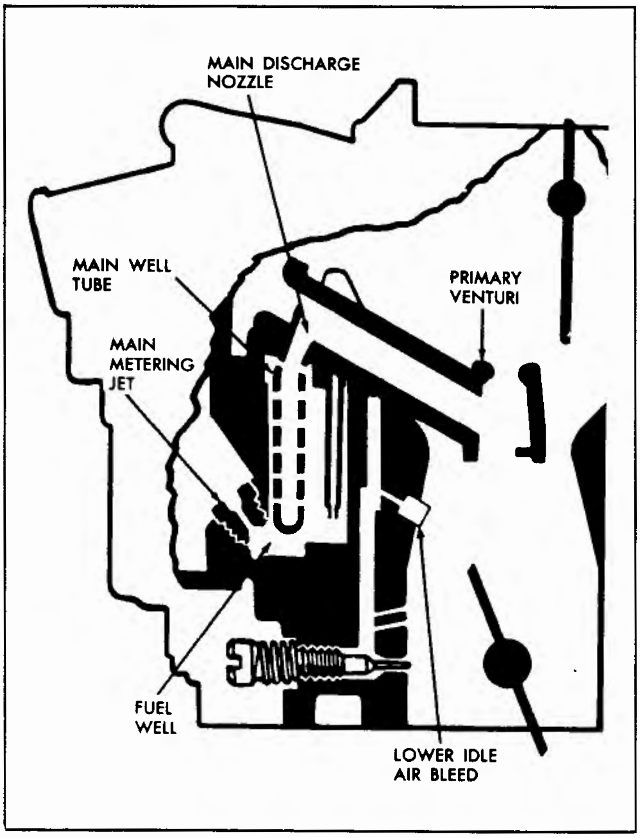


Fig. 6B-32 Part Throttle System

bowl forces fuel through the main metering jets into the main well area. The fuel travels up the idle tube after passing through the idle metering orifice at the lower tip of the tube. Air joins the fuel at the primary idle air bleeds. This mixture then passes through the idle restrictions which tend to mix thoroughly the fuel and air. More air enters the mixture at the secondary idle air bleeds. The mixture then passes down the vertical idle channel. At the lower end of the channel additional air is bled into the mixture through the lower idle air bleeds and idle discharge holes. The resultant mixture is then discharged into the throttle bore from the idle needle holes.

In addition to this mixture of fuel and air, there is air entering the bore through the slightly open throttle valve; for smooth operation, the air from the bore and the fuel-air mixture from the idle needle hole must combine to form the correct final mixture for curb idle engine speed.

As the throttle valves are opened the bleed effect of the idle discharge holes gradually diminishes. When these holes become exposed to manifold vacuum they become fuel discharge holes to meet the increased fuel demand. Further opening of the throttle valves increases the air velocity striking the extended lower idle air bleed causing the pressure differential to discharge fuel from this tube which continues during part and wide open throttle operation.

The idle mixture adjusting screws govern the amount of fuel-air mixture admitted to the carburetor bore at idle.

PART THROTTLE SYSTEM (FIG. 6B-32)

As the throttle valves are opened to a greater degree and more air is drawn through the carburetor, it is necessary to provide more fuel than is available from the idle system. Since the primary side operates alone up to approximately 57° of primary throttle opening all fuel used during part throttle operation originates from the primary side.

The increased air flow through the venturi during part throttle operation lowers the pressure at the tip of the main discharge nozzles. This differential in pressure forces fuel from the float bowl, through the main metering jets and into the main well tubes. After passing through the main well tubes the mixture passes from the tip of the nozzle through the mixture passage to the venturi and on into the intake manifold. As the throttle opening is increased and more fuel is forced through the main well tubes the fuel level in the main well drops. More holes in the main well tubes are then exposed to the air in the upper well area and become air bleeds. This maintains the proper fuel-air mixture to the engine throughout the part throttle range.

As covered under the idle system the lower idle air bleeds act as fuel discharge nozzles during part throttle operation.

POWER SYSTEM (FIG. 6B-33)

As the primary throttle valves are opened past 57°, mechanical linkage between the primary and secondary throttle valves starts to open the secondary valves. The ratio of motion is such that by the time the primary valves have reached wide open, the secondary valves are also wide open. With both the primary and secondary throttle valves open, the venturi systems in both sides feed fuel-air mixture through their respective main metering systems.

A pair of spring loaded, air velocity operated, auxiliary throttle valves are located in the secondary bores above the regular throttle valves. When the throttle valves are moved to their wide open position and engine speed is low there is insufficient air flow through the secondary bores to force the spring

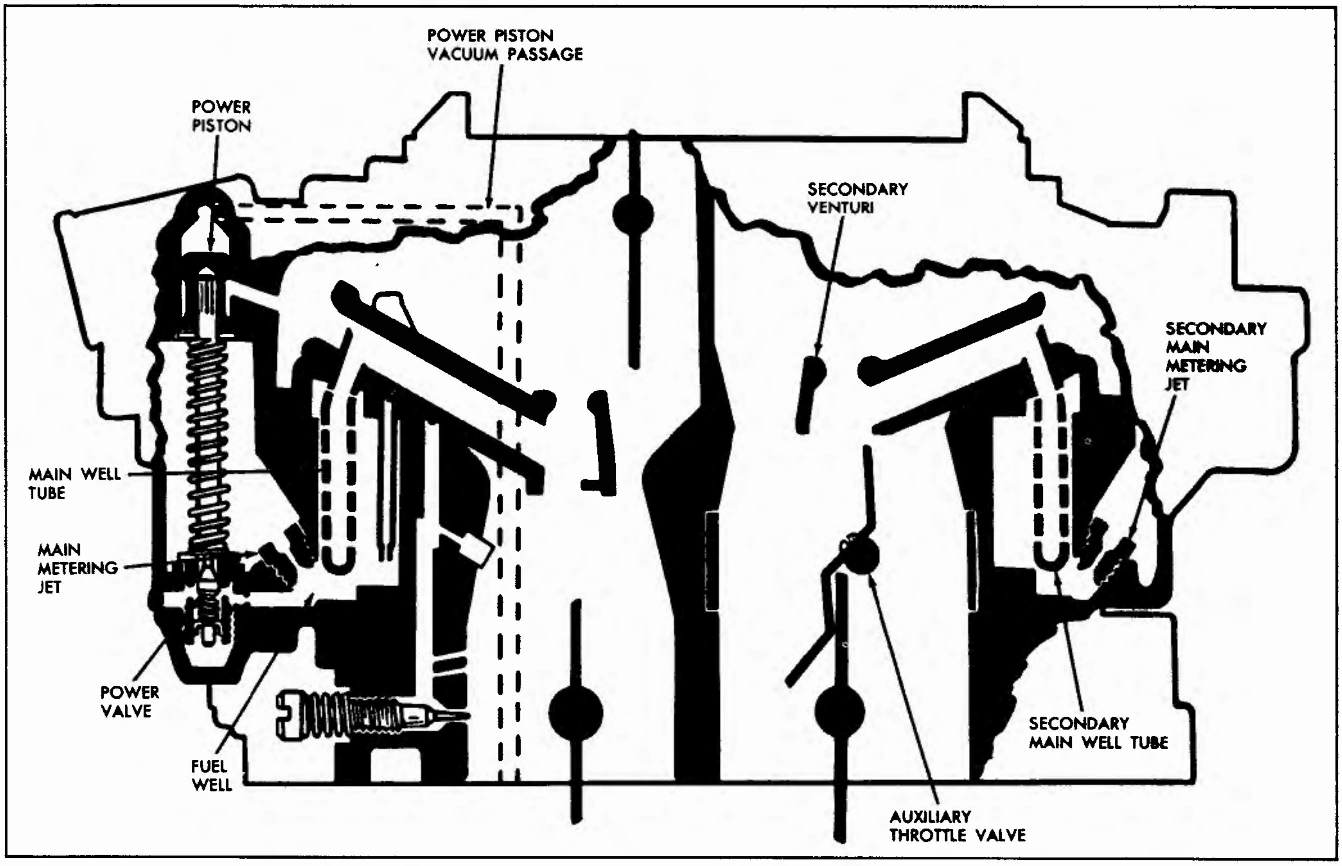


Fig. 6B-33 Power System

loaded auxiliary valves to open. This will concentrate all air flow through the primary throttle bores with better metering of fuel and air. In this condition the carburetor is functioning as a 2-Barrel carburetor. As the engine speed increases, the force of the air acting on the auxiliary valves increases to the point where the auxiliary valves are forced to open. The calibration of the auxiliary valve spring tension is such that valve opening occurs when greatest metering efficiency is possible.

In addition, fuel flow is supplemented through a vacuum-controlled power valve on the primary side.

As was pointed out under part throttle operation, the fuel level in the main well area drops as the throttle valves are opened. This is due to the fact that more fuel is drawn through the main well tubes while the supply to the main well is held constant by the opening in the main metering jet. For high speed and/or heavy load conditions an additional source of fuel for the main well area is required. The power system accomplishes this purpose.

A spring loaded power piston, controlled by vacuum, regulates the power valve to supply the additional fuel.

The power piston vacuum channel is exposed to manifold vacuum beneath the throttle valves. This vacuum is sufficient to hold the power piston in its extreme up position during part throttle operation. However, as the throttle valves are progressively opened manifold vacuum decreases to the point that the spring beneath the piston forces the piston down. This occurs only at very high speeds or during rapid acceleration. When the piston is forced down it unseats the spring loaded power valve allowing additional fuel to flow into the main well. This raises the level in the main well and by covering some of the openings in the main well tubes supplies a considerably richer mixture than normal part throttle mixtures.

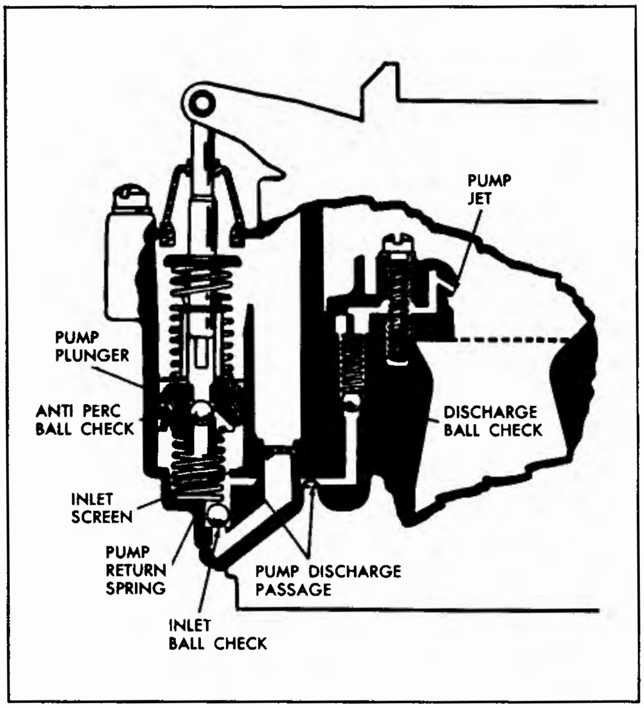


Fig. 6B-34 Pump System

PUMP SYSTEM (FIG. 6B-34)

Extra fuel for smooth, quick acceleration is supplied by a double spring pump plunger. A rapid opening of the throttle valves, as is the case when accelerating from low speeds, causes an immediate increase in air velocity. Since fuel is heavier than air it requires a short period of time for it to "catch up" with the air flow. To avoid a leanness during this momentary lag, the accelerator pump furnishes a quantity of liquid fuel, sprayed into the air stream to mix with incoming air and maintain the proper fuel-air mixture.

Since the secondary throttle valves remain closed during part throttle operation, only the primary side needs the extra boost; hence the primary side only contains the pump system.

The pump is operated by the combined action of two springs which are calibrated to move the plunger in such a manner that a sustained charge of fuel is delivered for smooth acceleration.

The pump is attached by linkage to the accelerator so that when the throttle valves are closed the pump plunger moves upward in its cylinder, creating a low pressure area (partial vacuum) in the cylinder below the plunger. Atmospheric pressure acting on the fuel in the bowl forces fuel into the cylinder through the intake ball check. The discharge ball check is seated at this time to prevent air being forced into the cylinder.

When the plunger is moved downward for acceleration, the force of the stroke seats the intake ball check to prevent flow to the fuel bowl, and the fuel is forced up the pump discharge passage. The pressure of the fuel lifts the pump outlet ball check from its seat and the fuel passes on through the pump jets in the cluster, where it is sprayed into the venturi and delivered to the engine.

At higher speeds pump discharge is no longer necessary to insure smoother acceleration. When the throttle valves are opened a predetermined amount, the pump plunger bottoms in the cylinder eliminating pump discharge.

The "anti-percolator" check valve, contained inside the plunger, provides relief for any vapors which might form during hot idle or when a hot engine is not operating. The ball check is designed so that it can move up and down in its passage. Throughout the above periods it is seated by gravity, and vapors in the pump well rise and by-pass the ball check through small holes in the plunger head.

The "anti-perc" ball check also acts as an extra inlet during the upstroke of the pump plunger, but is seated by fuel when the plunger moves down.

CHOKE SYSTEM (FIG. 6B-35)

The purpose of the choke system is to provide a very rich mixture for cold engine operation. It is necessary to have an extra rich mixture because fuel vapor has a tendency to condense on the cold engine parts; thus decreasing the amount of combustible mixture available at the combustion chamber.

The choke system subjects all fuel outlets in the bore of the carburetor to manifold vacuum while restricting the intake of air.

The choke system includes a thermostatic coil, housing, choke piston, choke valve, and fast idle cam and linkage. It is controlled by a combination of manifold vacuum, air velocity against the offset choke valve, and tension of the thermostatic spring.

When the engine is cold, tension of the thermostatic coil holds the choke valve closed. Starting the engine causes air velocity to strike the offset choke valve. This tends to open it along with the action of intake manifold vacuum on the choke piston. After a slight opening of the choke valve, the tension of the thermostatic coil spring balances the force of air on the valve and the pull of vaccum at the piston.

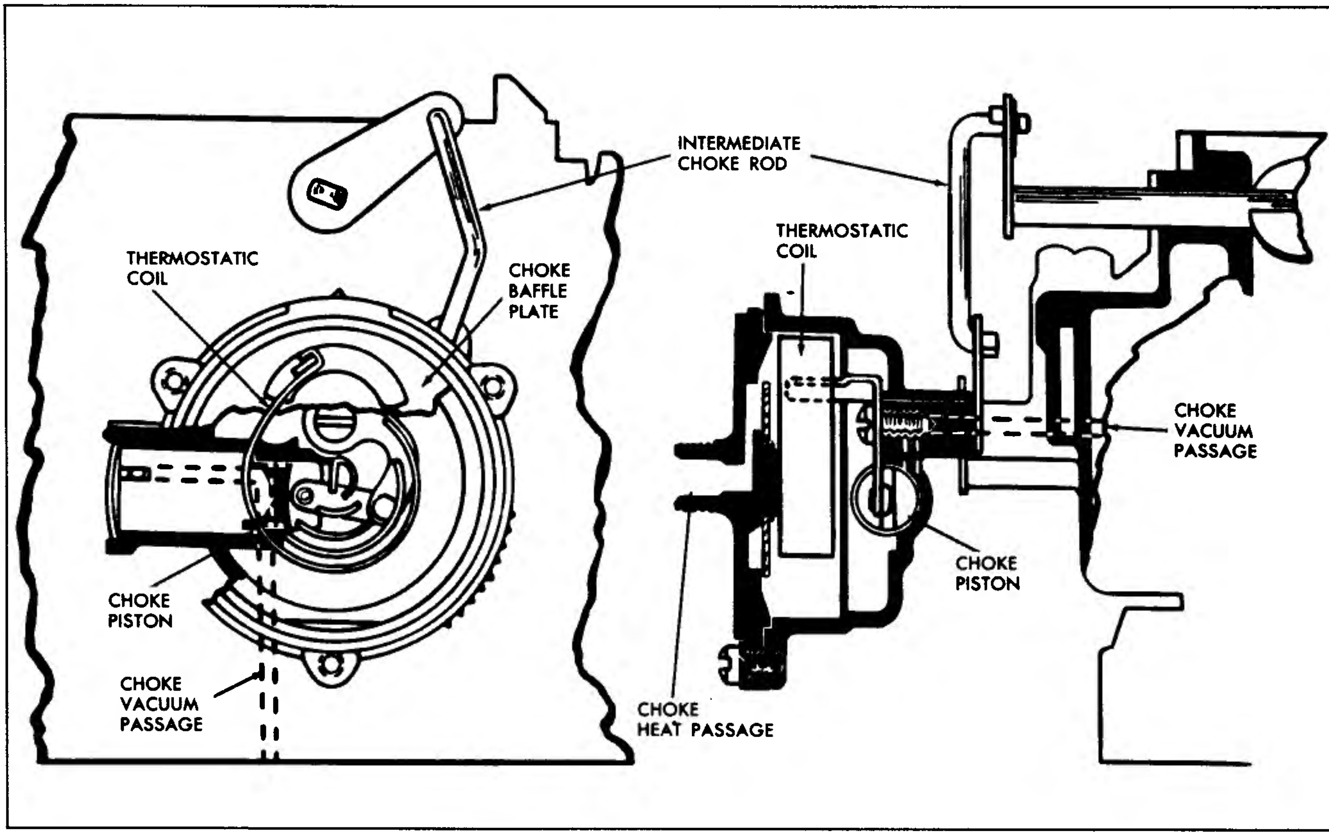


Fig. 6B-35 Choke System

As the engine warms up manifold vacuum exists in the choke housing. Hot air from the choke stove is forced into this low pressure area through a passage in the side of the choke housing to heat the thermostatic coil.

A baffle plate serves to evenly distribute the heat throughout the choke housing, to prevent a "hot spot" in the coil center, which would cause a rapid opening of the choke valve. The thermostatic coil "relaxes" gradually until the choke is fully open.

If the engine is accelerated during warm up, the corresponding drop in manifold vacuum allows the thermostatic coil to momentarily close the choke, providing a richer mixture.

During warm up it is necessary to provide a fast idle to prevent engine stalling. This is accomplished by a fast idle cam connected to the choke shaft. The idle screw on the throttle lever contacts the fast idle cam and prevents the throttle valves from returning to a normal warm engine idle position until the choke is open.

Since the secondary throttle valves remain closed, only the primary side requires a choke system. When the choke is closed, the fast idle cam is raised; the raised position of the fast idle cam "locks out" any opening of the secondary throttle valve by means of a lockout lever, which is free to move only when the cam is fully lowered.

If the engine becomes flooded during the starting period, the choke valve can be partially opened manully to allow increased air flow through the carburetor. This is accomplished by depressing the accelerator pedal to the floor and engaging the starter. The unloader projection on the throttle lever contacts the unloader lug on the fast idle cam and in turn partially opens the choke valve.

ADJUSTMENTS ON CAR ROCHESTER 4GC CARBURETOR

All Rochester 4GC adjustments except the idle vent valve adjustment can be performed on the car. With three exceptions, all adjustments are covered in the "Overhaul and Adjustments" procedure. Following are the three adjustments which must be performed on the car.

IDLE SPEED AND MIXTURE ADJUSTMENT

With the engine at operating temperature adjust idle speed to the following specifications.

Synchro-Mesh	450—470 R.P.M.
All Hydra-Matic Except Air Conditioning	430—450 R.P.M. in drive range
All Air Conditioning	500—520 R.P.M. in drive range, air conditioner off

The idle mixture adjustment should be adjusted to give a smooth idle at the specified idle speed. Missing is a sign of too lean an idle mixture, while "rolling" or "loping" indicates too rich a mixture. Turning in the idle mixture adjusting screw leans out the idle mixture. One and one-half turns out from the lightly seated position may be used as a preliminary setting of the idle mixture adjusting screw before making the final setting.

Setting the idle speed and mixture will also give the correct fast idle speed.

UNLOADER ADJUSTMENT

1. Remove carburetor air cleaner assembly.
2. Depress accelerator pedal forcibly to floor. (This should be done by person sitting in driver's seat of car to simulate actual driving conditions.) Check to see that accelerator pedal is not hitting "hump" over transmission. Move upper end of pedal to left if necessary by enlarging left hand hole in accelerator pedal bracket, and rotating bracket counterclockwise.
3. With accelerator pedal depressed as in step 2, bend tang on fast idle cam to give a clearance of .100" to .130" (gauge J-6178) between top of choke valve and inside of the air horn.
4. Replace air cleaner assembly.

The above procedure will eliminate variance in linkage, floor mat, pedal location, etc. and should ensure correct unloader action.

SECONDARY THROTTLE LEVER ADJUSTMENT

1. Adjust carburetor idle speed and mixture. (Be sure secondary valves are closed during this adjustment.)
2. Shut off engine and manually close choke valve.

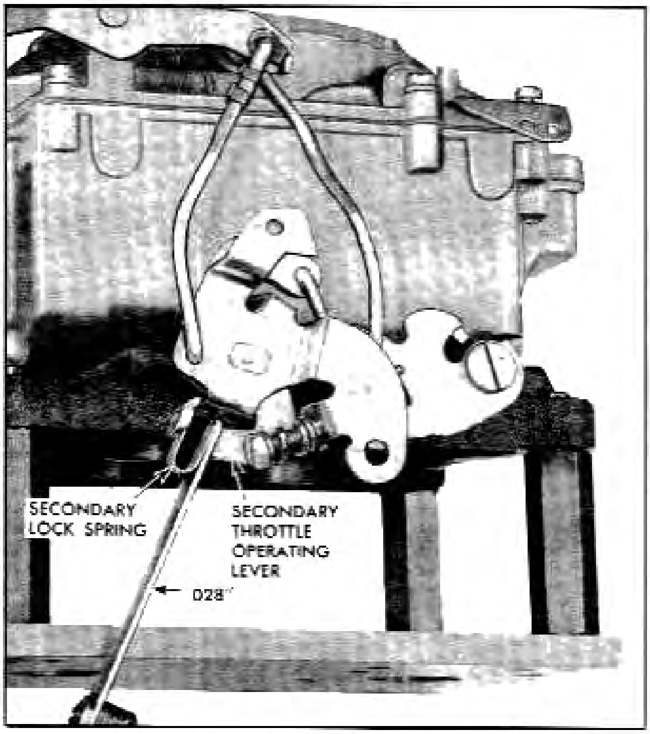


Fig. 6B-36 Secondary Throttle Lever Adjustment (Carburetor Removed for Photographic Purposes Only)

3. Position idle speed screw on the second step of the fast idle cam.
4. Measure clearance between the secondary lock spring and the secondary throttle operating lever (Fig. 6B-36). This clearance should be .028". Bend lock spring to adjust.

It is important that this adjustment be made accurately. .028" clearance ensures the proper amount of tension when car is on hot idle. Too much tension (less than .028" clearance) could interfere with the idle speed adjustment.

PERIODIC SERVICE

The Rochester 4GC carburetor requires no periodic service.

OVERHAUL AND ADJUSTMENTS ROCHESTER MODEL 4GC CARBURETOR

DISASSEMBLY

DISASSEMBLY OF AIR HORN

1. Mount carburetor on holding fixture J-5923. Remove gasoline inlet fitting, screen and gasket assembly (Fig. 6B-37).

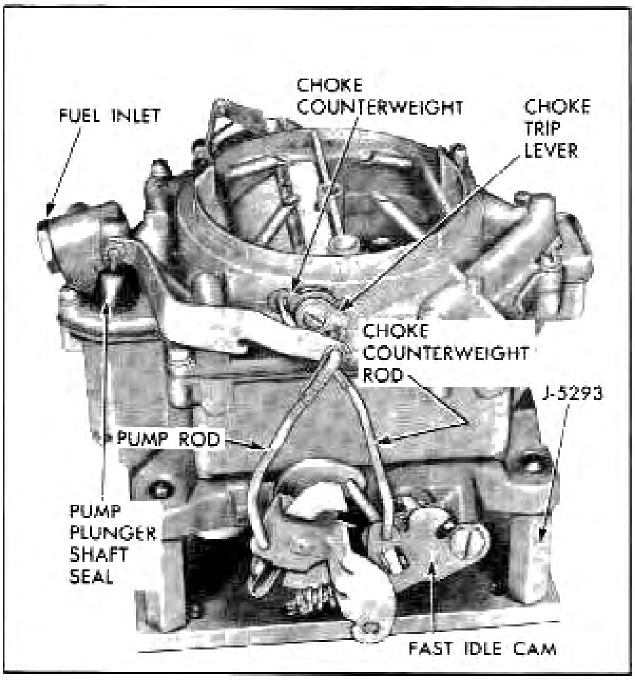


Fig. 6B-37 Rochester 4GC Carburetor

2. Remove clip from upper end of pump rod (Fig. 6B-37). It is not necessary to remove rod at lower end.

3. Remove trip lever retaining screw at end of choke shaft and remove trip lever (Fig. 6B-37).

4. Remove fast idle cam attaching screw and remove choke counterweight rod and fast idle cam as an assembly (Fig. 6B-37).

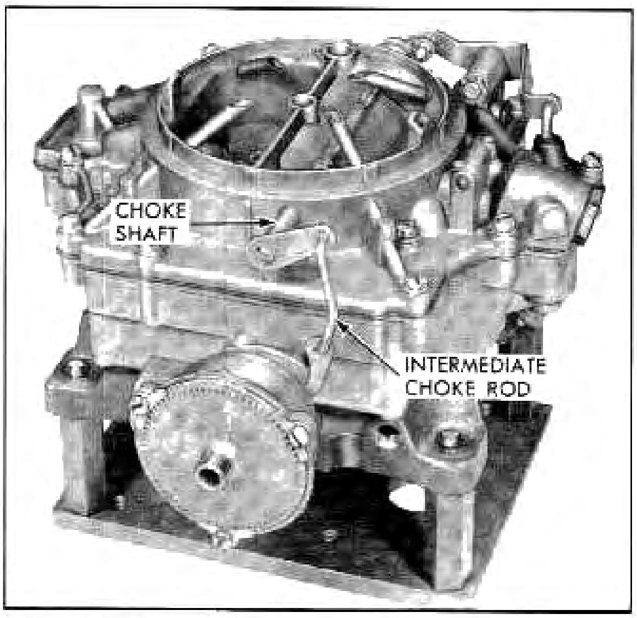


Fig. 6B-38 Rochester 4GC Carburetor

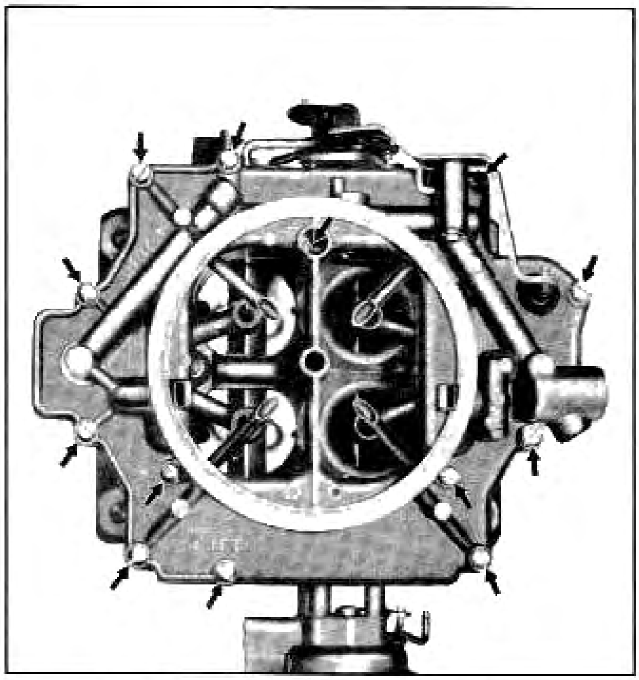


Fig. 6B-39 Air Horn Attaching Screws

5. Remove two choke valve retaining screws and slide choke valve from slot in choke shaft.

6. Detach intermediate choke rod (Fig. 6B-38) by removing horseshoe clip at upper end, then remove choke shaft.

7. Remove 13 air horn attaching screws (Fig. 6B-39).

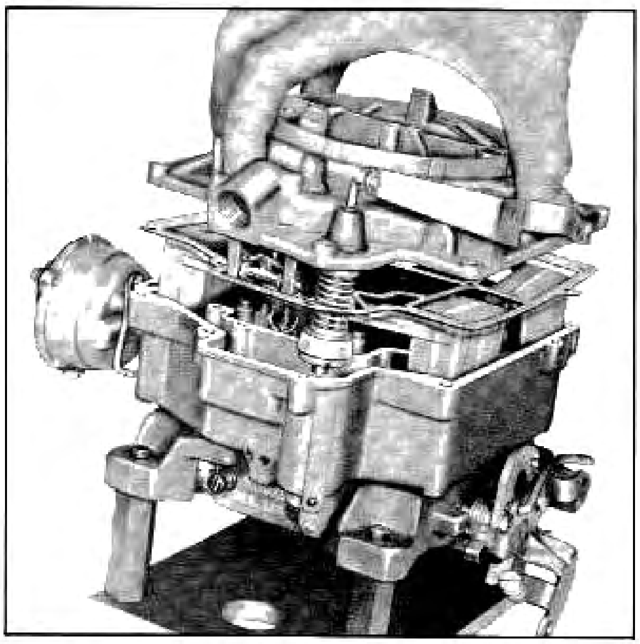


Fig. 6B-40 Removing Air Horn Assembly

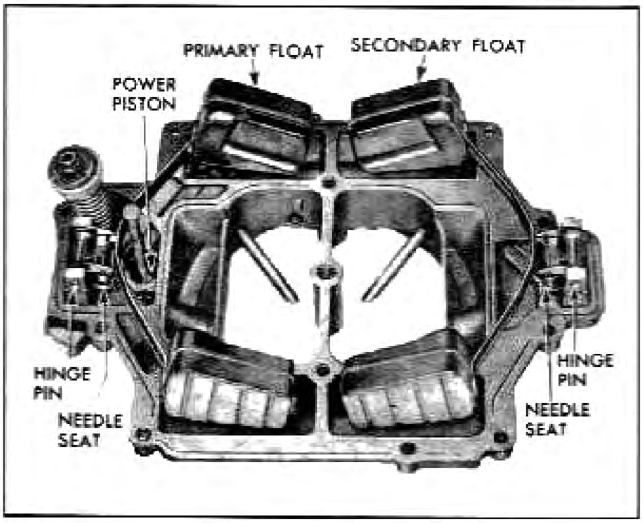


Fig. 6B-41 Air Horn Inverted

8. Carefully remove air horn by lifting straight up, until all parts are clear of carburetor body (Fig. 6B-40).

9. Invert air horn and remove hinge pin and float assembly on primary side (Fig. 6B-41).

10. Remove float needle seat and gasket from primary side (Fig. 6B-41). CAUTION: *Group and keep together float, float needle, needle seat, and gasket as units. Never mix parts from primary and secondary sides.*

11. Remove and group hinge pin, float, float needle, needle seat, gasket, and strainer screen from secondary side.

12. Remove horseshoe retainer from pump plunger shaft and remove rubber seal and pump plunger assembly from air horn (Fig. 6B-37).

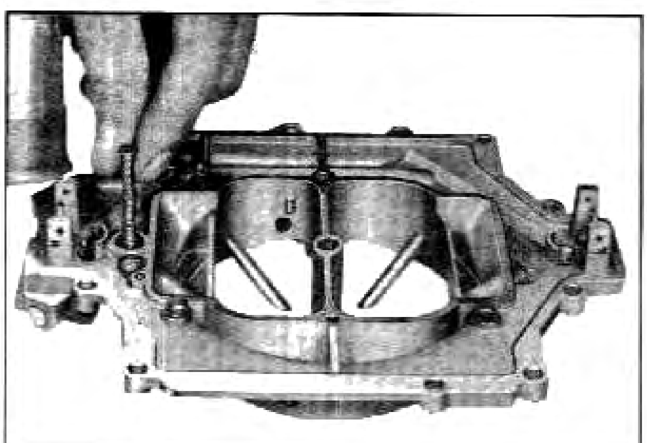


Fig. 6B-42 Removing Power Piston

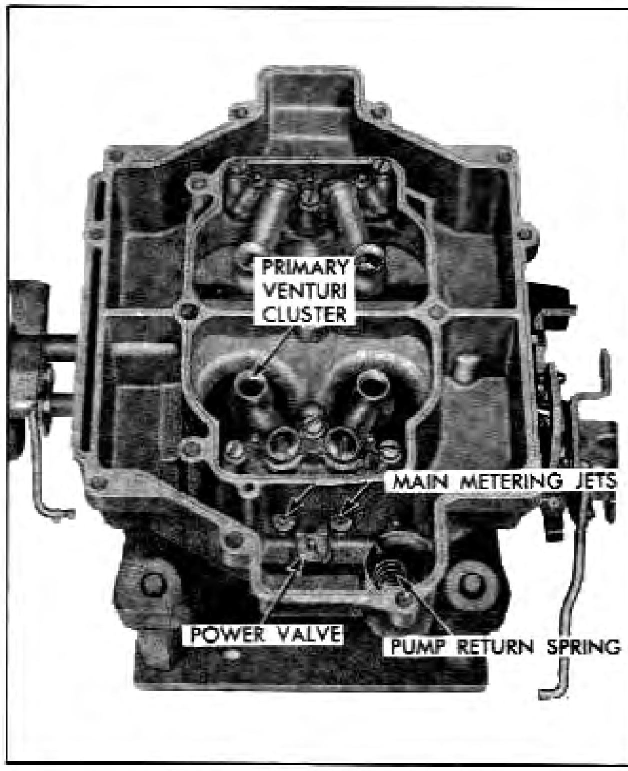


Fig. 6B-43 Carburetor Body Assembly

13. Remove power piston assembly from air horn by depressing piston stem and allowing it to snap free or by holding stem and tapping lightly on air horn with a non-metallic object (Fig. 6B-42).

14. Remove air horn gasket.

DISASSEMBLY OF CARBURETOR BODY

1. Remove three attaching screws and lockwashers from venturi cluster on primary side and carefully remove cluster and gasket (Fig. 6B-43). NOTE: The primary venturi cluster contains the pump discharge nozzles and idle tube in addition to main well tubes, and must always be installed on primary side. The venturi clusters are serviced as an assembly.

2. Remove both main metering jets from primary side of carburetor body (Fig. 6B-43).

3. Remove power valve and gasket (Fig. 6B-43).

4. Remove three screws from secondary venturi cluster and remove cluster and gasket.

5. Remove both main metering jets from secondary side of carburetor body. Keep separate from primary metering jets.

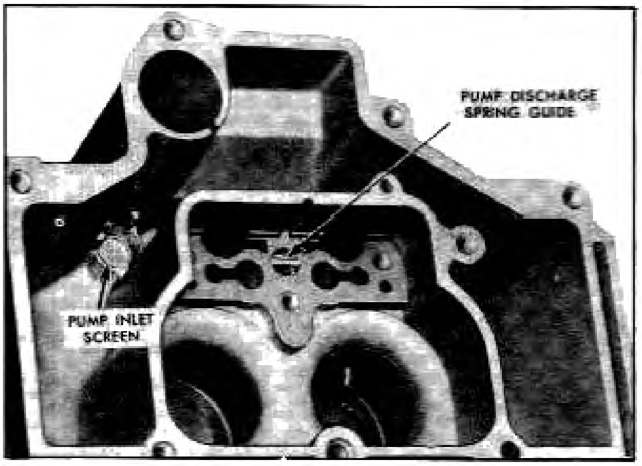


Fig. 6B-44 Pump Dicharge Spring Guide and Pump Inlet Screen

6. Remove pump return spring from pump well (Fig. 6B-43). Carefully invert carburetor body to remove aluminum pump inlet ball.

7. Using needle nose pliers, remove pump discharge spring guide, spring and steel ball (Fig. 6B-44).

8. If required, pump inlet screen may be removed for cleaning by prying up retaining ring with pointed tool (Fig. 6B-44).

9. Remove intermediate choke link from intermediate choke shaft lever (Fig. 6B-45).

10. Remove three choke cover attaching screws, then remove choke cover and gasket.

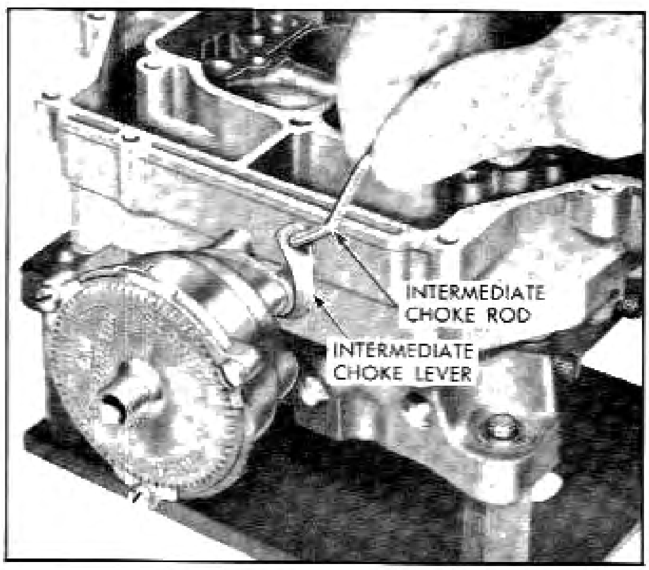


Fig. 6B-45 Removing Intermediate Choke Rod

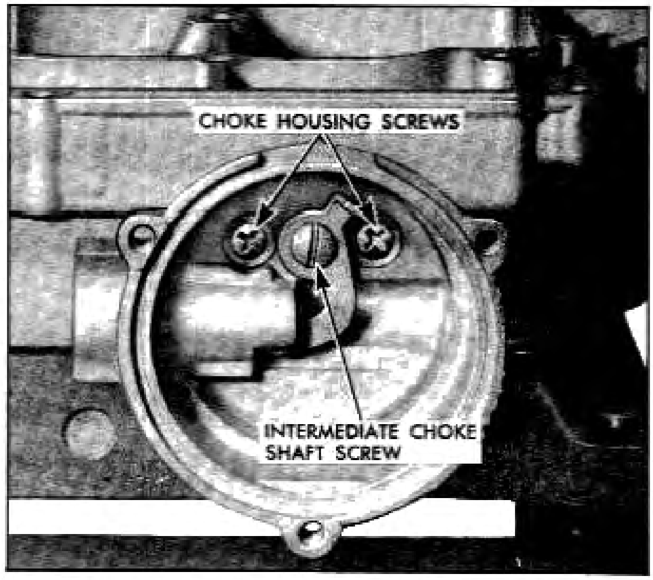


Fig. 6B-46 Location of Choke Housing Screws

11. Remove choke baffle plate.

12. Detach piston and link assembly from intermediate choke shaft by removing screw (Fig. 6B-46).

13. Remove piston link and lever from choke housing.

14. Detach choke housing from float bowl by removing two attaching screws (Fig. 6B-46).

15. Remove intermediate choke shaft from choke housing.

16. Remove choke housing gasket.

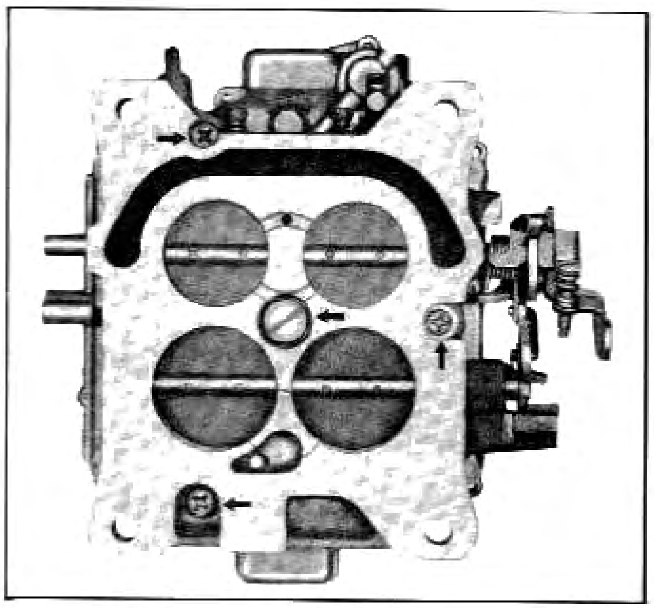


Fig. 6B-47 Location of Throttle Flange Screws

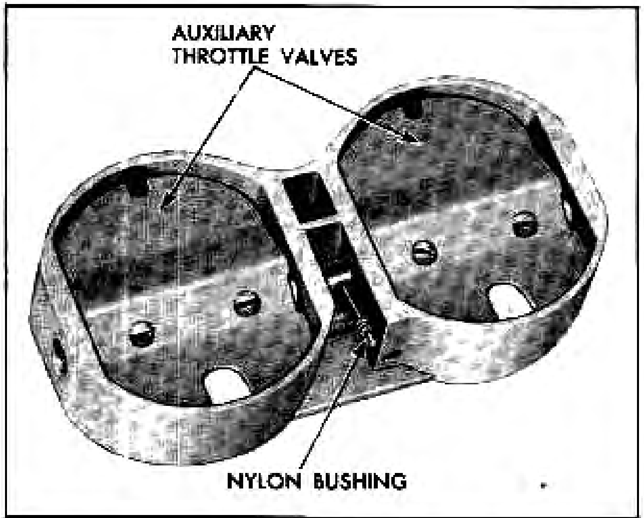


Fig. 6B-48 Auxiliary Throttle Valve Body

DISASSEMBLY OF THROTTLE FLANGE

1. Remove four throttle flange attaching screws and lockwashers and remove throttle flange (Fig. 6B-47).

2. Remove throttle flange gasket.

3. Remove idle mixture adjusting screws.

NOTE: The throttle flange and levers are serviced as a unit. No further disassembly of throttle flange should be attempted as it may be impossible to again reassemble throttle valves correctly in relation to vacuum and idle discharge orifices.

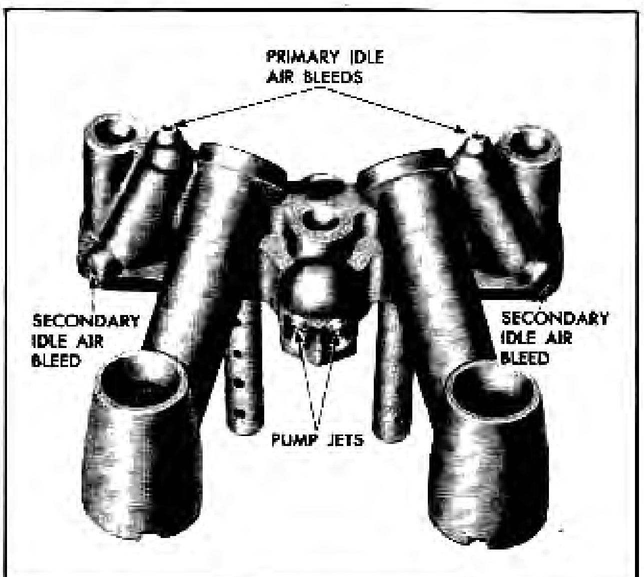


Fig. 6B-49 Passage Identification—Primary Venturi Cluster

DISASSEMBLY OF AUXILIARY THROTTLE BODY

As soon as the throttle flange has been removed from the float bowl, the auxiliary throttle valve assembly (Fig. 6B-48) can be easily removed from its recess in the float bowl by simply lifting it out. If it should stick in the carburetor body, hold the bowl upright and tap the auxiliary throttle valve casting at its ends with a long punch from above. NOTE: Do not attempt any further disassembly of the auxiliary throttle valve assembly. The spring tension is exactly calibrated and any change will completely upset the operation of the secondary side of the carburetor.

CLEANING AND INSPECTION OF PARTS

Dirt, gum, water or carbon contamination in the carburetor or on the exterior moving parts of a carburetor are often responsible for unsatisfactory performance. For this reason, efficient carburetion depends upon careful cleaning and inspection while servicing.

1. Thoroughly clean carburetor castings and all metal parts in clean carburetor cleaning solution. CAUTION: *Composition and plastic parts such as pump plunger and gaskets should not be immersed in cleaner.*

2. Blow out all passages (Figs. 6B-49 through 6B-53) in casting with compressed air and blow off all parts so they are free of cleaner (be sure to follow instructions furnished with cleaning solution). CAUTION: *Do not use drills or wire to clean out jets or ports as this may enlarge the opening and affect carburetor operation.*

3. Carefully inspect parts for wear and replace those which are worn. Check the following specific points:

a. Inspect choke piston and choke piston housing for carbon. If necessary to clean choke piston housing, remove Welch plug in the bottom of the housing. Plug can be removed by piercing center with a small pointed instrument and prying outward. Care should be exercised so that damage will not result to the casting when removing this plug. Before installing new plug, carbon present in piston cylinder slots should be removed and the Welch plug seat should be carefully cleaned.

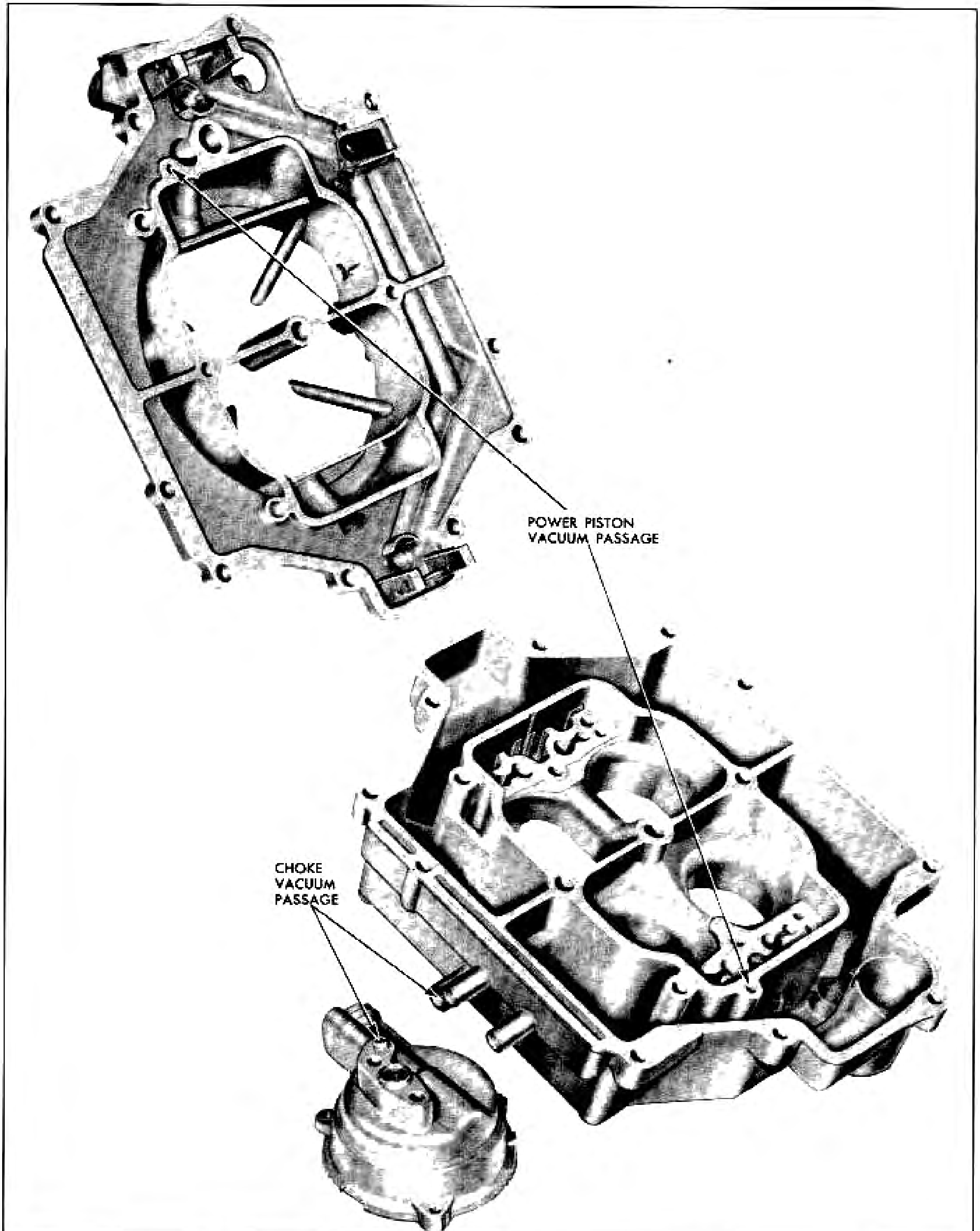


Fig. 6B-50 Passage Identification—Body-Air Horn-Choke Housing

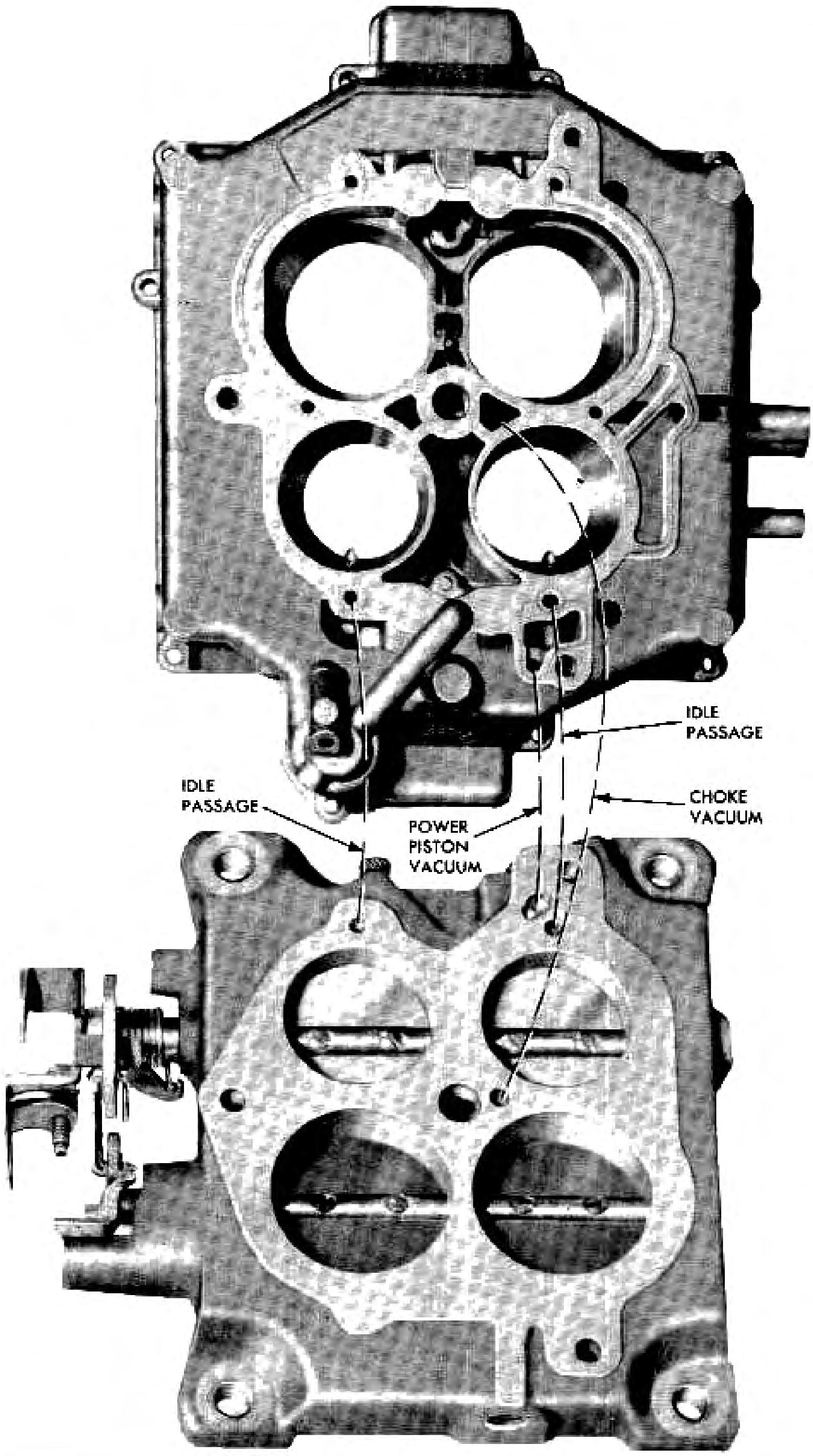


Fig. 6B-51 Passage Identification—Body to Flange

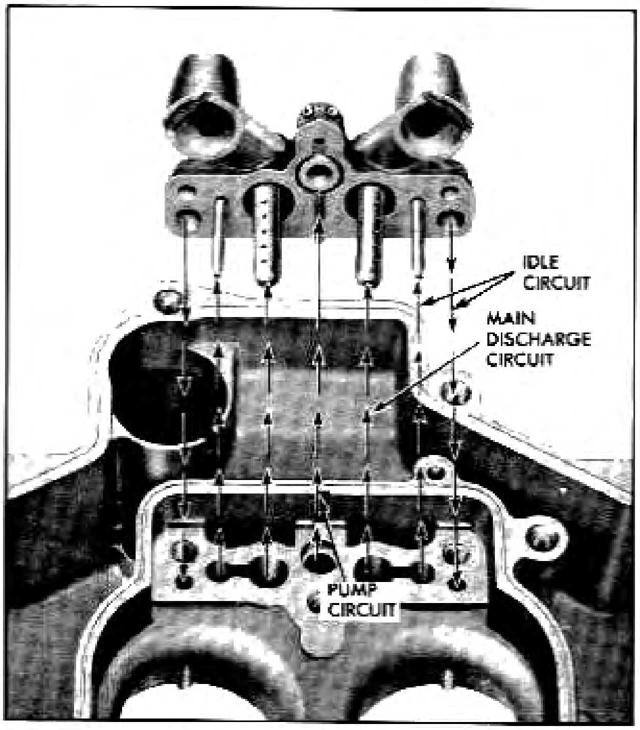


Fig. 6B-52 Passage Identification—Body to Cluster

b. Remove carbon from bores of throttle flange with sandpaper: never use emery cloth.

c. Inspect float needles and seats for wear; if worn, both needle and seat must be replaced.

d. Inspect float pins for excessive wear.

e. Inspect floats for dents and excessive wear on lip. Check for fluid inside floats by shaking. Replace float if any of above are present.

f. Inspect throttle shafts for excessive wear (looseness or rattle in body flange casting).

g. Inspect idle mixture adjusting screws for burrs. Replace if burred.

h. Inspect pump plunger assembly. If leather is not in good condition, replace plunger.

j. Inspect gasketed surfaces between body and air horn, and between body and flange. Small nicks or burrs should be smoothed down to eliminate air or fuel leakage. Be especially particular when inspecting choke vacuum passages and the top surface of the inner wall of the bowl.

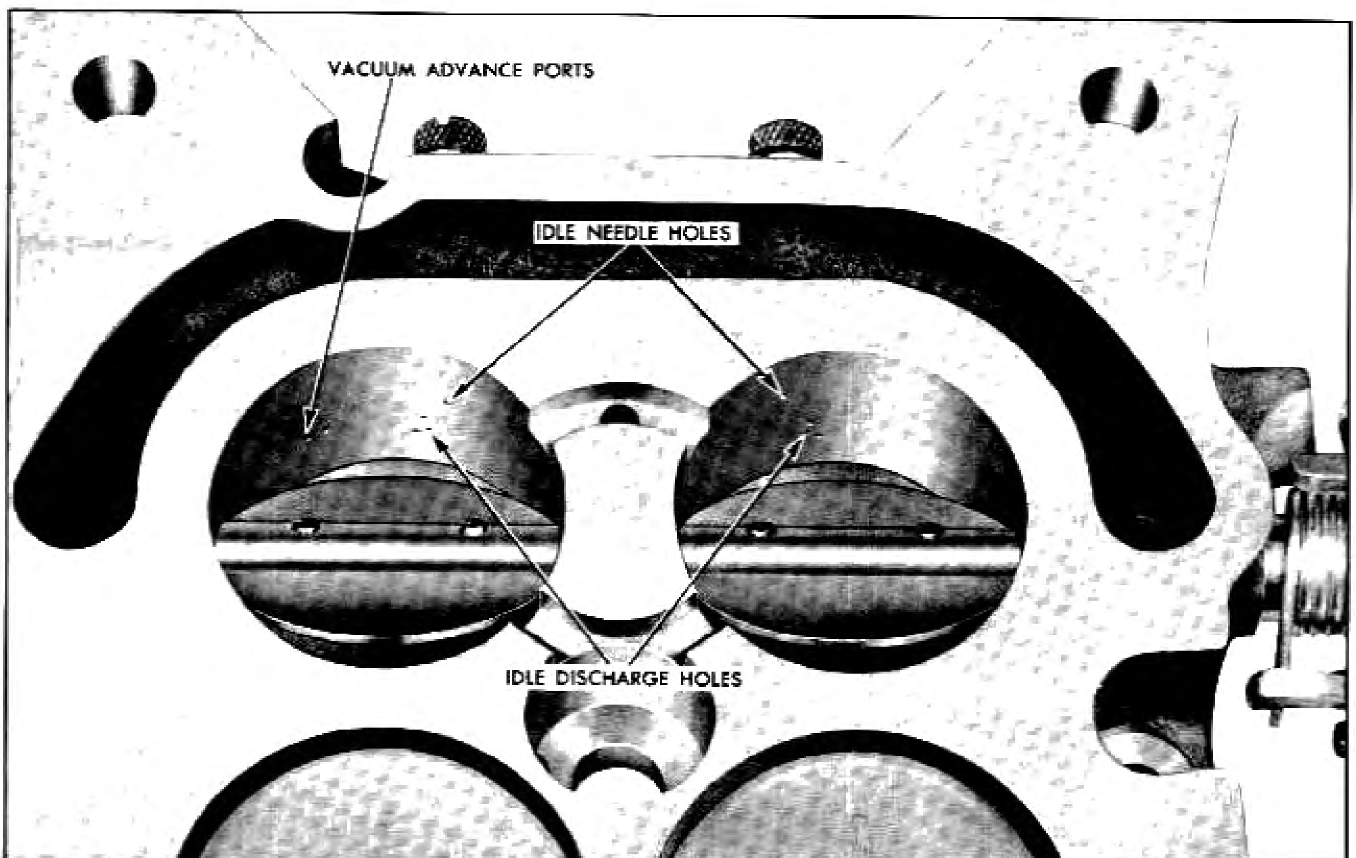


Fig. 6B-53 Passage Identification—Flange Inverted

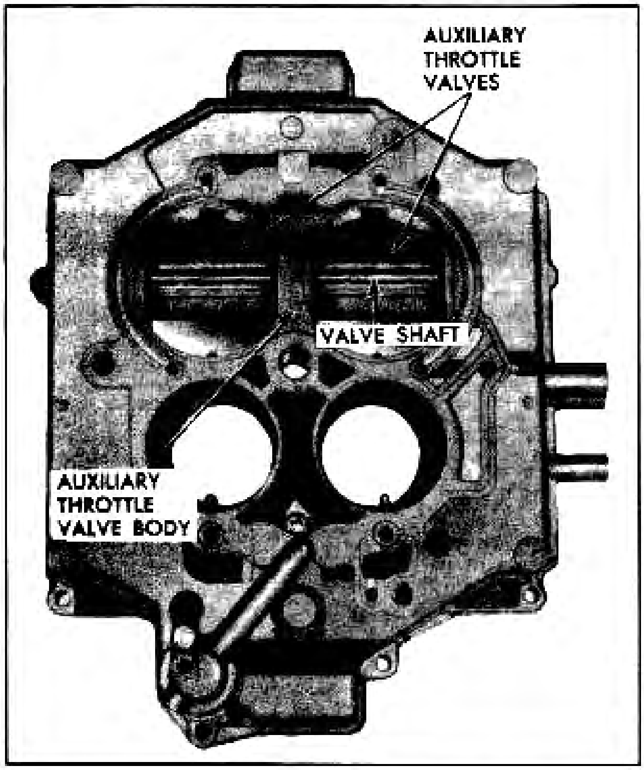


Fig. 6B-54 Auxiliary Throttle Valve Body Installed

k. Inspect holes in pump rocker arm, fast idle cam and throttle shaft lever. If holes are worn excessively or out of round to the extent of causing improper carburetor operation, the part should be replaced.

l. Inspect fast idle cam if excessive wear is noted on cam, it should be replaced to ensure proper engine operation during warm up.

m. Check all filter screens for lint or dirt. Clean or replace as necessary.

n. Check venturi clusters for loose or damaged parts. If damage or looseness exists, replace cluster assembly.

ASSEMBLY AND ADJUSTMENT

ASSEMBLY OF THROTTLE FLANGE

1. Place auxiliary throttle valve assembly in place in float bowl (Fig. 6B-54), then position throttle flange to bowl gasket on bowl, making sure all holes are properly aligned.

2. Place throttle flange on carburetor body and install four attaching screws. Tighten screws evenly and securely.

3. Install idle mixture adjusting screw assemblies. Tighten finger tight and back off 1½ turns for approximate adjustment.

ASSEMBLY OF CARBURETOR BODY

1. Place throttle flange assembly and carburetor on holding fixture J-5923 and install steel pump outlet ball, discharge spring and guide, aluminum inlet ball and pump return spring.

2. Replace the pump inlet screen if it was removed in disassembly.

3. Install primary and secondary main metering jets in their respective sides.

4. Install power valve assembly and gasket in primary side of carburetor body.

5. Install secondary venturi cluster and gasket using three attaching screws and lockwashers. NOTE: The secondary venturi cluster does not have pump discharge nozzles or idle tubes.

6. Install primary venturi cluster and gasket using three attaching screws and lockwashers.

7. Place new choke housing gasket on choke housing, insert intermediate choke shaft in place and assemble choke housing to bowl with two attaching screws.

8. Insert choke piston in its sleeve in the choke housing and attach choke piston lever to the intermediate choke shaft with the attaching screw.

9. Install lower end of intermediate choke rod in hole in intermediate choke shaft lever.

NOTE: Choke baffle plate and choke cover should be left out until the carburetor is assembled and the intermediate choke rod is adjusted at a later point in the procedure.

ASSEMBLY OF AIR HORN

1. Install power piston into air horn and stake lightly to retain piston during assembly.

2. Assemble rubber seal on pump plunger shaft.

3. Assemble pump plunger assembly into air horn making certain that the seal is properly located in air horn.

4. Assemble pump plunger shaft into operating lever and install horseshoe retainer.

5. Position gasket on air horn.

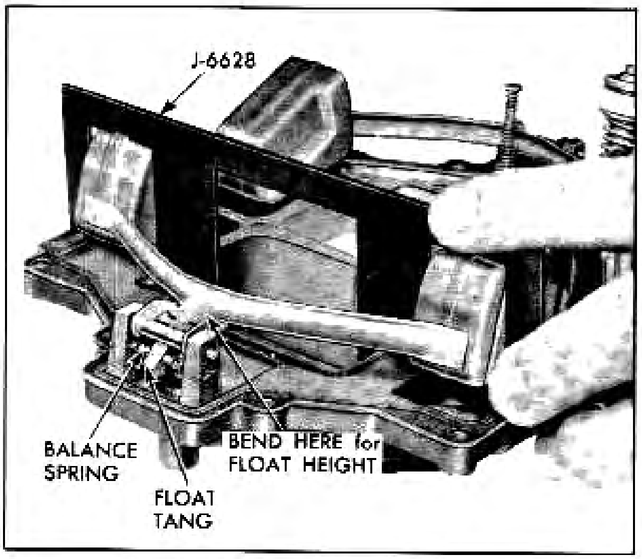


Fig. 6B-55 Float Level Adjustment

6. Install primary and secondary float needle seats, gaskets and inlet screens in air horn. **CAUTION:** *Needle seats must be installed on the same sides from which they were removed to match their respective float needles.*

7. Install float and needle assembly and hinge pin on primary side.

8. Install float and needle assembly and hinge pin on secondary side. **NOTE:** Make sure float tang is installed outside float balance spring as shown in Fig. 6B-55.

FLOAT LEVEL ADJUSTMENT

1. With air horn gasket in place, position float level gauge J-6628 over floats so that gauge is located against the curvature in bore of the carburetor air horn (Fig 6B-55).

2. Bend float arms at center so floats just contact gauge as shown in Fig. 6B-55. The vertical height should be $1\frac{3}{8}'' \pm \frac{1}{32}''$.

3. If necessary, bend float arms horizontally until each float pontoon is centered between gauge legs.

4. Repeat same adjustment on the opposite float assembly. **NOTE:** With air horn inverted, lower tip of float should clear air horn casting. This ensures needle valve will fully close.

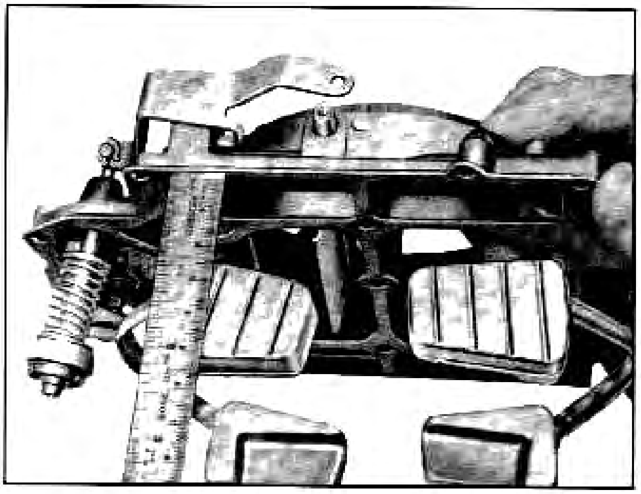


Fig. 6B-56 Float Drop Adjustment

FLOAT DROP ADJUSTMENT

1. Check distance between air horn and bottom of float with air horn held in upright position (Fig. 6B-56). Float drop is correct when distance between air horn, with gasket installed, and lowest point on float is $1\frac{13}{16}'' \pm \frac{1}{32}''$.

2. If adjustment is necessary, bend float tang toward float needle seat to lessen drop and away from seat to increase drop (See Fig. 6B-55).

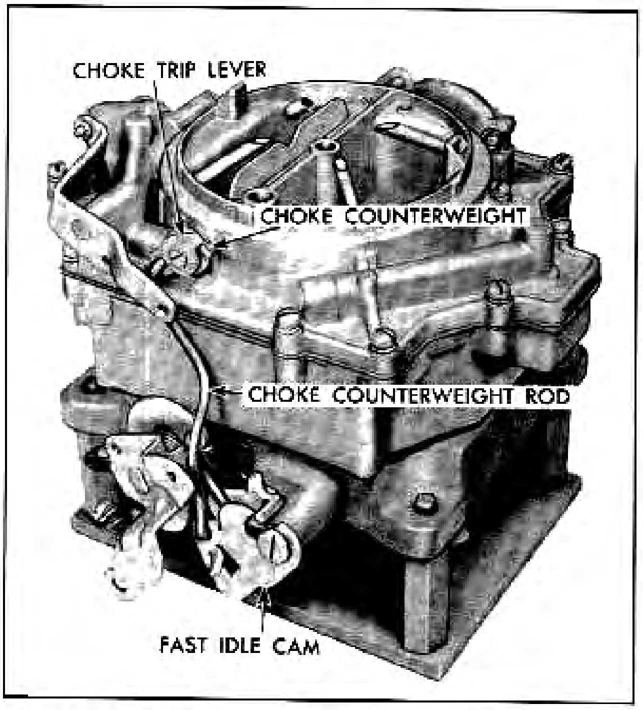


Fig. 6B-57 Choke Counterweight Trip Lever and Fast Idle Cam Installed

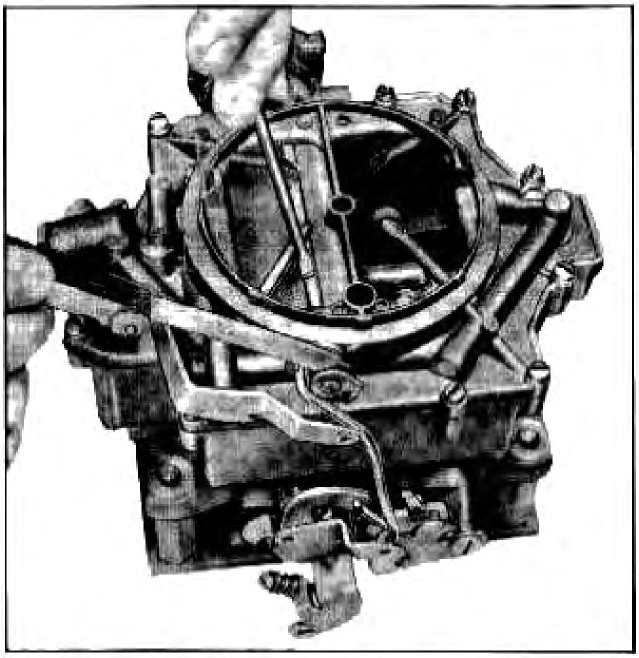


Fig. 6B-58 Spacing the Choke Valve

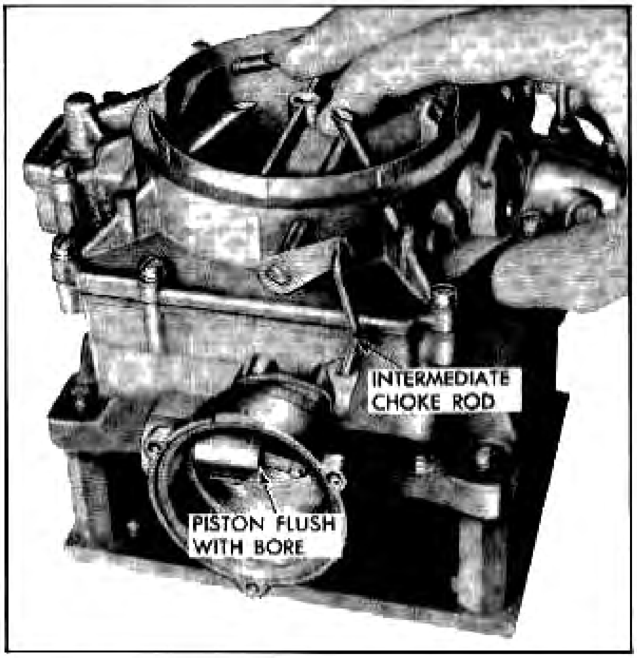


Fig. 6B-59 Intermediate Choke Rod Adjustment

COMPLETION OF CARBURETOR ASSEMBLY

1. Install air horn assembly on body being careful to guide pump plunger into well. Check to see that floats are lined up correctly so that they will not bend.

2. Align air horn and gasket to screw holes in body.

3. Start but do not tighten 13 air horn attaching screws.

4. Tighten evenly and securely all inner attaching screws, then tighten outer screws.

5. Install choke shaft in air horn.

6. Slide choke valve through shaft so letters "RP" are facing up when choke valve is closed.

7. Just start, but do not tighten, choke valve attaching screws.

8. Install choke counterweight, trip lever and fast idle cam. (Fig. 6B-57).

9. To provide correct fit of choke valve in air horn push lightly on choke shaft to obtain a minimum clearance of .020" between trip lever and counterweight (Fig. 6B-58). While holding in this position, tighten choke valve retaining screws.

10. Attach upper end of intermediate choke rod to choke shaft lever.

11. Holding choke valve completely closed, bend intermediate link if necessary so that the end of the choke piston is flush to 1/32" out of the choke piston bore (Fig. 6B-59).

12. Place baffle plate in position in choke housing.

13. Install thermostat cover, coil assembly, gasket, retaining screws and retainers. Leave screws loose.

14. Rotate cover counterclockwise until the coil picks up the tang, set choke at "Index". Tighten retaining screws.

15. Install pump rod to pump rocker arm and throttle lever with clip and horseshoe retainer.

16. Install fuel inlet fitting, screen and gasket in air horn.

ADJUSTMENTS

The float adjustments have been described and made during assembly of the air horn. The remaining adjustments should be made in the following sequence:

1. Pump Rod Adjustment.
2. Idle Vent Adjustment.
3. Choke Rod Adjustment.
4. Secondary Throttle Lockout Adjustment.

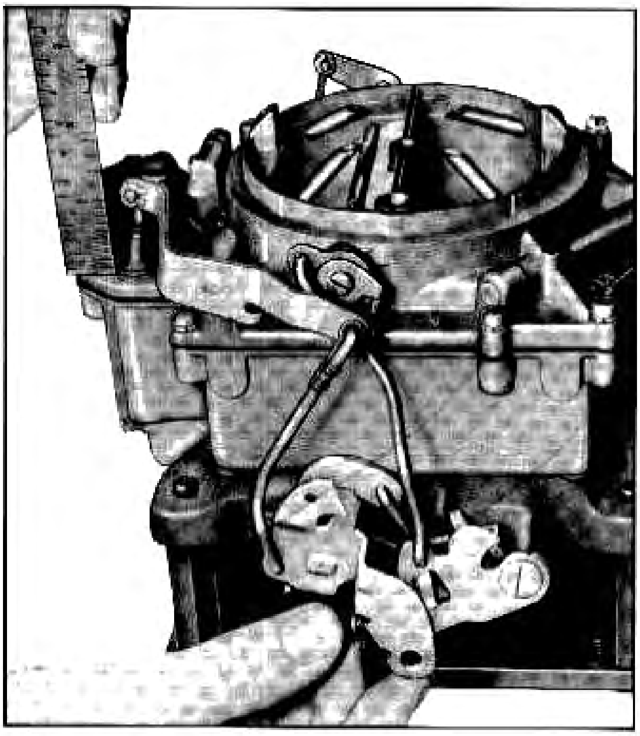


Fig. 6B-60 Pump Rod Adjustment

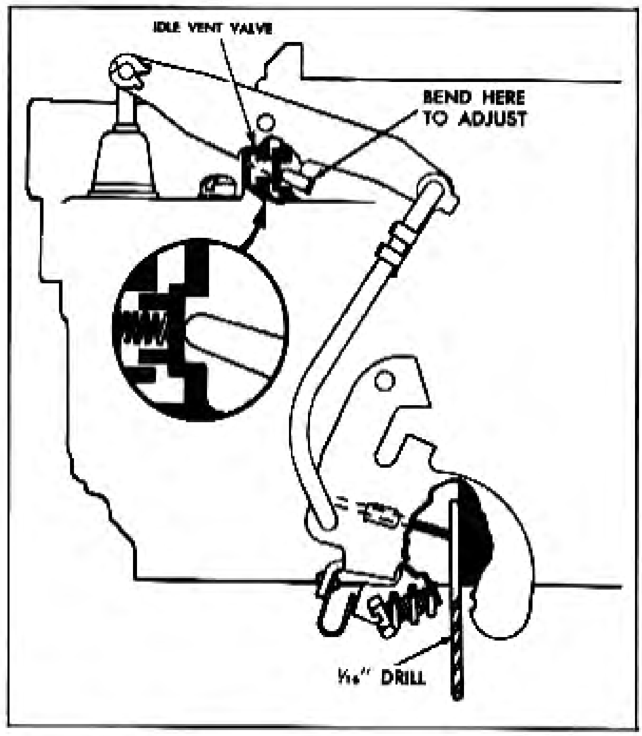


Fig. 6B-61 Idle Vent Valve Adjustment

5. Secondary Throttle Contour Clearance Adjustment.

Pump Rod Adjustment

1. Back off idle speed screw so that throttle valves are completely closed.

2. Hold throttle closed and measure from top of air horn casting to bottom of pump plunger rod (Fig. 6B-60). Distance should be $^{15}/_{16}$" $\pm ^{1}/_{64}$". Bend pump rod to correct.

3. Operate pump shaft several times to assure free movement.

Idle Vent Adjustment

With the throttle valves closed against a $^{1}/_{16}$" drill the idle vent contact tang on the pump lever should be in a position such that the valve is just closed (Fig. 6B-61). Bend the tang if necessary to adjust.

Choke Rod Adjustment

1. Turn idle speed screw in until it just contacts second step and is against shoulder of high step of fast idle cam.

2. Be certain that choke trip lever is in contact with choke counterweight lever.

3. There should be .052"—.072" clearance (use $^{1}/_{16}$" drill as gauge) between top edge of choke valve and dividing wall in the air horn (Fig. 6B-62). Bend choke rod at lower angle if necessary to adjust.

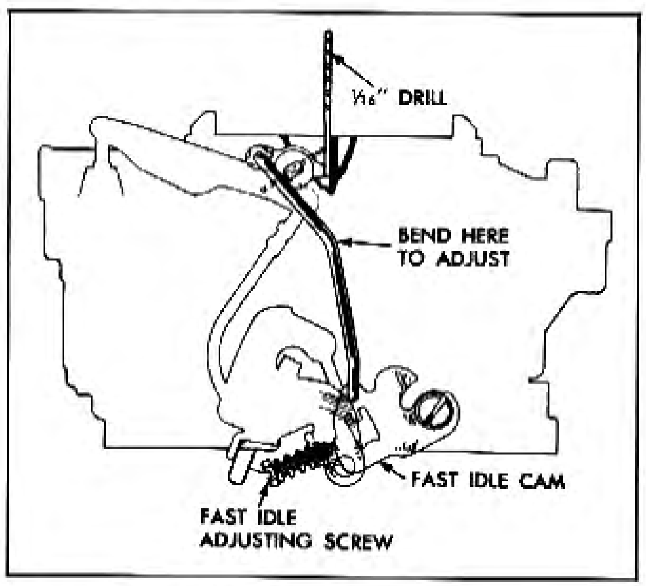


Fig. 6B-62 Choke Rod Adjustment

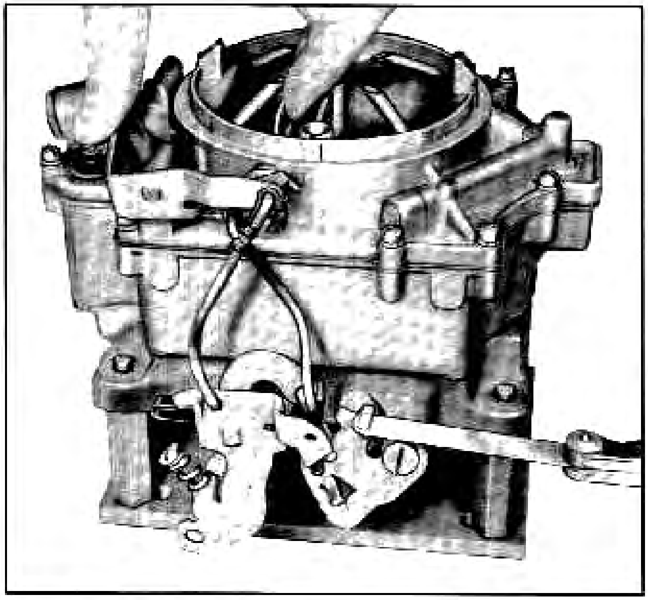


Fig. 6B-63 Contour Clearance Adjustment

Secondary Throttle Contour Clearance Adjustment

1. With choke valve held wide open and the fast idle cam and secondary lockout lever positioned as shown in Fig. 6B-63, there should be a clearance of .010"–.020" between the cam and the tang.

2. Bend tang vertically to adjust.

Secondary Throttle Lockout Adjustment

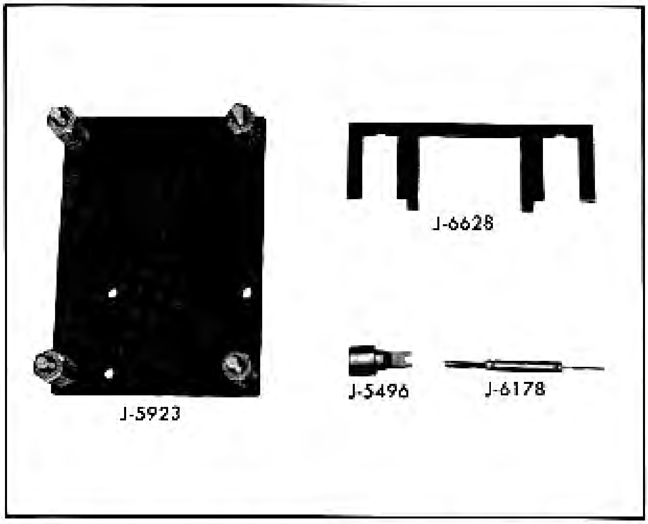
1. With the choke valve closed so that secondary lockout tang is in the fast idle cam slot, check clearance between fast idle cam and tang. The clearance should be .010"–.020".

2. Bend tang horizontally to adjust.

TROUBLE DIAGNOSIS AND TESTING

EXCESSIVE LEANNESS

Excessive leanness during cold engine operation may



indicate that the secondary throttle valves are partially open. Check the secondary lockout and check for too rapid choke opening.

GASOLINE FUMES ON SHARP TURNS

Check idle vent valve adjustment. Also check condition of flapper valve below idle vent valve.

In all other respects 4-jet trouble diagnosis is the same as on the 2-jet carburetor. See page 6B-14 for 2-jet trouble diagnosis.

ROCHESTER 4GC 4-JET CARBURETOR ADJUSTMENT SPECIFICATIONS

Float Level	$1\frac{3}{8}'' \pm \frac{1}{32}''$
Float Drop	$1\frac{13}{16}'' \pm \frac{1}{32}''$
Pump Rod	$1\frac{5}{16}'' \pm \frac{1}{64}''$
Choke Rod	.052" to .072"
Unloader	.100" to .130"

ROCHESTER 4-JET SPECIAL TOOLS

J-5496	Bending Tool
J-5923	Holding Stand
J-6178	Choke Unloader Gauge
J-6628	Float Level Gauge

GENERAL DESCRIPTION
CARTER AFB 4-BARREL CARBURETOR

The Carter AFB 4-Barrel carburetor is used in mixed production with the Rochester 4 GC 4-Jet carburetor.

The Carter 4-Barrel carburetor is composed of two major assemblies, an air horn assembly and a combined throttle body and bowl called the body assembly. The air horn and body are made of cast aluminum.

The Carter AFB carburetor is basically two dual carburetors in one assembly. The half of the carburetor containing the step up rods, pump assembly and idle system is called the primary side of the carburetor. The other half is called the secondary side.

The carburetor contains the conventional carburetor circuits. They are:

Float Circuits
Low Speed Circuit
High Speed Circuits
Pump Circuit
Choke Circuit

FLOAT CIRCUIT (FIG. 6B-64)

The purpose of the float circuit is to maintain the correct fuel level in the carburetor bowl at all times. The Carter AFB carburetor has two separate float circuits. Each float operates in its own float bowl and each bowl supplies fuel to a primary low speed circuit and to a primary and secondary high speed circuit. The two circuits operate identically.

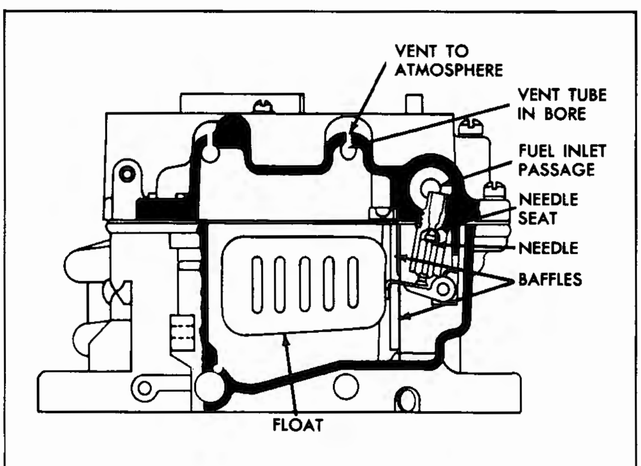


Fig. 6B-64 Float Circuit

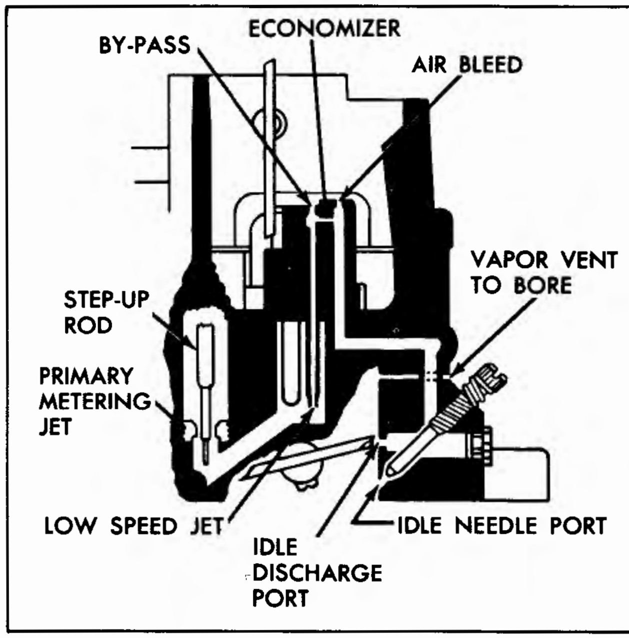


Fig. 6B-65 Low Speed Circuit

When the fuel level in the bowl drops the float also drops allowing the needle to fall away from its seat. Fuel at the fuel inlet under fuel pump pressure will then enter through the strainer screen past the needle and seat and into the float bowl. As the fuel level rises in the bowl the needle valve is seated cutting off the flow of fuel.

The intake needle seats are installed at an angle to give positive seating action of the intake needles. Intake needles and seats are carefully matched in manufacture and tested to ensure against fuel leakage. They should therefore always be used in pairs and not intermixed.

The bowl areas are vented to the inside of the air horn, to atmosphere and to each other to ensure equal pressure on the surface of the fuel at all times and to allow the escape of fuel vapors. Baffles are used in the bowl area to minimize fuel turbulence.

LOW SPEED CIRCUIT (FIG. 6B-65)

Fuel for idle and early part throttle operation is metered through the low speed circuits on the primary side of the carburetor. With the throttle valves closed, manifold vacuum exists at the idle needle port and idle discharge port. Atmospheric pressure will then force fuel through the primary metering jet and up through the low speed jet. The fuel picks up air at the bypass and is metered and broken up in the economiser passage. The fuel mixture then passes by another air bleed, down the idle passage and is

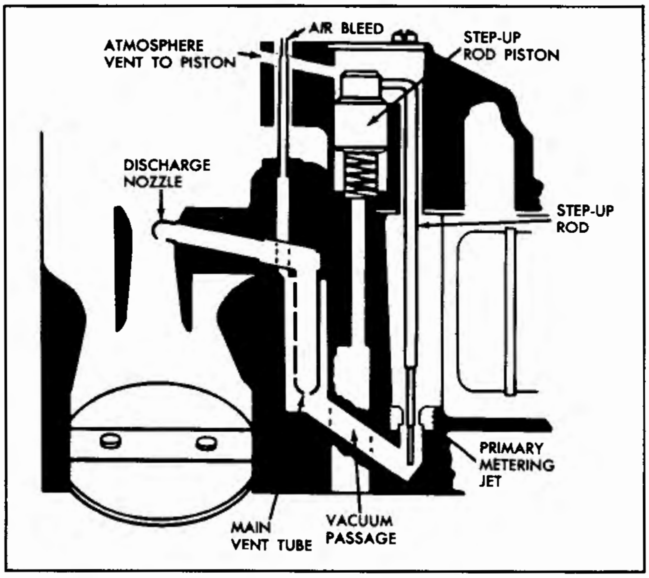


Fig. 6B-66 High Speed Circuit—Primary Side

discharged at the idle discharge port and the idle needle port.

The idle ports are slot-shaped. As the throttle valves are opened, more of the idle ports are uncovered allowing a greater quantity of fuel mixture to enter the carburetor bores. The secondary throttle valves remain closed at idle.

To aid in hot starting, vapor vents are provided in the throttle bores.

HIGH SPEED CIRCUIT—PRIMARY SIDE (FIG. 6B-66)

Fuel for late part throttle and full throttle operation is supplied through the high speed circuit.

As the throttle valves are opened air flow through the carburetor increases to the point that fuel is picked up at the discharge nozzles located in the main venturi. The pressure differential caused by the rapid flow of air through the venturi forces fuel

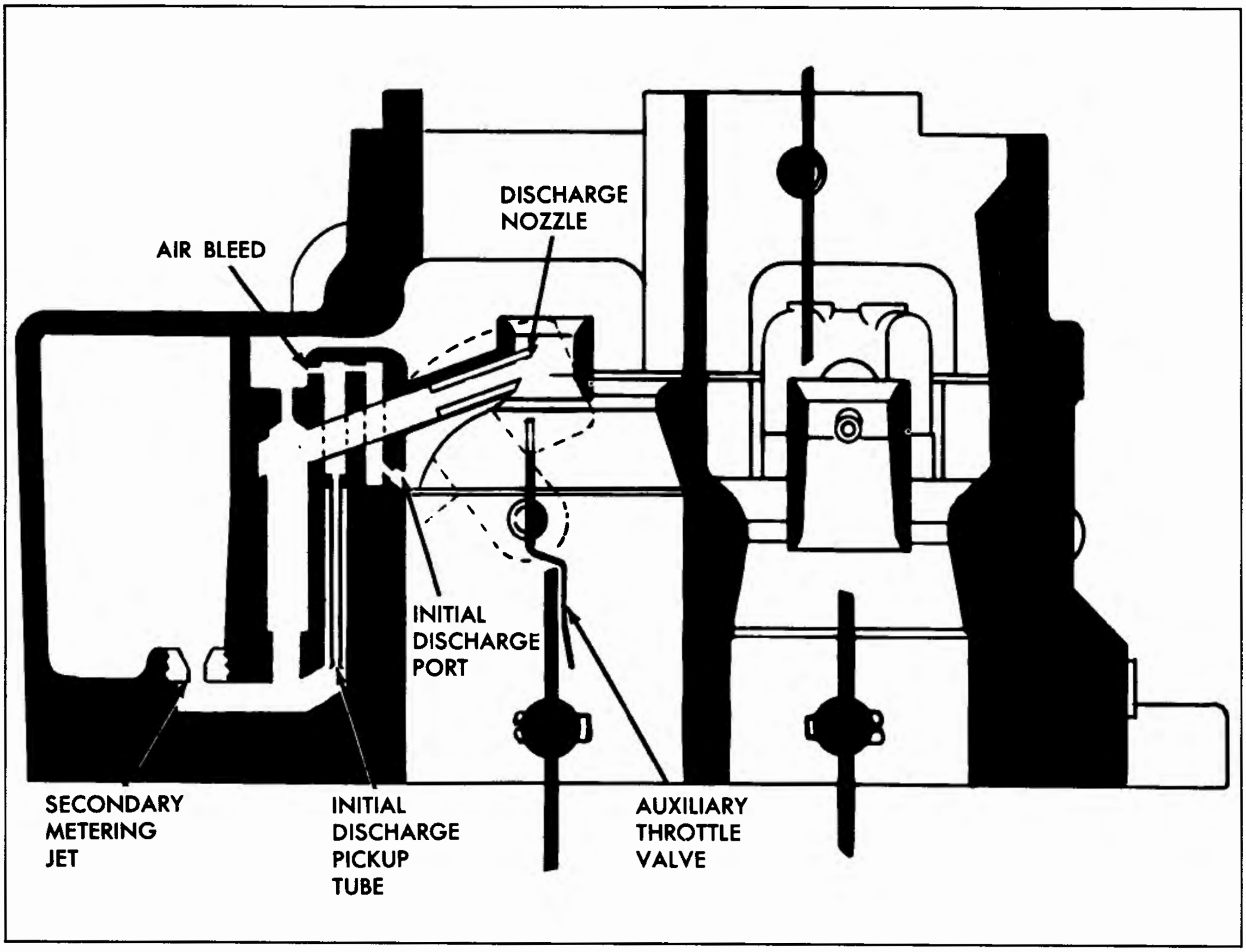


Fig. 6B-67 High Speed Circuit—Secondary Side through the primary metering jet up through the main vent tube. After picking up air at the air bleed the mixture is forced out through the main discharge nozzle. The air bleed in the high speed circuit also serves as an anti-percolator passage.

The amount of fuel delivered through the primary high speed circuit is dependent upon air flow or throttle valve opening and by the position of the step-up rods in the primary main metering jets. The step-up rods are controlled entirely by manifold vacuum. When manifold vacuum is high the step-up rod piston and step-up rod are held downward, restricting the flow of fuel through the primary main metering jet. Under any operating condition that reduces manifold vacuum such as acceleration or hill climbing the step-up rod piston spring raises the step-up rod positioning the smaller diameter or power step in the jet. This allows additional fuel to be metered through the jet. The step-up rods are not adjustable.

HIGH SPEED CIRCUIT— SECONDARY SIDE (FIG. 6B-67)

The throttle valves in the secondary side remain closed until the primary throttle valves open a predetermined amount (approximately 50° of throttle opening). They arrive at the wide open position at the same time as the primary throttle valves.

Mounted above the secondary throttle valves are the auxiliary throttle valves. These valves are opened by air flow and closed by counterweights. When the secondary throttle valves open, only the primary high speed circuit will function until there is sufficient air velocity to open the auxiliary throttle valves. When the auxiliary valves open, fuel will be supplied through the secondary high speed circuit.

Fuel for the secondary side is metered through the secondary main metering jets. No step-up rods are used.

To supplement the starting of the secondary high speed circuit an initial discharge system is used. Initial discharge ports are located next to the venturi struts. When the auxiliary valves start to open, a low pressure area results at these ports and atmospheric pressure forces fuel up the pick-up tube. Air is picked up at the air bleed and the mixture enters the air stream at the initial discharge ports. As the auxiliary valves continue to open and the secondary nozzles begin to function, pressure increases at the discharge ports and their operation ceases.

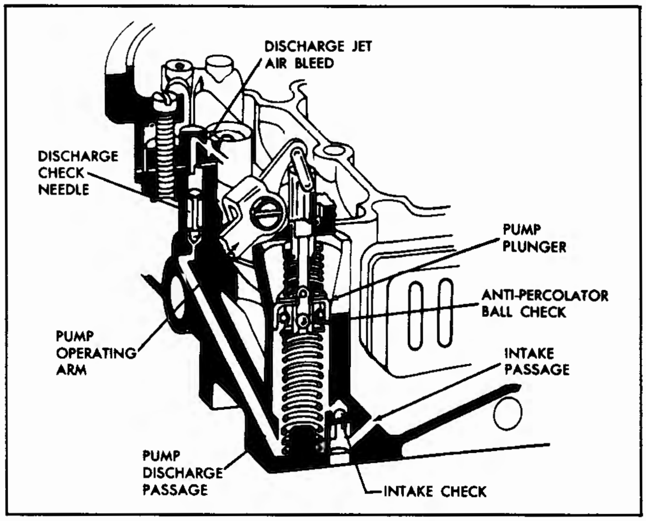


Fig. 6B-68 Pump Circuit

PUMP CIRCUIT (FIG. 6B-68)

The accelerating pump circuit located in the primary side provides for a measured amount of fuel to be discharged into the carburetor throat during acceleration from low car speeds. A rapid opening of the throttle valves, as is the case when accelerating from low speeds, causes an immediate increase in air velocity. Since fuel is heavier than air it requires a short period of time for it to "catch up" with the air flow. To avoid a leanness during this momentary lag, the accelerator pump furnishes a quantity of liquid fuel, sprayed into the air stream to mix with incoming air and maintain the proper fuel-air mixture. The pump is operated by the combined action of two springs which are calibrated to move the plunger in such a manner that a sustained charge of fuel is delivered for smooth acceleration.

The pump is attached by linkage to the accelerator so that when the throttle valves are closed the pump plunger moves upward in its cylinder creating a low pressure area (partial vacuum) in the cylinder below the plunger. Atmospheric pressure acting on the fuel in the bowl forces fuel into this cylinder through the intake ball check. The discharge needle is seated at this time to prevent air being drawn into the cylinder.

When the throttle is opened, the friction of the plunger in the cylinder and the tension of the lower plunger spring resists the downward movement of the pump plunger causing the plunger shaft to telescope. This compresses the upper spring. The upper spring then overcomes the resistance and pushes the plunger down. However, the speed of the plunger is retarded by the lower spring so that a sustained charge of fuel is released into the system. The movement of the plunger exerts a pressure in the cylinder which seats the intake ball check preventing fuel from being forced back into the bowl. The same pressure also forces fuel up the discharge passage, unseating the pump discharge needle, and on through the pump jets in the cluster where it is sprayed into the carburetor throat.

At higher speeds, pump discharge is no longer necessary to insure smooth acceleration. When the throttle valves are opened a predetermined amount, the pump plunger bottoms in the cylinder eliminating pump discharge.

During high speed operation, a vacuum exists at the pump discharge ports. To prevent atmospheric pressure from forcing fuel to these ports and into the system, the pump jets are vented. This allows air instead of fuel to be forced through the pump discharge ports.

An "anti-percolator" check valve, contained inside the plunger, provides relief for any vapors which might form during hot idle or when a hot engine is not operating. The ball check is designed so that it can move up and down in its passage. Throughout the above periods it is unseated by gravity and vapors in the pump well rise and by-pass the ball check through small holes in the plunger head.

The "anti-perc" ball check also acts as an extra inlet during the upstroke of the plunger, but is seated by fuel when the plunger moves down.

CHOKE CIRCUIT (FIG. 6B-69)

The purpose of the choke system is to provide a very rich mixture for cold engine operation.

The choke system subjects all fuel outlets in the bore of the carburetor to manifold vacuum while restricting the intake of air.

The choke system includes a thermostatic coil, housing, choke piston, choke valve, and fast idle cam and linkage. It is controlled by a combination of intake manifold vacuum, air velocity against the offset choke valve, atmospheric temperature and hot air from the intake manifold.

When the engine is cold, tension of the thermostatic coil holds the choke valve closed. Starting the engine causes air velocity to strike the offset choke valve. This tends to open it along with the action of intake manifold vacuum on the choke piston. Thus, after a slight opening of the choke valve, the tension of the

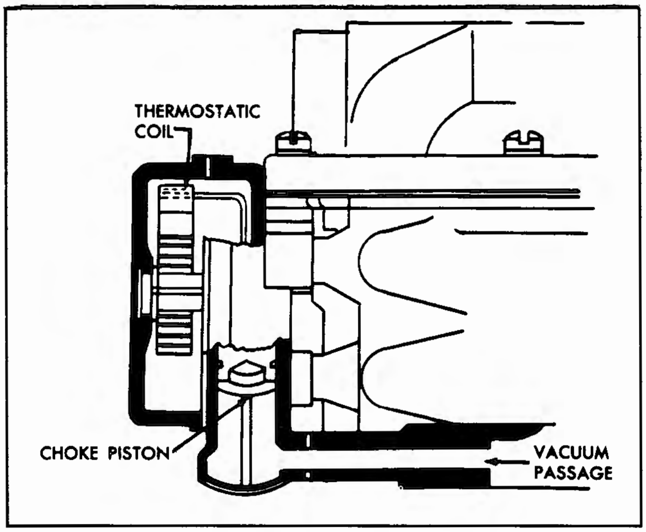


Fig. 6B-69 Choke Circuit

thermostatic coil spring balances the force of air on the valve and the pull of vacuum at the piston.

At the cold idle position, slots located in the sides of the choke piston cylinder are uncovered, exposing them to intake manifold vacuum. Air, heated in a tube running through the exhaust cross-over passage in the intake manifold, then fills this low pressure area in the choke housing. The flow of warm air heats the thermostatic coil and causes it to lose its tension until full choke valve opening is accomplished. A secondary baffle plate is located in the choke housing to distribute the warm air evenly over the thermostatic coil. Thereby insuring gradual relaxation of the coil. The baffle revolves with the choke valve and prevents the warm air from striking the thermostatic coil until the choke valve opens a predetermined amount. This delays choke opening.

If the engine is accelerated during the warm-up period, the corresponding drop in manifold vacuum allows the thermostatic coil to momentarily close the choke, providing a richer mixture.

To combat engine stalling during warm-up on cool, humid days, caused by "carburetor icing", heated air from the choke housing is circulated through a passage in the base of the carburetor flange.

During the warm-up period, it is necessary to provide a fast idle to prevent engine stalling. This is accomplished by a fast idle cam connected to the choke shaft. The fast idle adjusting screw on the throttle lever contacts the fast idle cam and prevents the throttle valves from returning to a normal warm engine idle position until the choke is open.

If, during the starting period, the engine becomes flooded the choke valve can be partially opened manually to allow increased air flow through the carburetor. This is accomplished by depressing the accelerator pedal forcibly to the floor and engaging the starter. The unloader projection on the throttle lever contacts the unloader lug on the fast idle cam and in turn partially opens the choke valve.

ADJUSTMENTS ON CAR

All Carter adjustments can be performed on the car. All adjustments are included in the "Overhaul and Adjustments" procedure, with the exception of the idle speed and mixture adjustment, on the car fast idle adjustment, and the unloader adjustment. Following are the idle speed, mixture, and the unloader adjustments.

IDLE SPEED AND MIXTURE ADJUSTMENT

With the engine at operating temperature adjust idle speed to the following specifications.

Syncho-Mesh	450 - 470 R.P.M.
All Hydra-Matic Except Air Conditioning	430 - 450 R.P.M. in drive range
All Air Conditioning	500 - 520 R.P.M. in drive range Air Conditioning off

The idle mixture adjustment should be adjusted to give a smooth idle at the specified idle speed. Missing is a sign of too lean an idle mixture, while "rolling" or "loping" indicates too rich a mixture. Turning in the idle mixture adjusting screw leans out the idle mixture. One and one-half turns out from the lightly seated position may be used as a preliminary setting of the idle mixture adjusting screw before making the final setting.

FAST IDLE ADJUSTMENT

1. Start engine and run until engine reaches normal temperature.

2. Move fast idle cam so that highest step is under end of fast idle screw.

3. Observing tachometer, adjust fast idle screw to give an engine speed of 1900 RPM.

UNLOADER ADJUSTMENT

1. Remove carburetor air cleaner assembly.

2. Depress accelerator pedal forcibly to floor. (This should be done by person sitting in driver's seat of car to simulate actual driving conditions.) Check to see that accelerator pedal is not hitting "hump" over transmission. Move upper end of pedal to left if necessary by enlarging left hand hole in accelerator pedal bracket, and rotating bracket counterclockwise.

3. With accelerator pedal depressed as in step 2, bend tang on throttle lever to give a clearance of $\frac{1}{8}'' \pm \frac{1}{64}''$ (gauge J-818-5) between the top of the choke valve and the inside of the air horn.

4. Replace air cleaner assembly.

The above procedure will eliminate variance in linkage, floor mat, pedal location, etc. and should ensure correct unloader action.

OVERHAUL AND ADJUSTMENTS CARTER MODEL AFB CARBURETOR

DISASSEMBLY

DISASSEMBLY OF AIR HORN

1. Place carburetor on stand J-5923 and remove gasoline inlet strainer nut, gasket and inlet screen. (Fig. 6B-70).

2. Remove throttle connector rod and anti-rattle spring. (Fig. 6B-70).

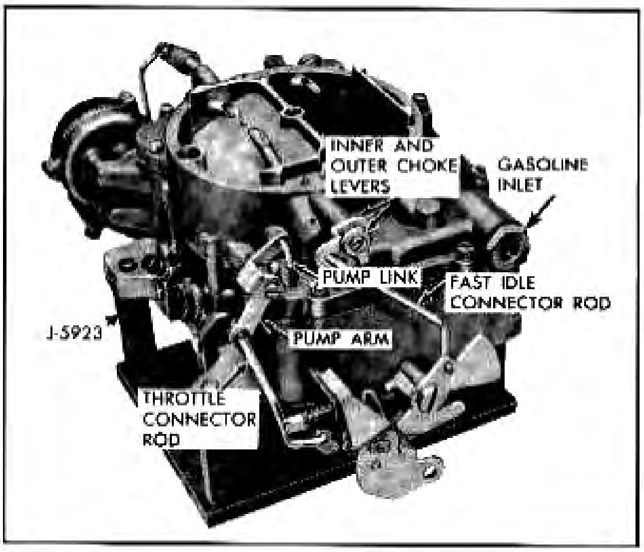


Fig. 6B-70 Carter AFB Carburetor

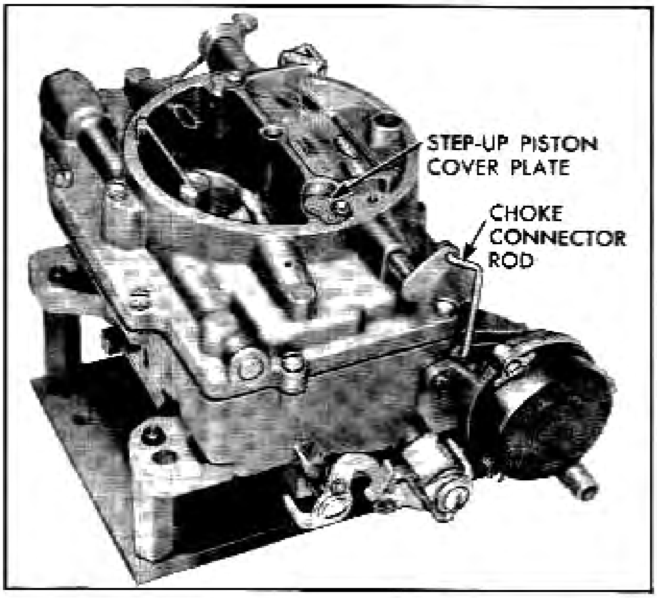


Fig. 6B-71 Carter AFB Carburetor

3. Remove fast idle connector rod at upper end. (Fig. 6B-70).

4. Remove choke connector rod. (Fig. 6B-71).

5. Remove two step-up piston cover plate attaching screws and cover plates. (Fig. 6B-71).

6. Remove two step-up rods and step-up pistons. If desired, step-up rod may be separated from piston by unhooking step-up rod retaining spring from end of rod. (Fig. 6B-72). Remove two step-up rod piston springs.

7. Remove choke shaft lever retainer screw, inner and outer choke shaft levers and washers from end of choke shaft. (Fig. 6B-70).

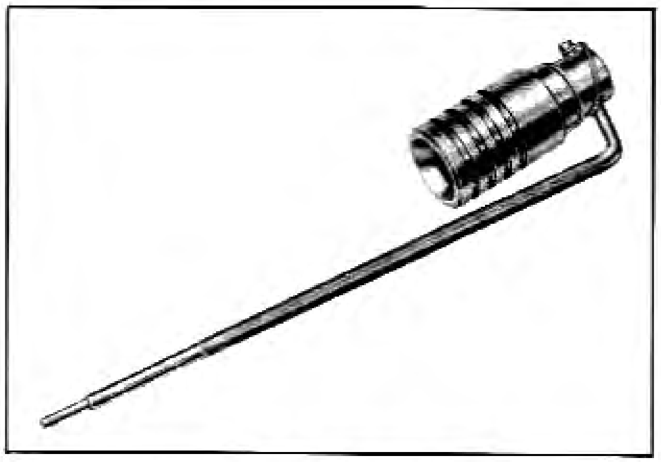


Fig. 6B-72 Step-Up Rod and Piston Assembly

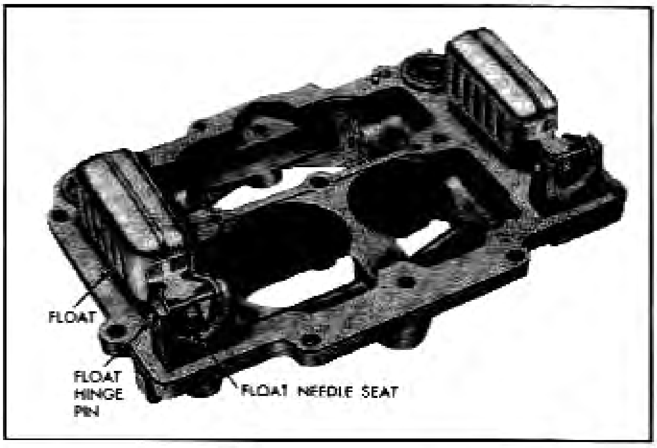


Fig. 6B-73 Air Horn Assembly

8. Remove two choke valve attaching screws and choke valve.

9. Remove 10 air horn attaching screws and lift off air horn assembly.

10. Slide choke shaft from air horn.

11. Remove pump arm and link and pump plunger assembly. (Fig. 6B-70).

12. Remove float hinge pin, float and float needle assembly on inlet side of carburetor. (Fig 6B-73).

13. Remove float needle seat and gasket using wide blade screw driver. NOTE: Keep individual float parts grouped so that same needle and seat are used together.

14. Remove remaining float hinge pin, float, float needle, float needle seat and gasket.

15. Remove air horn gasket.

DISASSEMBLY OF CARBURETOR BODY ASSEMBLY

1. Remove three choke coil housing attaching screws and choke coil housing and thermostatic coil.

2. Remove coil housing gasket and baffle plate.

3. Remove choke lever attaching screw and retaining washer. (Fig. 6B-74). Remove choke piston, lever and link assembly by rotating piston from bore.

4. Remove three choke housing to body attaching screws (Fig. 6B-74) and remove choke housing and gasket.

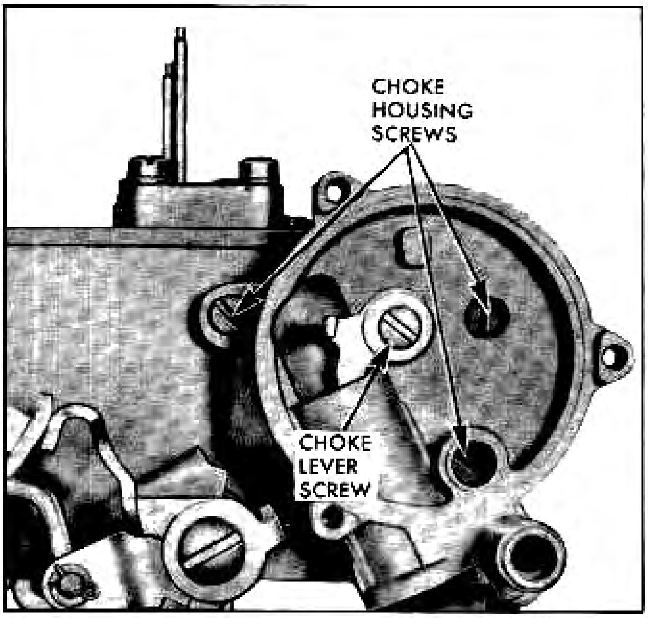


Fig. 6B-74 Location of Choke Housing Screws

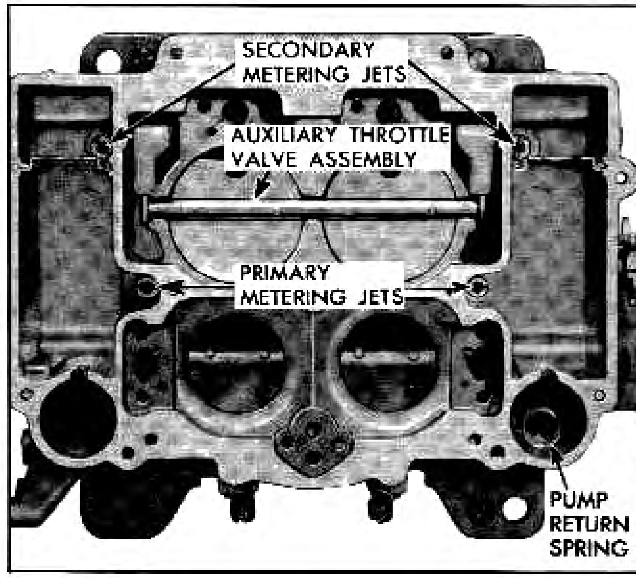


Fig. 6B-76 Body Assembly with Clusters Removed

5. Remove lower choke lever and shaft from choke housing.

6. Remove pump jet cluster and gasket. (Fig. 6B-75).

7. Remove two screws and primary venturi and gasket on pump side. (Fig. 6B-75).

8. Remove two screws and primary venturi and gasket on choke side. NOTE: The venturi assemblies are not interchangeable.

9. Remove secondary venturii on pump and choke sides. (Fig. 6B-75).

10. Lift out auxiliary throttle valve, shaft and weight assembly. (Fig. 6B-76). If necessary the auxiliary throttle valves can be removed from the shaft by removing attaching screws.

11. Remove two primary metering jets. (Fig. 6B-76).

12. Remove two secondary metering jets. (Fig. 6B-76).

13. Remove pump return spring. (Fig. 6B-76).

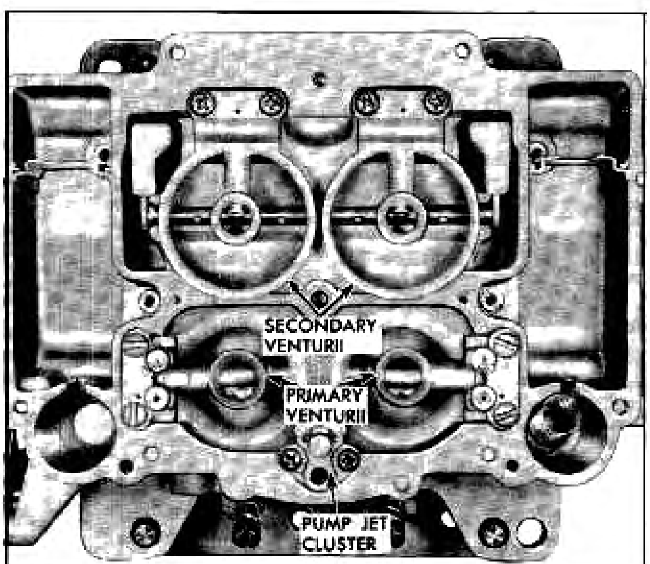


Fig. 6B-75 Top View of Carburetor Body Assembly

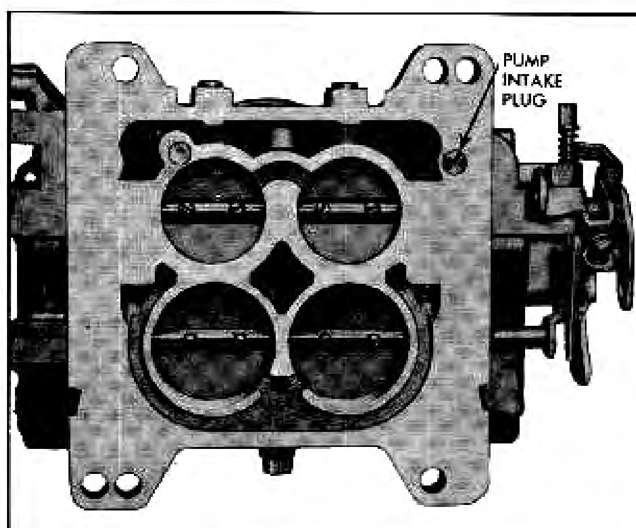


Fig. 6B-77 Location of Pump Intake Screw Plug

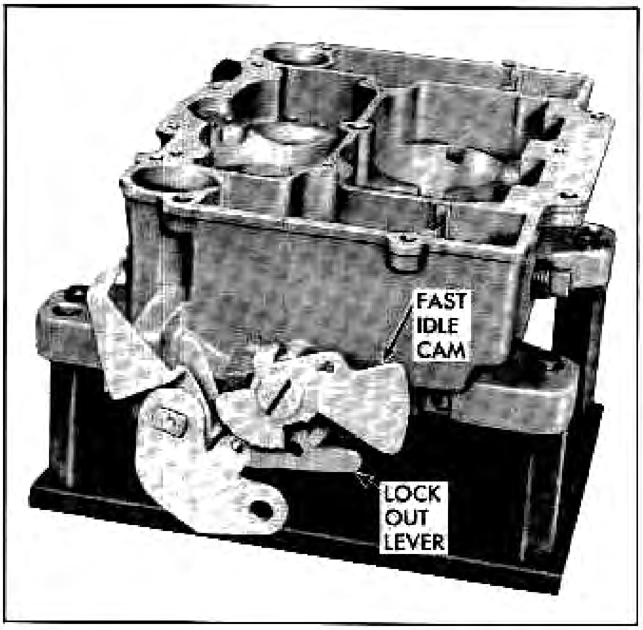


Fig. 6B-78 Location of Fast Idle Cam and Lockout Lever

14. Remove idle mixture screws.

15. Carefully invert carburetor body and remove pump discharge check needle.

16. With body inverted remove pump intake screw plug. (Fig. 6B-77). Remove pump intake check ball seat, found under plug, and check ball.

17. Remove throttle lever adjusting screw and spring.

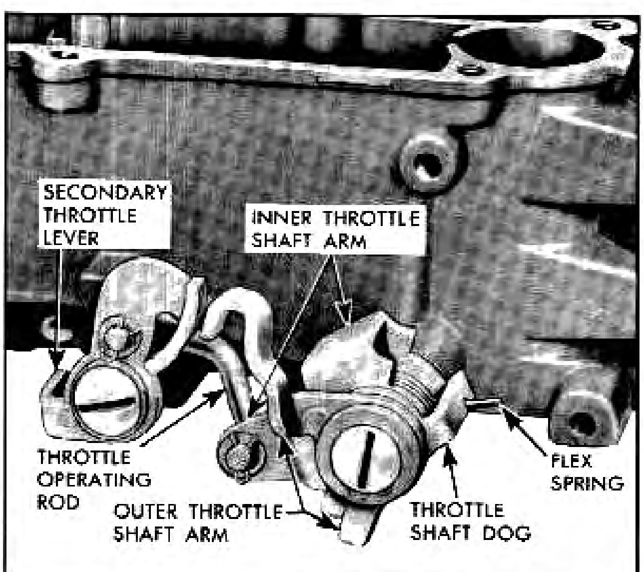


Fig. 6B-79 Primary and Secondary Throttle Linkage

18. Remove fast idle cam attaching screw, fast idle cam, spacer and lockout lever. (Fig. 6B-78).

19. Remove primary to secondary throttle operating rod. (Fig. 6B-79).

20. Remove screw, secondary throttle shaft washer and secondary throttle operating lever and spring. (Fig. 6B-79).

21. Unhook throttle flex spring from primary outer throttle shaft arm. (Fig. 6B-79).

22. Remove primary throttle shaft lever attaching screw and washer from primary throttle shaft.

23. Remove outer throttle shaft arm and throttle shaft dog. (Fig. 6B-79).

24. Remove inner throttle shaft arm and flex spring.

25. If necessary to remove throttle shafts remove throttle valve attaching screws, throttle valves and slide shaft from carburetor body.

26. Remove fast idle adjusting screw if necessary to replace.

CLEANING AND INSPECTION OF PARTS

Dirt, gum, water or carbon contamination in the carburetor or on the exterior moving parts of a carburetor are often responsible for unsatisfactory performance. For this reason, efficient carburetion depends upon careful cleaning and inspection while servicing.

1. Thoroughly clean carburetor castings and all metal parts in clean carburetor cleaning solution. CAUTION: Composition and plastic parts such as pump plunger and gaskets should not be immersed in cleaner.

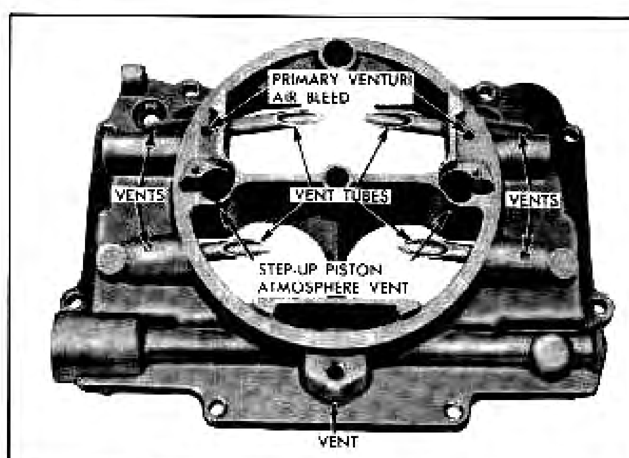


Fig. 6B-80 Passage Identification—Air Horn

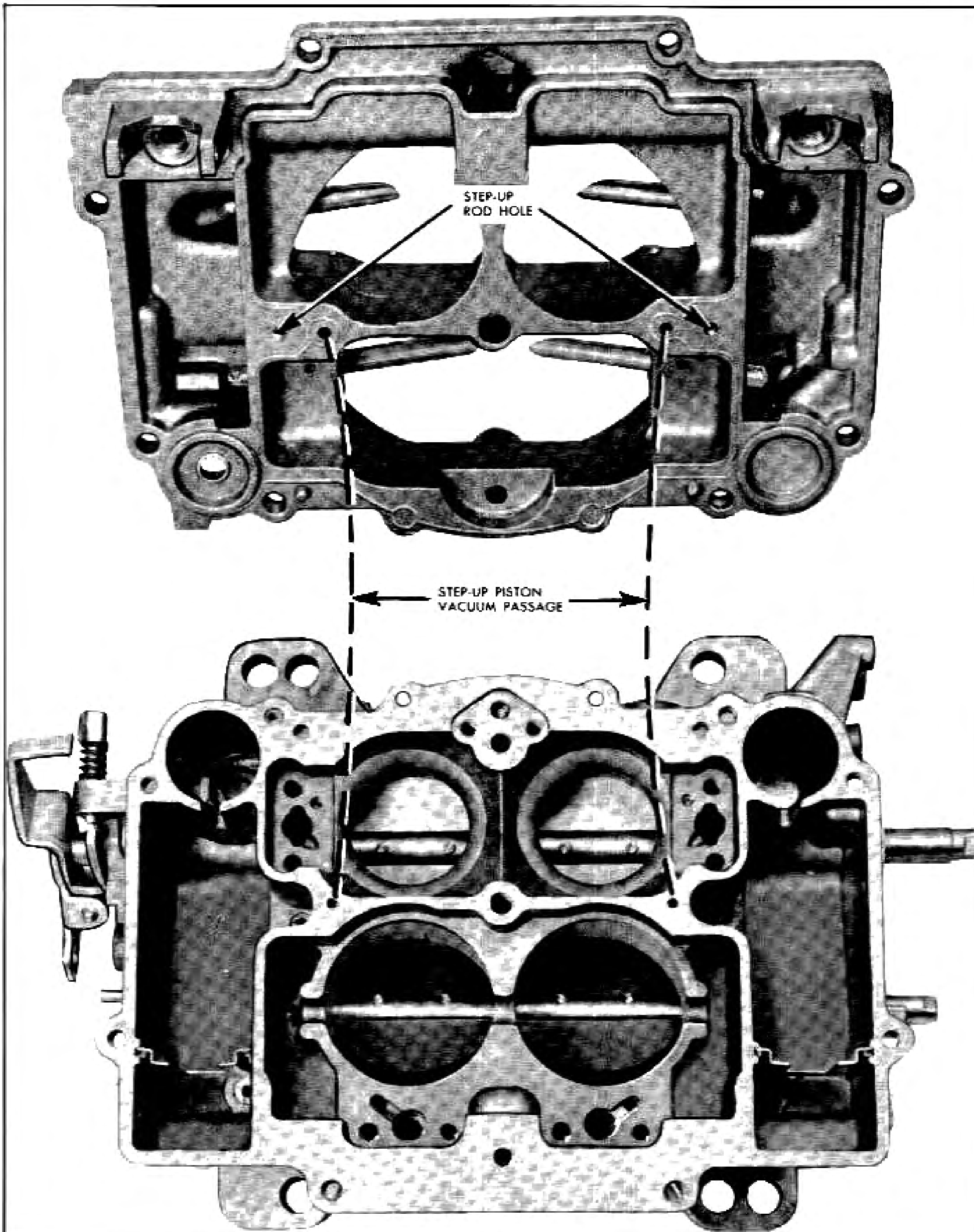


Fig. 6B-81 Passage Identification—Air Horn to Body

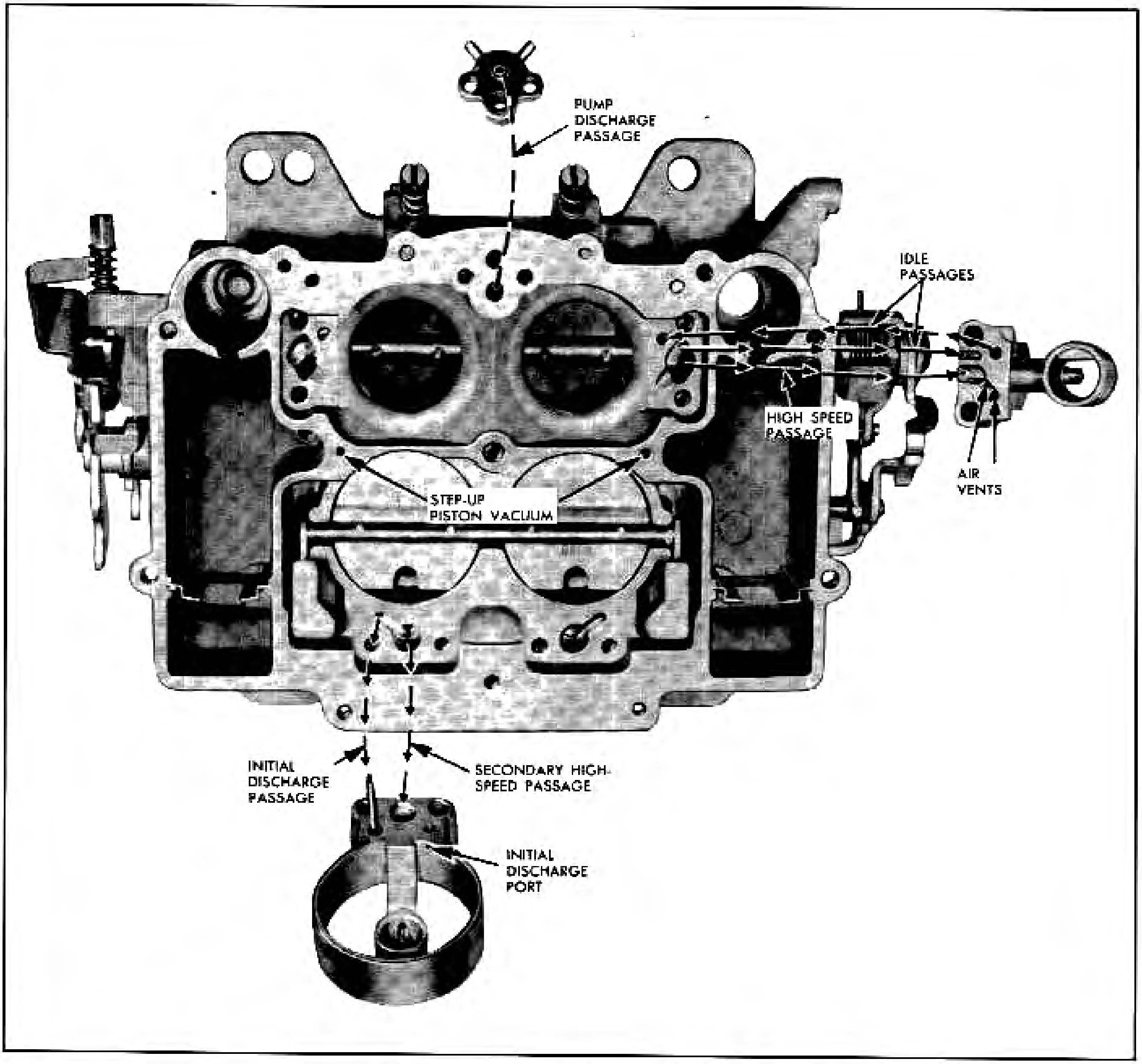


Fig. 6B-82 Passage Identification—Cluster to Body

2. Blow out all passages (Figs. 6B-80 through 6B-84) in casting with compressed air and blow off all parts so they are free of cleaner. (Be sure to follow instructions furnished with cleaning solution.)

CAUTION: *Do not use drills or wire to clean out jets or ports as this may enlarge the opening and affect carburetor operation.*

3. Carefully inspect parts for wear and replace those which are worn. Check the following specific points:

A. Inspect choke piston and choke piston housing for carbon. If necessary to clean choke piston housing, remove Welch plug in the bottom of housing. Plug can be removed by piercing center with a small pointed instrument and prying outward. Care should be exercised so that damage will not result to the casting when removing this plug. Before installing new plug, carbon present in piston cylinder slots should be removed and the Welch plug seat should be carefully cleaned.

B. Remove carbon from bores of throttle flange.

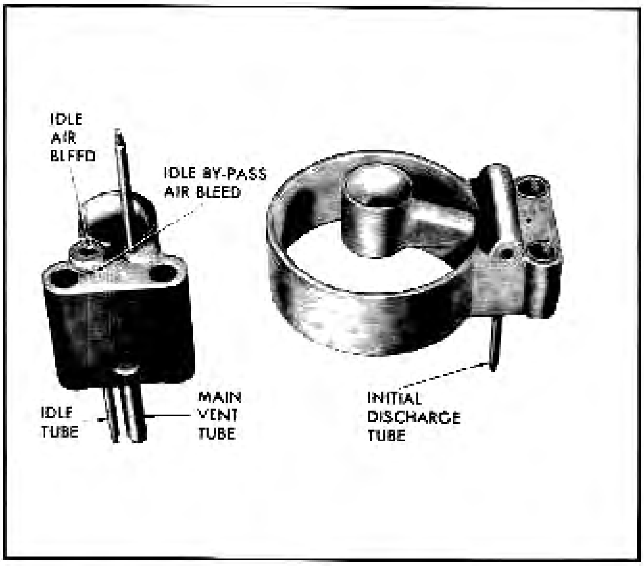


Fig. 6B-83 Passage Identification—Primary and Secondary Venturi Clusters

C. Inspect float needles, and seats for wear; if worn, both needle and seat must be replaced.

D. Inspect float pins for excessive wear.

E. Inspect floats for dents and excessive wear on lip. Check for fluid inside floats by shaking. Replace float if any of above are present.

F. Inspect throttle shafts for excessive wear (looseness or rattle in body flange casting).

G. Inspect idle mixture adjusting screws for burrs. Replace if burred or scored.

H. Inspect pump plunger assembly. If leather is not in good condition, replace plunger.

I. Inspect gasketed surfaces between body and air horn, and between body and flange. Small nicks or burrs should be smoothed down to eliminate air or fuel leakage. Be especially particular when inspecting

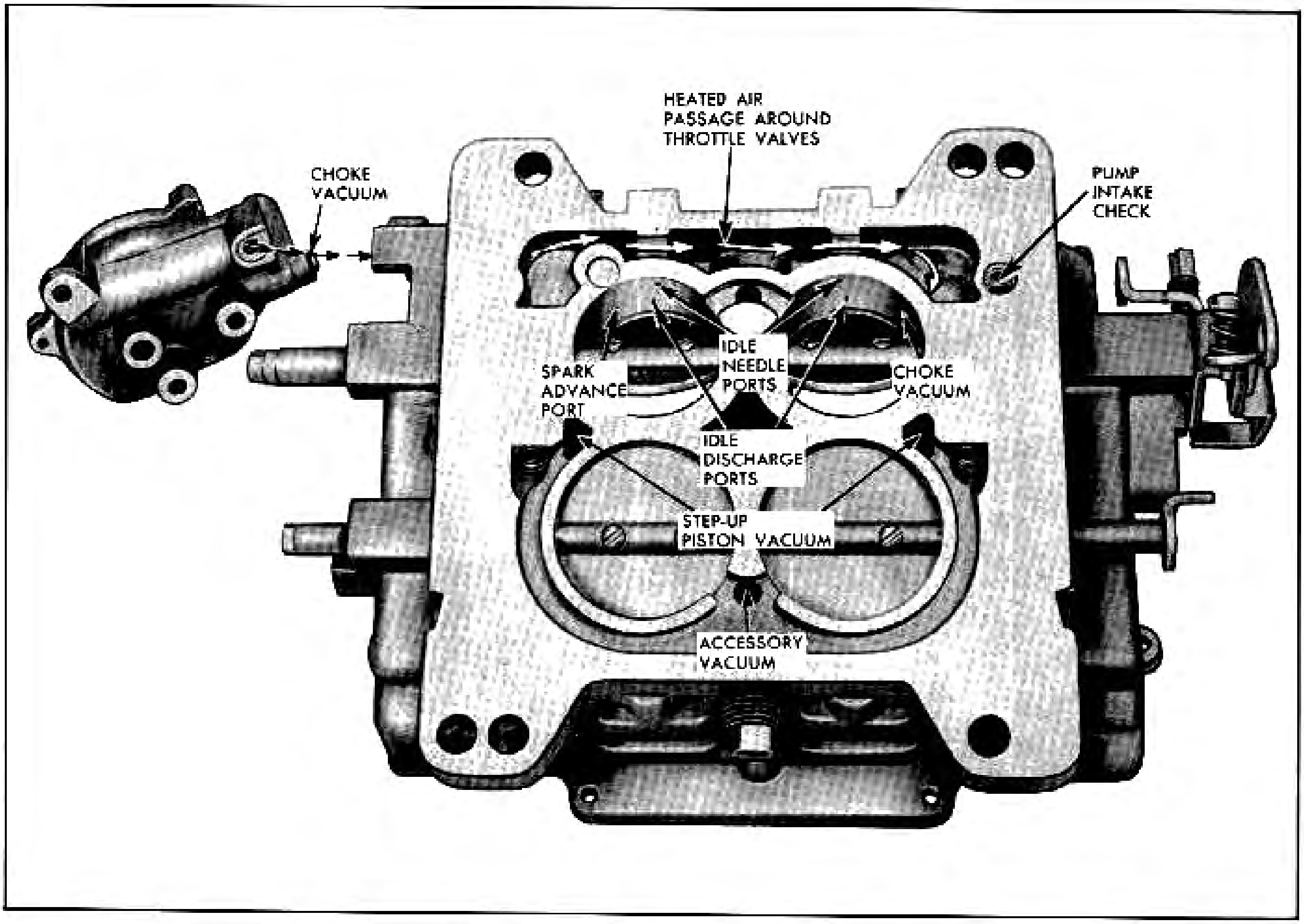


Fig. 6B-84 Passage Identification—Flange Area of Body choke vacuum passage and the top surface of the inner wall of the bowl.

J. Inspect holes in pump rocker arm, fast idle cam and throttle shaft lever. If holes are worn excessively or out of round to the extent of causing improper carburetor operation, the part should be replaced.

K. If excessive wear is noted on fast idle cam, it should be replaced to ensure proper engine operation during warm up.

L. Check all filter screens for lint or dirt. Clean or replace as necessary.

M. Check venturi clusters for loose or damaged parts. If damage or looseness exists, replace cluster assembly.

ASSEMBLY AND ADJUSTMENTS

ASSEMBLY OF THROTTLE BODY

1. If throttle shafts were removed during disassembly insert shafts through body with lever ends on pump side of body.

2. Using new screws install primary and secondary throttle valves so that trade mark (c in circle) is visible from the bottom of body with throttle valves closed.

3. Install fast idle adjusting screw.

4. Install pump check ball, ball seat and intake screw plug.

5. Place carburetor body on stand J-5923.

6. Install inner throttle shaft arm and flex spring on primary throttle shaft (Fig. 6B-85).

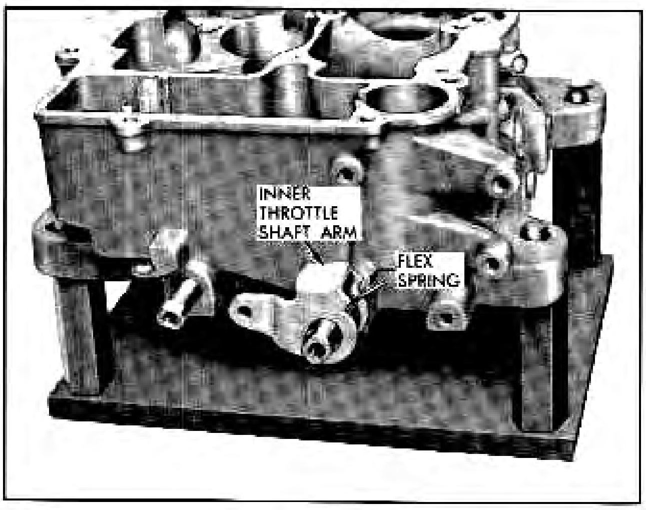


Fig. 6B-85 Inner Throttle Shaft Arm and Flex Spring Installed

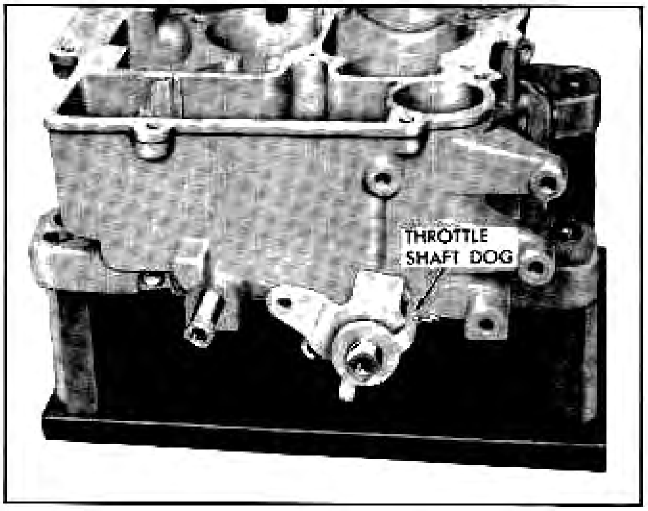


Fig. 6B-86 Throttle Shaft Dog Installed

7. Install throttle shaft dog on primary throttle shaft (Fig. 6B-86).

8. Install outer throttle shaft arm, washer and retaining screw on primary throttle shaft (Fig. 6B-87).

9. Hook end of flex spring into notch on outer throttle shaft arm.

10. Install secondary throttle operating spring, lever, washer and screw (Fig. 6B-87). Wind spring two turns tight.

11. Install throttle operating rod, washers and spring clips.

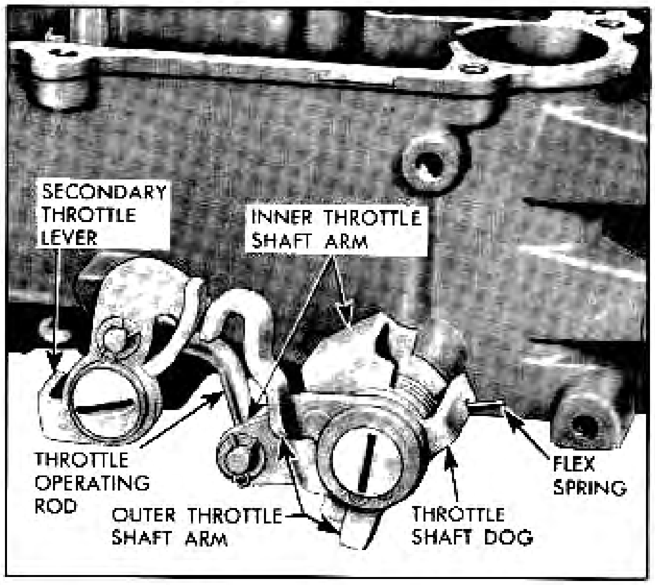


Fig. 6B-87 Primary and Secondary Throttle Linkage Installed

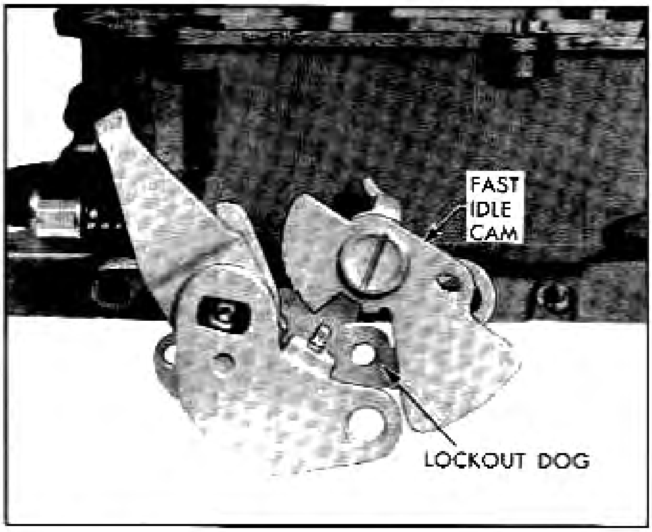


Fig. 6B-88 Lockout Dog and Fast Idle Cam Installed

12. Install lockout dog, spacer, fast idle cam and screw (Fig. 6B-88).

13. Install throttle lever screw and spring.

14. Install idle mixture screws. Turn in finger tight and back out 1¼ turns for approximate adjustment.

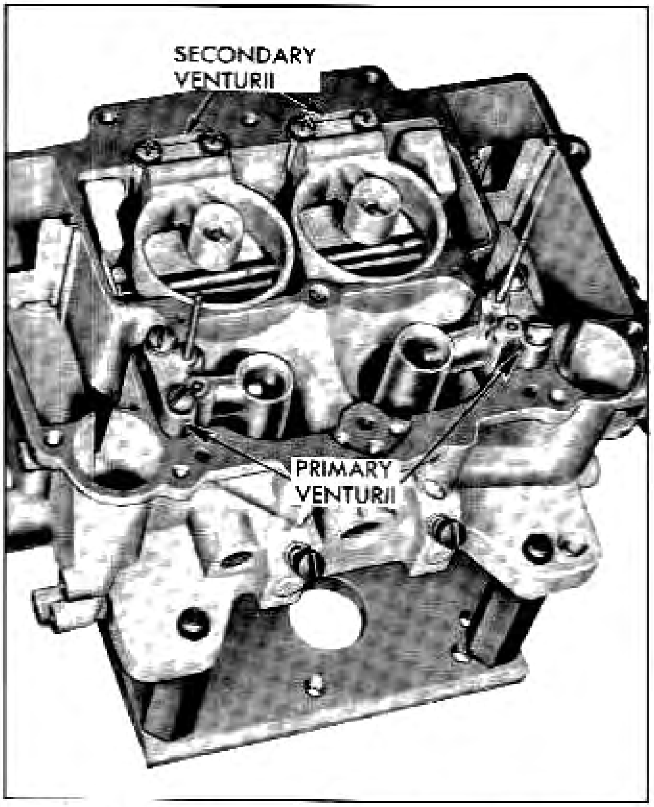


Fig. 6B-89 Primary Venturii Correctly Installed

15. Install primary metering jets and secondary metering jets in their respective bores.

16. Set auxiliary throttle valves in place.

17. Install secondary venturii and gaskets on choke and pump sides.

18. Install primary venturii and gaskets on choke and pump side of carburetor (Fig. 6B-89). NOTE: Primary venturii are installed with vent tubes towards secondary side of carburetor.

19. Install pump discharge check needle, point down and pump jet cluster and gasket with two screws.

20. Install pump plunger return spring in pump bore.

21. Install lower choke shaft and lever in choke housing and attach choke housing and gasket to carburetor body with three self tapping screws.

22. Install choke piston and link assembly in choke housing.

23. Attach choke piston linkage to lower choke shaft with screw and spacer washer. NOTE: Before proceeding with next step perform Choke Piston Lever Adjustment. Procedure is found under Adjustments Page 6B-49.

24. Install choke baffle plate, cover gasket, and choke cover and spring assembly. Set choke at center index.

ASSEMBLY OF AIR HORN

1. Slide choke shaft into air horn.
2. Install air horn gasket.
3. Install float needle seat and gasket, float needle and float assembly on pump side of air horn.
4. Install float needle seat and gasket, float needle, and float assembly on choke side of air horn.

FLOAT ADJUSTMENT

1. Alignment—

   a. Sight down the side of the float shell to determine if the side of the float is parallel to the outer edge of the air horn casting. TO ADJUST: Bend float lever by applying pressure to the end of the float shell with the fingers while supporting the float lever with the thumb. CAUTION: *To avoid damaging the float, apply only enough pressure to bend float lever.*

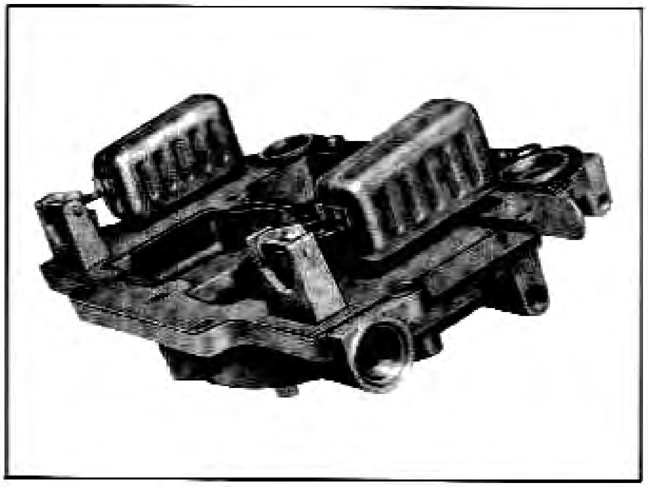


Fig. 6B-90 Float Level Check

b. After aligning float, remove as much clearance as possible between arms of float lever and lugs on air horn by bending the float lever. Arms of float lever should be as parallel to the inner surfaces of lugs on air horn as possible. Floats must operate freely without excess clearance on its hinge pin.

2. Level (Fig. 6B-90)—

With air horn inverted, bowl cover gasket in place, and needle seated, there should be $^{17}/_{64}$" $\pm ^{1}/_{64}$" clearance between top of float at outer end and air horn gasket. Use gauge J-6834. To adjust, bend float arm. Adjust both floats. Recheck float alignment.

3. Drop (Fig. 6B-91)—

With bowl cover held in upright position and measuring from outer end of each float, the distance between top of floats and bowl cover gasket should be $^{23}/_{32}$" $\pm ^{1}/_{32}$". To adjust, bend stop tabs on float brackets.

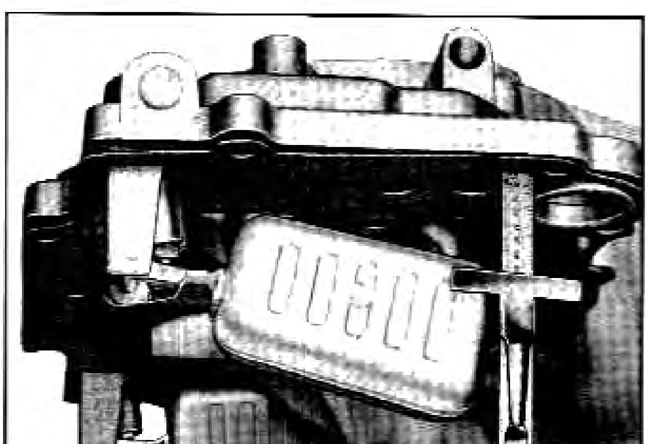


Fig. 6B-91 Checking Float Drop

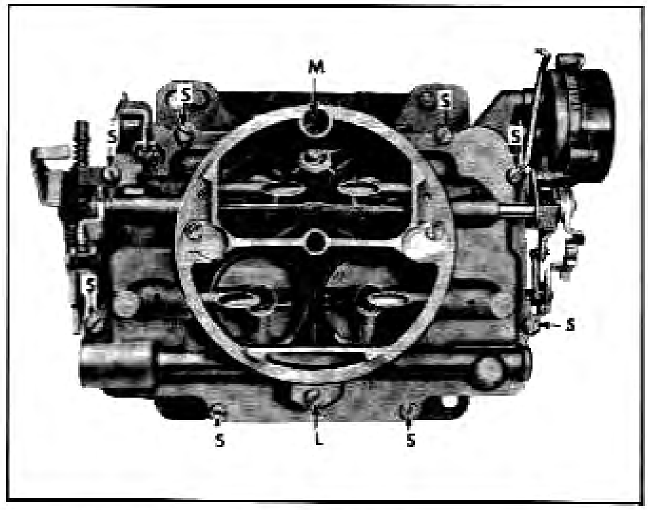


Fig. 6B-92 Location of Air Horn Attaching Screws
L=Long, M=Medium, S=Short

COMPLETION OF CARBURETOR ASSEMBLY

1. Insert pump plunger shaft through air horn and retain with pump link.

2. Install air horn attaching screws (Fig 6B-92).

3. Install two step-up rod piston springs in their respective bores.

4. Install step-up rod and piston on pump side of carburetor.

5. Install step-up rod and piston on choke side of carburetor.

6. Install two step-up piston cover plates and screws.

7. Install pump arm to air horn casting and connect to pump link with pin spring.

8. Install choke valve with circle c in trademark visible with the choke valve closed.

9. Install choke connector rod between upper and lower choke lever.

10. Install inner choke shaft lever, washer, and outer choke shaft lever on end of choke shaft (Fig. 6B-93).

11. Install fast idle connector rod between fast idle cam and inner choke shaft lever.

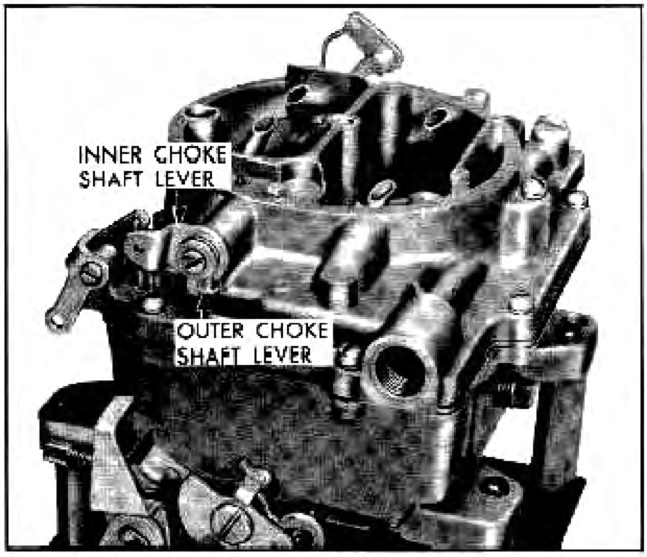


Fig. 6B-93 Choke Shaft Levers Installed

12. Install throttle connector rod, washers and anti-rattle spring.

13. Install inlet screen plug and gasket.

ADJUSTMENTS

PUMP ADJUSTMENT

1. Back off idle speed screw until throttle valves seat in bores of carburetor. NOTE: Be sure choke is wide open so fast idle cam does not hold throttle valves open.

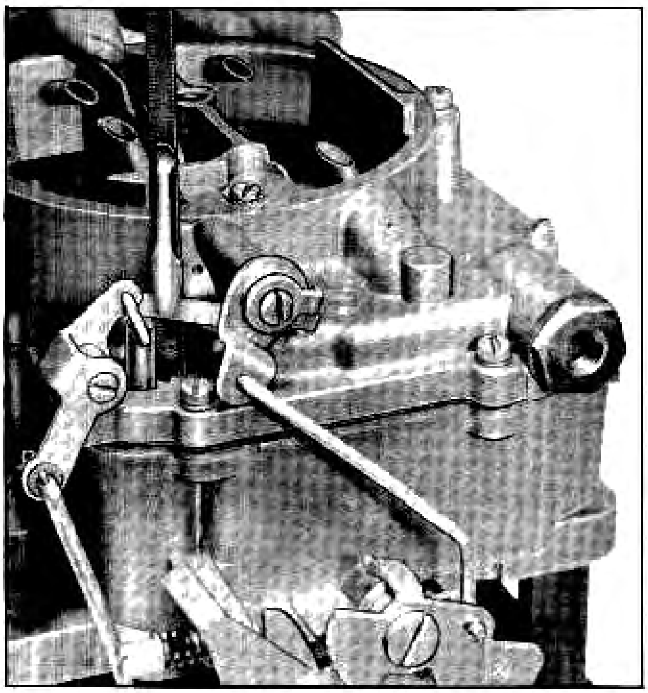


Fig. 6B-94 Checking Pump Adjustment

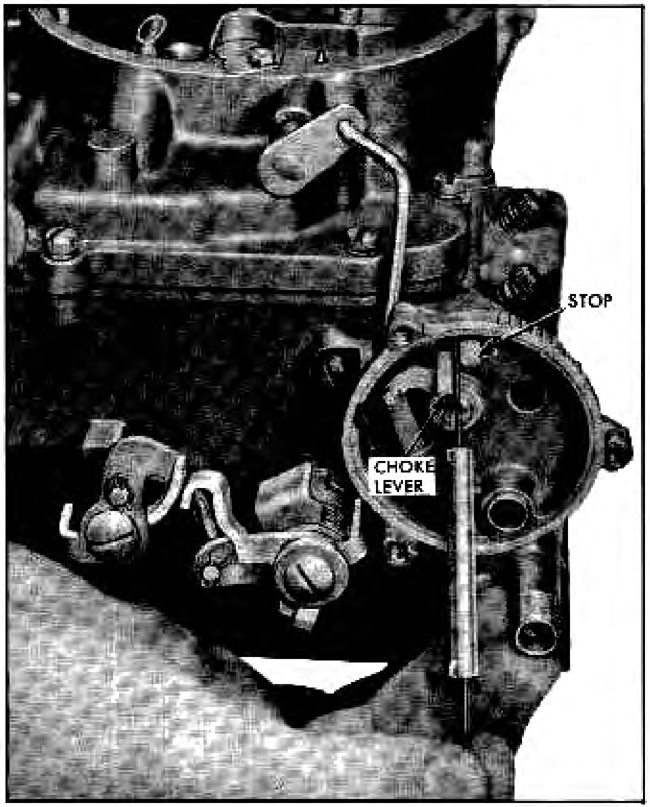


Fig. 6B-95 Checking Choke Piston Lever Adjustment

2. The distance from the top of the bowl cover to the top of the plunger shaft should be $\frac{9}{16}$" (Fig. 6B-94).

3. To adjust, bend throttle connector rod at lower angle using tool J-5496.

CHOKE PISTON LEVER ADJUSTMENT

1. Remove three choke coil housing screws and choke coil housing and thermostatic coil.

2. Remove coil housing gasket and baffle plate.

3. Completely close choke valve.

4. There should be .045" clearance (Gauge KMO-480-A) between choke lever and stop in piston housing (Fig. 6B-95).

5. To adjust, bend choke connector rod using tool J-5496.

CHOKE SHAFT LEVER ADJUSTMENT

1. Close choke valve, having fast idle cam against stop on casting.

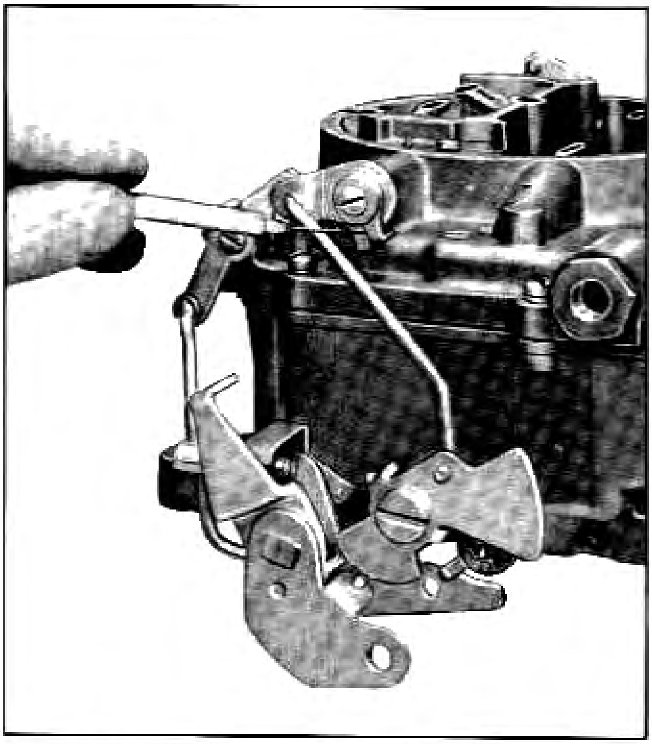


Fig. 6B-96 Checking Choke Shaft Lever Adjustment

2. There should be .010" clearance (Gauge J-5640) between lug on outer choke shaft lever and stop on inner choke shaft lever (Fig. 6B-96).

3. To adjust, bend lug on outer choke shaft lever.

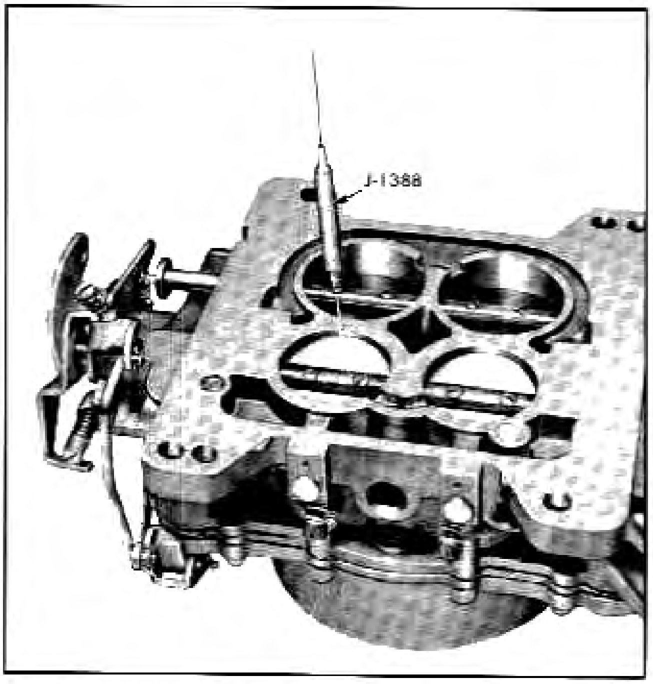


Fig. 6B-97 Checking Fast Idle Adjustment

FAST IDLE ADJUSTMENT

1. Close choke valve tightly.

2. Tighten fast idle screw on high step of cam until there is .030" clearance (Gauge J-1388) between primary throttle valve and bore of carburetor, directly opposite idle port (Fig. 6B-97).

SECONDARY THROTTLE LEVER ADJUSTMENT

1. Open fully both sets of throttle valves. (In this position the stop lugs on primary and secondary throttle levers should contact the boss on the flange.)

2. To adjust, bend secondary throttle operation rod at angle. NOTE: Primary throttle valves will be a few degrees past vertical and secondary throttle valve will be a few degrees from vertical at wide open throttle.

3. Now close primary and secondary throttle valves tightly.

4. There should be .017-.022" clearance (Gauge J-1388) between positive closing shoes on primary and secondary throttle levers (Fig. 6B-98).

5. To adjust, bend shoe on primary lever.

SECONDARY THROTTLE LOCKOUT ADJUSTMENT

1. Crack throttle valves and manually open and close the choke valve.

2. Tang on secondary throttle lever should freely engage in notch of lock-out dog.

3. If necessary to adjust, bend tang on secondary throttle lever.

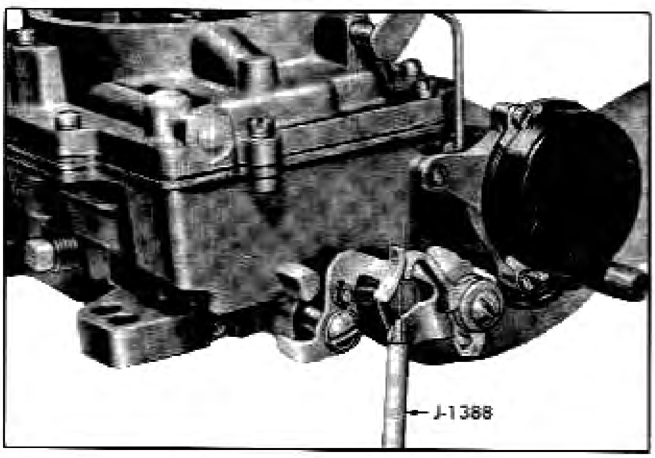


Fig. 6B-98 Checking Secondary Throttle Lever Adjustment

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 carburetion 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 stat is properly installed.

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 inspect evidence of leaks in vacuum passages to step-up rod vacuum piston and automatic choke vacuum piston. Check float level.

SURGING CONDITION AFTER SHORT STOP WITH HOT ENGINE

1. Lean carburetor adjustment. Check float level and idle mixture adjustment.

2. Weak fuel pump. Check fuel pump pressure and output.

FLAT SPOT OR POOR ACCELERATION

1. See that manifold heat valve operates freely and that thermostat is properly installed.

2. Check accelerator pump action. Remove air horn and open throttle to observe stream from nozzles. If pump is not functioning properly check pump adjustment.

3. Check pump for defective plunger leather, obstructed passages, or leaking intake check valve.

ROUGH IDLE WHICH CANNOT BE CORRECTED BY MIXTURE AND SPEED ADJUSTMENT

1. Check manifold gaskets for evidence of air leak into intake manifold. When kerosene is used ensure that no liquid or fumes enter choke stove by disconnecting heat tubes.

2. Check float level.

3. Check metering jets for obstructions.

4. Check idle passages in carburetor castings for obstructions.

5. Check for leak between exhaust gas holes in manifold and throttle bore.

IMPROPER HIGH SPEED PERFORMANCE

1. Check spark plug gap.

2. Check distributor points.

3. Test fuel pump output and pressure.

4. Check for evidence of air leaks into vacuum passage to step-up rod vacuum piston.

5. Check float level adjustments.

6. Check for restriction in bowl vents.

7. Inspect high speed passages and nozzles for obstructions.

FLOODING OR LEAKING

1. Test fuel pump for excessive pressure.

2. Clean intake strainer and check for dirt on intake needle or seat.

3. Check float adjustment (make sure float is centered so it does not rub side of bowl).

4. Check for leaking or collapsed float.

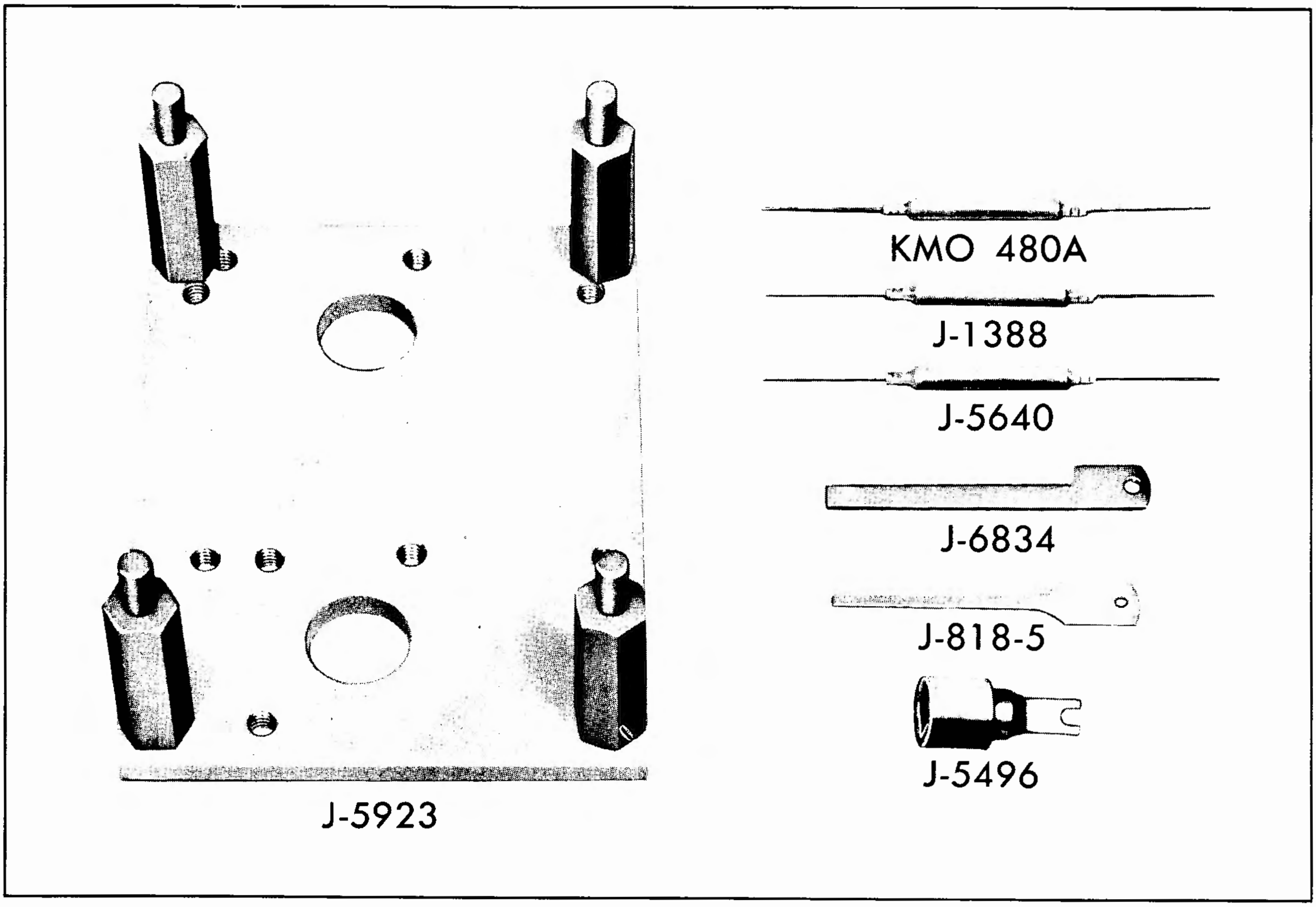
5. Check for worn intake needle and seat.

6. Inspect bowl casting for cracks or loose passage plugs.

CARTER CARBURETOR AFB—SPECIFICATIONS

ADJUSTMENT SPECIFICATIONS

Float Level	17/64" ±1/64"
Float Drop	23/32" ±1/32"
Pump Rod	9/16"
Fast Idle (off car)	.030"
Fast Idle Speed (on high step)	1900 rpm
Unloader	1/8" ±1/64"



CARTER FOUR BARREL SPECIAL TOOLS

J-818-5	Choke Unloader Gauge
J-1388	Fast Idle and Secondary Throttle Lever Gauge
J-5496	Bending Tool
J-5640	Choke Shaft Lever Gauge
J-5923	Holding Stand
J-6834	Float Level Gauge
KMO 480-A	Choke Piston Lever Gauge

DESCRIPTION—COMBINATION FUEL AND VACUUM PUMP AND SINGLE FUEL PUMP

All models are equipped with either a combination fuel and vacuum pump or a single fuel pump. The pumps are operated by an eccentric bolted to the front end of the engine camshaft. NOTE: The operation of the single fuel pump is exactly the same as the operation of the fuel side of the combination pump as explained below.

FUEL SECTION (Fig. 6B-99)

The fuel pump transfers gasoline from the tank to the carburetor in sufficient quantity to meet engine requirements at any speed or load.

The rocker arm spring keeps the rocker arm in constant engagement with the eccentric on the engine camshaft so that the rocker arm moves downward and upward as the camshaft rotates. As the rocker arm is moved 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 downward to expel the fuel through the outlet valve to the carburetor bowl.

Because the diaphragm is moved downward 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.

VACUUM SECTION (Fig. 6B-99)

The vacuum section acts as a booster when engine manifold vacuum is insufficient to operate the windshield wipers at adequate speed. This section is a double acting pump, since air is displaced on both upward and downward movement of the diaphragm.

As the rocker arm is moved downward by pressure from the high point of the eccentric, it bears against the double links which are also pivoted on the rocker arm pin bushing. The long end of the channel link is hooked to the diaphragm so the rocker arm movement results in upward motion of the vacuum diaphragm. The diaphragm movement compresses the diaphragm spring and exhausts air from the upper chamber to the intake manifold. With this same stroke the lower diaphragm chamber is enlarged thus drawing air from the windshield wiper.

As the rotating eccentric permits the rocker arm to move away from contact with the links, the compressed diaphragm spring is free to move the diaphragm downward. This diaphragm stroke exhausts air from the lower chamber, through the valve that opens into the pump body, into the engine crankcase. This same stroke draws air from the windshield wiper into the expanded area above the diaphragm.

When the windshield wiper control valve is closed, or engine vacuum is sufficient to operate the wiper, vacuum holds the diaphragm near the center of its stroke so that very little movement occurs.

FUEL AND VACUUM PUMP—REMOVE AND REPLACE

REMOVE

1. Disconnect battery cables and remove battery.

2. Disconnect fuel lines from fittings at pump.

3. Remove pump body attaching screws.

4. Lower pump and remove vacuum lines from pipes on pump. Lift out pump and gasket.

REPLACE

1. If new pump is being installed, remove fittings from old pump and install on new.

2. Using a new gasket, install pump with two attaching screws. NOTE: To insure that rocker arm is in its proper position beneath the camshaft eccentric, tip top of pump in as it is being positioned. Pump is installed more easily with engine rotated to number six cylinder on ignition.

3. Replace vacuum lines on vacuum pipes. NOTE: There will be no vacuum lines on the single pump assembly.

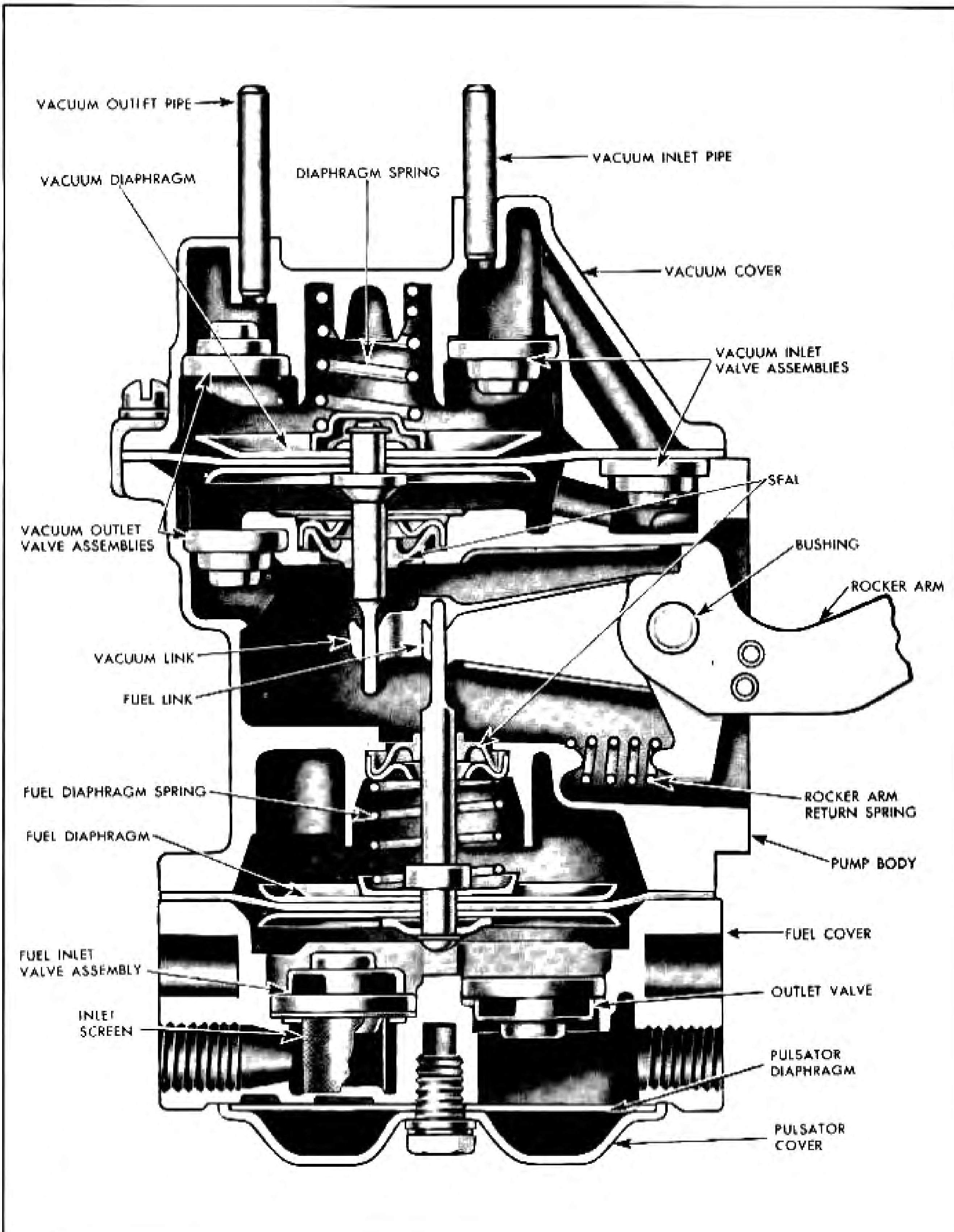


Fig. 6B-99 Schematic View of Combination Fuel and Vacuum Pump

4. Connect fuel lines to fittings on pump.

5. Install battery and connect cables.

FUEL PUMP—OVERHAUL

When overhauling a fuel pump all parts contained in the repair kit should be replaced.

COMBINATION FUEL AND VACUUM PUMP—DISASSEMBLY

NOTE: Two types of combination fuel and vacuum pumps have been used on 1957 Pontiacs. The early type pump has ⅛" pipe taps for 5/16" fuel lines. The late type pump differs from the early pump in the fuel cover assembly which has ¼" pipe taps for ⅜" fuel lines. The late pump contains a pulsator diaphragm and pulsator cover which the early pump does not have. Fuel valves on this pump are larger than those on the early pump. The late type pump has a fuel strainer screen, retainer and gasket enclosed in the fuel inlet passage underneath the inlet valve (Fig. 6B-99). The strainer screen on the early type pump is outside the inlet valve and held in place by a hex plug.

The following instructions apply to the late type pump (Fig. 6B-99):

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

2. Remove bolt and lockwasher holding down pulsator cover on fuel side of pump. Remove pulsator cover and pulsator diaphragm.

3. Remove screws and washers holding fuel cover to pump body and remove cover.

4. Place pump rocker arm in soft jawed vise so that vacuum side is up and remove all vacuum cover screws except any two that are diametrically opposite.

5. Press down firmly on vacuum cover to hold heavy vacuum diaphragm spring compressed and remove remaining two screws. Release vacuum cover slowly and remove cover assembly, diaphragm spring and spring retainer. NOTE: If desired, two 10-32NF 1½" screws may be screwed diametrically opposite into cover to aid in relieving diaphragm spring pressure when removing cover.

6. Lift vacuum diaphragm and remove vacuum valve from body under diaphragm at rocker arm side.

7. Unhook vacuum diaphragm pull rod from vacuum link. This can best be done by extending vacuum diaphragm and tilting towards rocker arm while rolling pull rod off link (Fig. 6B-100).

8. Remove pump from vise, invert pump so fuel side is up, and reinstall rocker arm in vise. Have pump body flush with jaw of vise.

9. Use a ⅜" or slightly larger drill or a file to remove portion of rocker arm pin which is upset over pin washer.

10. Drive out rocker arm pin using a long tapered drift.

11. Remove rocker arm, rocker arm spring, spacer washers, fuel and vacuum links, link spacer and rocker arm bushing from pump.

12. Remove fuel diaphragm.

13. Remove metal around diaphragm pull rod seals, which was displaced by staking, with chisel, small round file or small grinding wheel. Pull seals out of body with hook shaped tool, using care not to damage seal seats.

14. Remove all valves in fuel and vacuum covers in the same manner.

15. After inlet valve in fuel cover has been removed, pry up inlet screen retainer. Remove retainer gasket and screen.

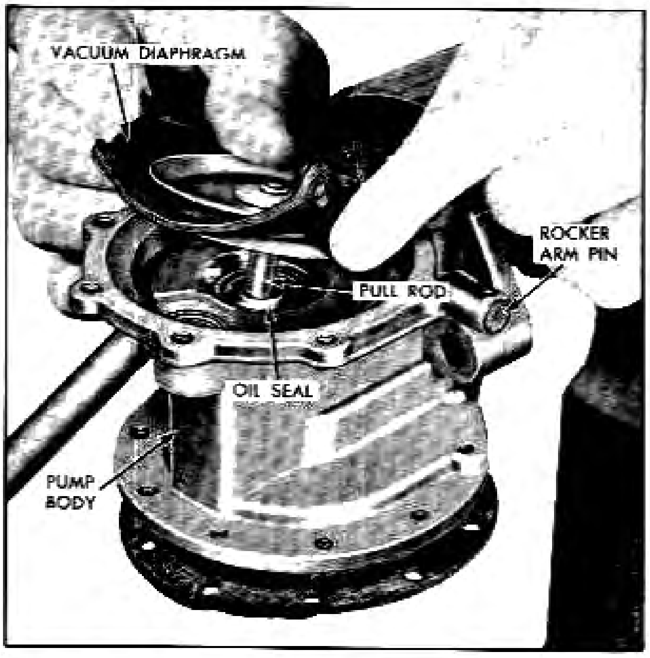


Fig. 6B-100 Removing Vacuum Diaphragm

FUEL PUMP—CLEAN AND INSPECT

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

2. Inspect pump body, fuel cover, and vacuum cover for cracks, breakage and distorted flanges. Examine all screw holes for stripped or crossed threads. If any of these three parts are damaged or if pressed in vacuum pipes in vacuum cover are bent or loose the pump should be replaced.

3. Inspect rocker arm for wear or scoring at camshaft pad, at point of contact with links, and at pivot hole. Inspect bushing for wear.

COMBINATION FUEL AND VACUUM PUMP—ASSEMBLE

1. Install seals by placing seal and retainer in pull rod recess of pump body with rubber end down toward links and press down firmly with flat end of 7/8" diameter round bar.

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

3. Assemble link spacer over fuel link.

4. Place one vacuum link on each side of fuel link. The hook ends of vacuum link should come together so that they surround fuel link. All link hooks should point in same direction.

5. Place assembly of links and spacer between lobes of rocker arm with one spacer washer on outer side of each vacuum link.

6. Slide rocker arm bushing through hole in rocker arm, spacer washers, links and link spacer. Place thick washer over both ends of bushing. (See Fig. 6B-101 for correct placement of all parts in rocker arm and links assembly.)

7. Set fuel pump on bench with mounting flange up.

8. Install rocker arm spring into body placing one end over cone-like projection in pump body.

9. Holding washers onto rocker arm bushing, slide the rocker arm and link assembly into pump body (Fig. 6B-102). Projection on link spacer should fit into end of rocker arm spring and open end of link hooks must point toward vacuum flange.

10. Drive new rocker arm pin through bushing and install flat washer on small end. Peen over end of pin to retain in position.

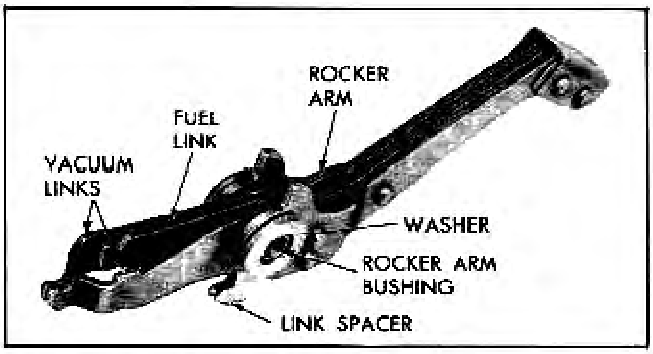


Fig. 6B-101 Rocker Arm and Link Assembly

11. Install gaskets and vacuum valves in vacuum cover. After pressing down to accomplished seal against gasket, stake valves in position. NOTE: Do not install inlet valve in pump body until diaphragm is installed.

12. Install inlet screen, gasket and retainer in fuel cover inlet passage.

13. Install gaskets and fuel valves in fuel cover. Stake valves into position.

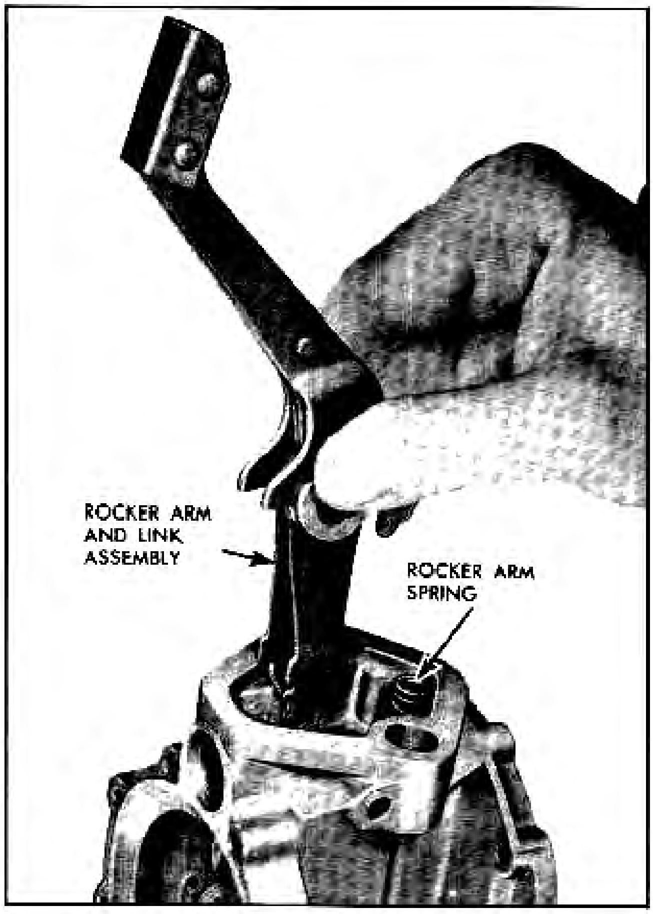


Fig. 6B-102 Installing Rocker Arm and Link Assembly

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

15. Set fuel diaphragm on beach with pull rod pointing up. Assemble retainer and diaphragm spring over fuel diaphragm pull rod.

16. Pick up pump body, with vacuum flange up, in one hand, and the fuel diaphragm assembly in the other. Position end of diaphragm spring into well of fuel side of pump body.

17. With vacuum side of pump still up, shake pump slightly so that fuel link drops down into position to engage with pull rod.

18. Position diaphragm in palm of hand so that flat of pull rod is parallel with fuel link (Fig. 6B-103). Push pull rod through oil seal against spring tension. Turn diaphragm 90° so that pull rod "rolls" onto link. This motion should engage hook end of link with "eye" of pull rod. If not, repeat this operation until connection is made. CAUTION: Extreme care must be used when inserting diaphragm push rod through seal to prevent damage to seal.

19. Install fuel 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 hold in that position while tightening cover screws securely. NOTE: Diaphragm must be flexed before tightening cover screws or pump will deliver too much pressure.

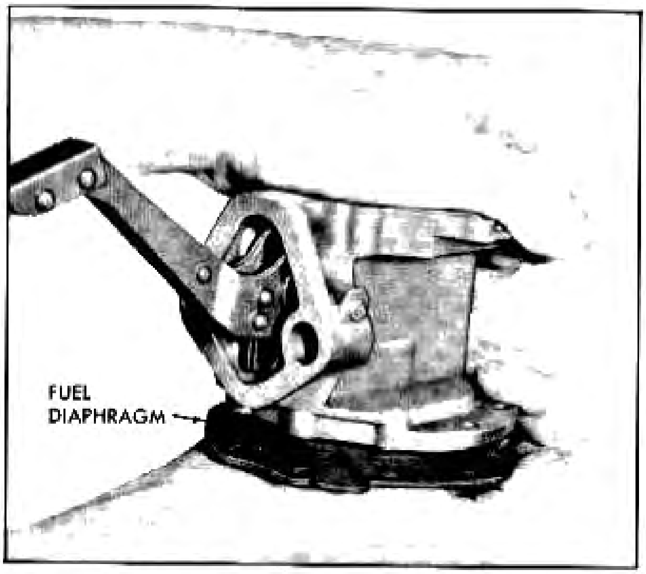


Fig. 6B-103 Installing Fuel Diaphragm

Fig. 6B-104 Hooking Vacuum Pull Rod to Vacuum Link

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

21. Place rocker arm in vise with vacuum flange of pump up.

22. With one hand push pump down against spring tension so it travels through half a stroke and hold. With the other hand insert the vacuum diaphragm pull rod through oil seal. Have flat of pull rod parallel to vacuum links. CAUTION: Be extremely careful when inserting diaphragm push rod through seal to avoid damaging seal.

23. Let up slightly on pump and turn diaphragm 90° so that pull rod rolls onto link (Fig. 6B-104).

24. Lift diaphragm cloth and position valve and cage in recess close to mounting flange. No gasket is required because the diaphragm seals the valve cage.

25. Before installing vacuum cover, rocker arm must be positioned so that vacuum diaphragm will be held level with the body flange while the vacuum cover is installed. This can be done by inserting a $\frac{5}{32}$ inch piece of metal between rocker arm stop and body. This tool can be made from a piece of steel $\frac{3}{16}$" x $\frac{5}{32}$" x 6". Bend one end to form a right angle $\frac{3}{8}$" from bend to end.

26. Place spring retainer on riveted end of diaphragm pull rod and place the diaphragm spring on the retainer. Place vacuum cover over spring and align holes.

27. Press vacuum cover firmly down against diaphragm and body flange and install two screws diametrically opposite. (Two 10–32NF x 1½" screws may be installed to pull vacuum cover down.) Install remaining vacuum cover screws and tighten until screws just engage lockwasher.

28. Release rocker arm to allow heavy vacuum spring to push diaphragm to flexing stop in body. Tighten all cover screws securely.

SINGLE FUEL PUMP-DISASSEMBLY

NOTE: Two types of fuel single pumps were used in 1957 production. The pump used later in the year has a fuel inlet strainer screen located in the fuel passage underneath the inlet valve. Early type pumps do not have this screen. The early pump has ⅛" pipe taps for 5/16" fuel lines. The later pump has ¼" pipe taps for ⅜" fuel lines.

The following instructions apply to the late type pump, but may also be used generally on the early type.

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 rocker arm in soft jawed vise with pump cover facing up.

3. Remove pulsator cover plate, bolt and washer; remove plate, and pulsator diaphragm.

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

5. Press down firmly on the cover to hold the heavy diaphragm spring compressed and remove the remaining two screws. Release the cover slowly and remove cover assembly, diaphragm spring and spring retainer. NOTE: If desired, two 10–32NF x 1½" screws may be screwed diametrically opposite each other to aid in relieving the diaphragm spring pressure when removing the cover.

6. Drive out rocker arm pin and plugs on both ends with a long tapered drift. Remove rocker arm, rocker arm spring, and link.

7. Remove diaphragm, diaphragm spring, and retainer.

8. Using a small chisel, round file or small grinding wheel, remove metal around oil seal which was displaced by staking during assembly. Pull out seal with hook shaped tool. Use care not to damage seal seats.

9. Remove metal displaced by staking around inlet and outlet valves in the same manner. Pry valves and cages out with screw driver blade. Lift out gaskets.

10. Remove strainer screen retainer, strainer screen and gasket.

FUEL PUMP—CLEAN AND INSPECT

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

2. Inspect pump body, fuel cover, and vacuum cover for cracks, breakage and distorted flanges. Examine all screw holes for stripped or crossed threads. If any of these three parts are damaged or if pressed in vacuum pipes in vacuum cover are bent or loose the pump should be replaced.

3. Inspect rocker arm for wear or scoring at camshaft pad, at point of contact with links, and at pivot hole. Inspect bushing for wear.

FUEL PUMP—ASSEMBLE

1. Install seal by placing seal and retainer in pull rod recess of pump body with rubber end down toward links and press down firmly with flat end of ⅞" diameter round bar.

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 all holes.

5. Drive rocker arm pin through rocker arm and link and center it in pump body.

6. Install retaining plugs on each end of pin.

7. Install inlet screen, gasket and retainer in pump cover.

8. Install inlet and outlet gaskets and valves in pump cover. After pressing down to seal valve against gasket, stake valves in position.

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

10. Place pump body in vise with mounting flange up (Fig. 6B–105).

11. Set diaphragm on bench with pull rod pointing up. Position the spring retainer and spring over pull rod.

12. Pick up diaphragm, retainer and spring as an assembly and push pull rod through oil seal into

body. Be sure diaphragm spring is seated in seal well (Fig. 6B-106). Have flat of pull rod parallel to flat of link with the diaphragm flush with the body cover flange. 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: Be extremely careful when performing this operation to avoid damaging seal.

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

14. 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 hold in that position while tightening cover screws securely. NOTE: Diaphragm must be flexed before tightening cover screws or pump will deliver too much pressure.

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

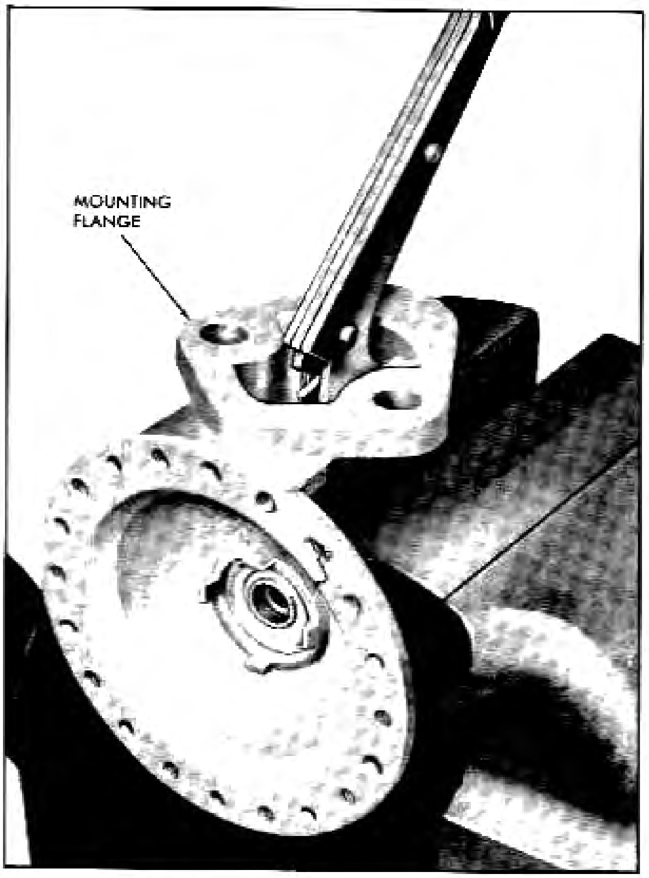


Fig. 6B-105 Correctly Positioning Pump Body in Vise

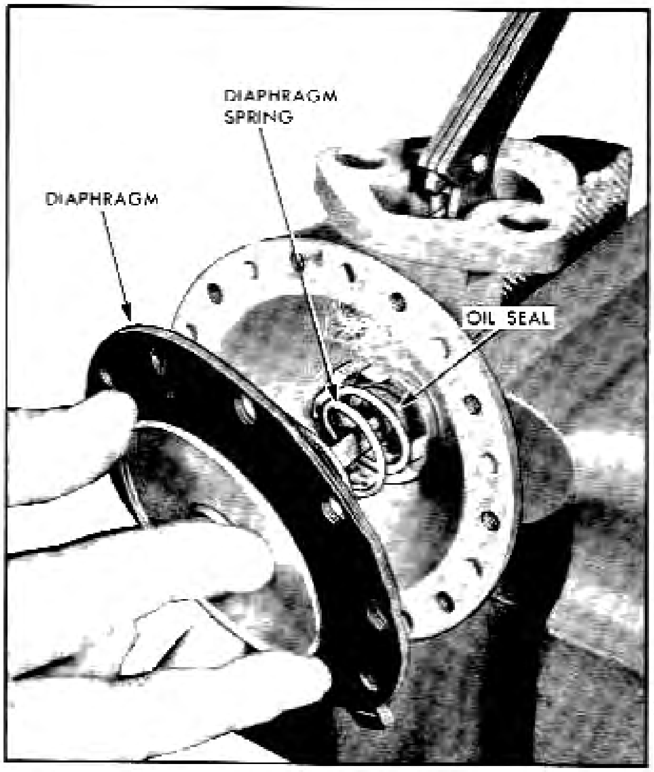


Fig. 6B-106 Seating Diaphragm Spring in Seal Well

TROUBLE DIAGNOSIS AND TESTING

FUEL PUMP INSPECTION AND TEST

NOTE: These procedures may be used for both the combination and single type fuel pumps.

Always check pump while it is mounted on the engine and be sure there is gasoline in the tank.

The line from the tank to the pump is the suction side of the system and the line from the pump to the carburetor is the pressure side of the system. A leak on the pressure side, therefore, would be made apparent by dripping fuel, but a leak on the suction would not be apparent except for its effect of reducing volume of fuel on the pressure side.

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

2. Tighten diaphragm flange screws.

3. Disconnect fuel pipe at carburetor. Disconnect distributor to coil primary wire so that 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 and 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 pump is operating within specified limits as follows:

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

b. Run engine at approximately 450 and 1,000 r.p.m. on gasoline in carburetor bowl and note reading on pressure gauge.

c. If pump is operating properly the pressure will be 4 to 5 pounds and will remain constant at speeds between 450 and 1,000 r.p.m. If pressure is too low or too high, or varies materially at different speeds, the pump should be removed for repair.

VACUUM SECTION INSPECTION AND TEST

NOTE: These procedures can be used only on the combination pump.

Test the vacuum section of the pump by fully opening the windshield wiper valve and observe wiper blade speed while alternately idling and accelerating the engine. Wiper blade speed should be fairly constant regardless of engine speed or throttle opening. NOTE THAT A DRY WINDSHIELD WILL SLOW WIPER SPEED. If windshield wiper does not operate properly make the following inspection and test.

1. Make certain that wiper hoses are properly connected at pump, wiper motor and control at instrument panel and that connections are air tight. Replace cracked or deteriorated hose.

2. If windshield wiper does not operate properly after all points of leakage have been corrected, detach both pipes at vacuum pump and join them with a piece of tubing. *Slowly* operate engine from idle to about 1,000 r.p.m.; the wiper should run at full speed operating on engine vacuum only. If it does not, it can be assumed that the wiper motor or tubing is defective. The pump vacuum section is inoperative if the windshield wiper operated properly on engine vacuum, but not on pump vacuum.

3. A further test of vacuum pump may be made by attaching a vacuum gauge to the inlet port (port connected to wiper motor) with outlet pipe disconnected. CAUTION: Always make this test of vacuum pump with outlet open.

4. With engine operating at 750 r.p.m. the gauge should show 10 to 12 inches of vacuum. Less than 10 inches of vacuum indicates an inoperative vacuum pump.