

SECTION 3-G

ROCHESTER 1-BARREL CARBURETOR

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3-22 DESCRIPTION AND OPERATION OF ROCHESTER 1-BARREL CARBURETOR

a. General Description

The Rochester Model BC carburetor is a single barrel, down-draft, automatic choke model, used on the V-6, 225 cu. in. engine, for both automatic transmission and synchromesh transmission.

The Model BC carburetor has a concentric float bowl, which completely surrounds the main bore of the carburetor. The design of the float bowl, in conjunction with the centrally located discharge

nozzle, prevents fuel spill-over regardless of the angle of the car. See Figure 3-71.

The main well assembly contains the main metering jet and power valve. It is attached to the carburetor air horn and is suspended in the float bowl. Engine heat cannot be directly transmitted from the float bowl into the main well area.

Clean, filtered air is supplied to the choke heat stove from a pipe in the air horn located just below the air cleaner. The heated air from the choke heat stove is drawn through an insulated tube into the choke housing. An external tube conducts the hot air

from the choke housing to the intake manifold.

b. Operation of Float System

Dual floats are used to maintain a constant fuel level at all times. The float bowl is designed so that the fuel is centrally located around the main well, so that efficient carburetor metering can be maintained under all engine operating conditions. See Figure 3-72.

As shown, components of the float system are the inlet fitting and gasket, fuel filter and gasket, pressure relief spring, needle valve and seat, and the float. It

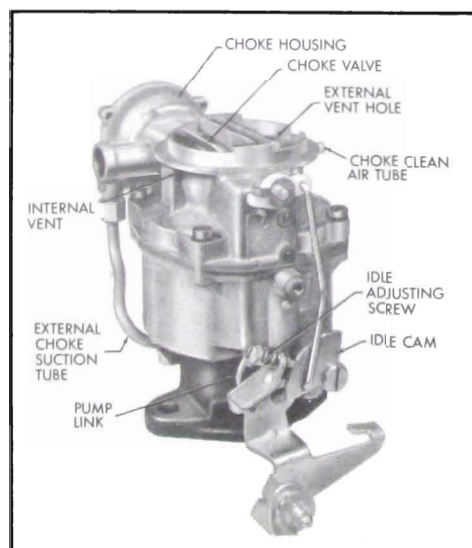


Figure 3-71—Rochester 1BC Carburetor Assembly - V-6 Engine

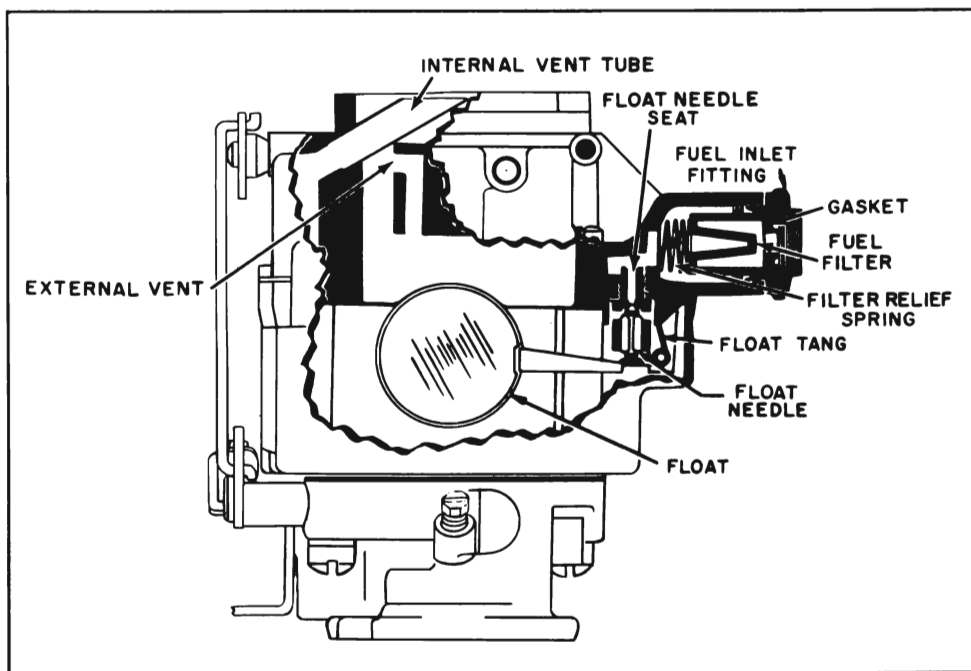


Figure 3-72—Float System

should be noted that the fuel filter is spring loaded. This provides a pressure relief feature so that in the event the filter should plug, fuel pump pressure would overcome the spring allowing fuel to by-pass the filter.

Three air vents are used for transmitting air pressure to the fuel in the float bowl. Two external vents, located in the air horn just beneath the air cleaner, supply atmospheric pressure to the fuel in the float bowl and are used to remove fuel vapors which might disrupt engine operation during prolonged, hot engine idling.

An internal vent tube, located inside the air horn bore, extends upward from the float bowl to the base of the air cleaner to provide a balance between external and internal air pressures acting upon the fuel in the float bowl.

c. Operation of Idle (Low Speed) System

At idle speeds, the throttle valve is nearly closed so there is not enough air flow through the venturi to lift fuel from the float bowl. Therefore, to supply enough fuel for idle and low speed requirements, a separate system is used. To make fuel flow, manifold vacuum from the idle needle hole is applied directly to the fuel in the bowl. The idle system consists of the idle pick up tube, idle tube, idle passages, idle air bleed, idle mixture adjustment needle, idle discharge holes, and an idle speed adjustment screw. See Figure 3-73.

Atmospheric pressure acting on the fuel in the float bowl, forces fuel through the main metering jet into the main well. It then travels through an anti-bubble screen located inside the main

well to break up any vapor bubbles which might form during hot engine idle. The fuel then travels up through the idle pick up tube and through the cross bar channel in the air horn. Air is then bled into the idle fuel at the center of the cross bar through the two top bleeds and nozzle hole. The air/fuel mixture is picked up by the horizontal idle tube in the cross bar and metered through a calibrated restriction, then passes on into the vertical down channel where it is further bled with air by an internal idle air bleed in the vertical channel in the top of the float chamber. The fuel travels downward, past the off idle discharge port where more air is picked up to mix with the fuel mixture and it then passes out the idle needle port below the throttle valve. Here the fuel mixture mixes with air coming past the slightly open throttle valves and passes on into the engine as a combustible idle mixture.

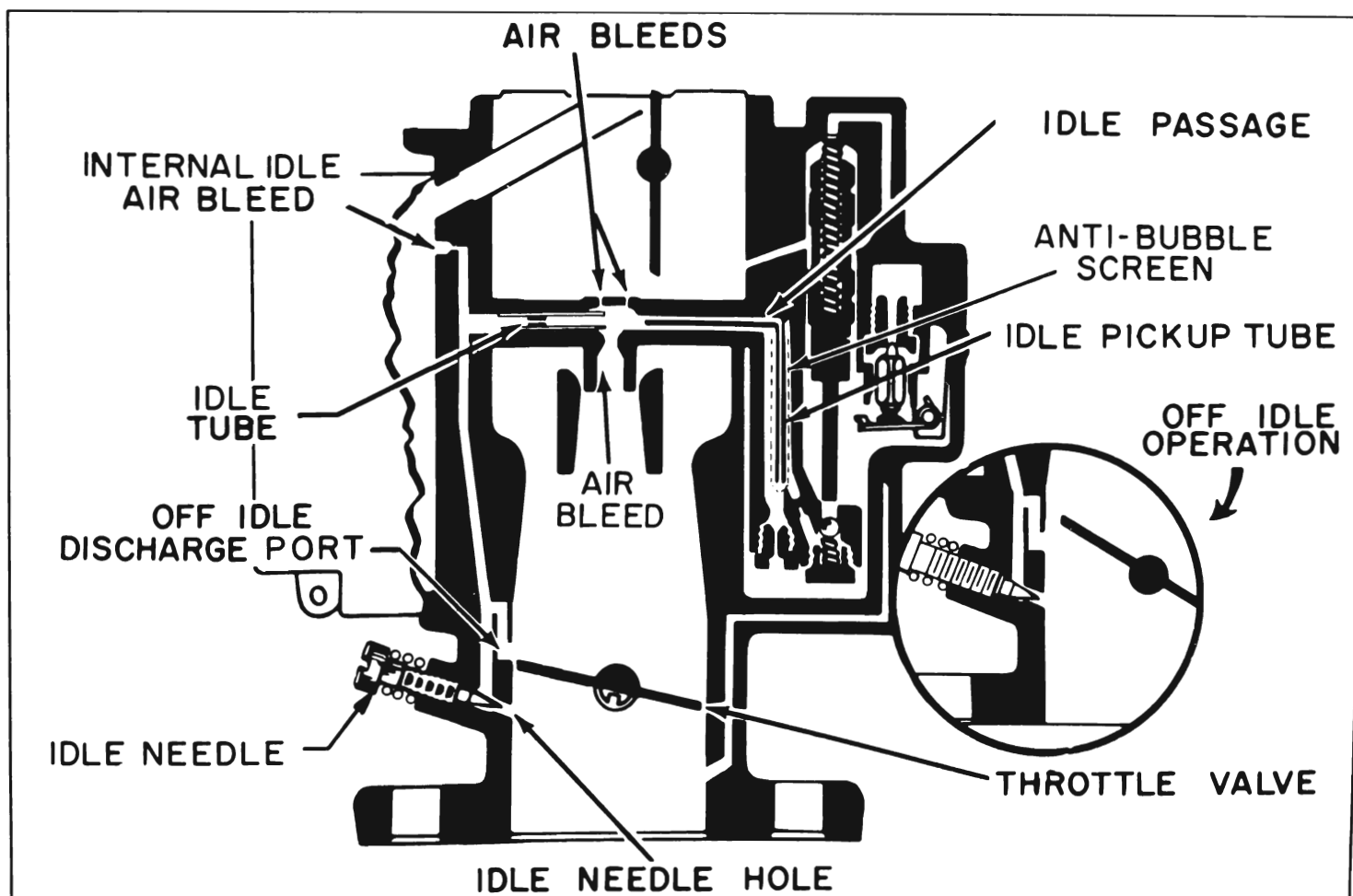


Figure 3-73—Low Speed System

As the throttle valve is opened slightly and engine speed increases, extra fuel is needed to combine with the additional air going by the throttle valve. This fuel is supplied by the off-idle discharge port.

Still further opening of the throttle valve causes increased air flow through the carburetor bore which causes a pressure drop in the small venturi sufficient to cause fuel delivery from the main nozzle. It should be remembered, however, that off-idle port discharge does not cease at this point, but rather diminishes as main nozzle discharge increases. Thus, the two systems combine to produce the correct air/fuel flow at intermediate engine speeds.

d. Operation of Main Metering (High Speed)

Once air flow is sufficient for fuel flow to start from the main nozzle, fuel will flow from the fuel bowl through the main metering system into the venturi, as follows:

Fuel passes through the main

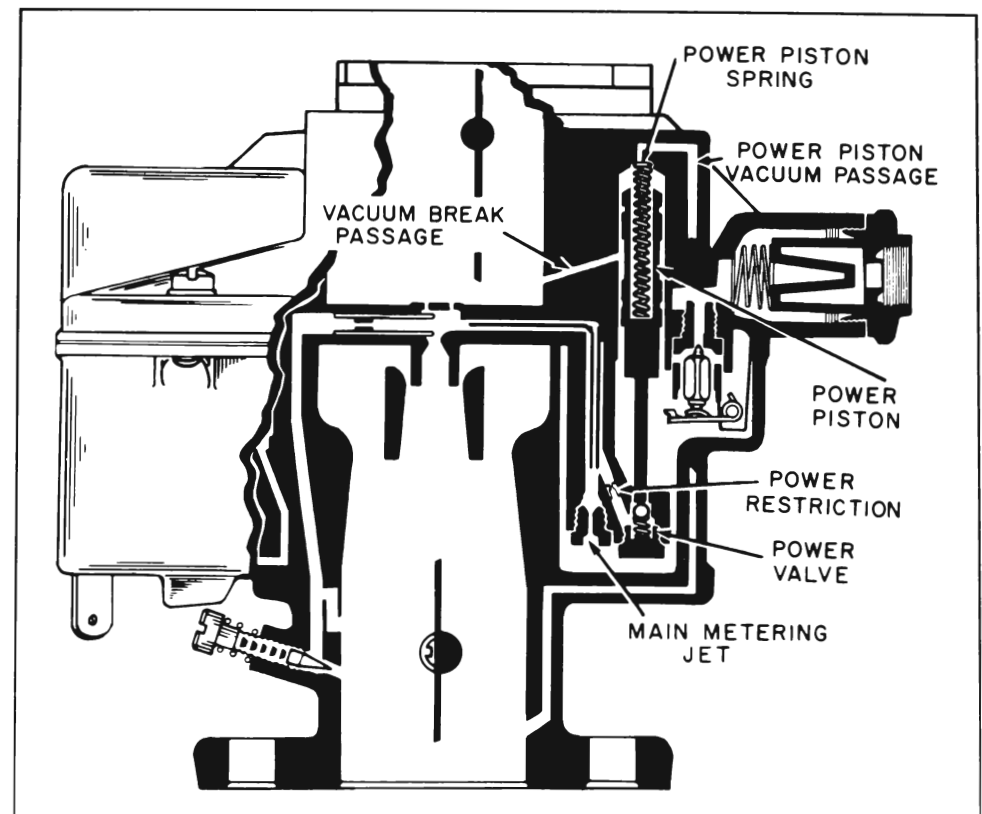


Figure 3-75—Power System

metering jet into the main well where it rises in the main well passage and idle pickup tube. It continues up the main well tube to the horizontal cross bar in the air horn and through the cross bar to

the main discharge nozzle. At this point, air is bled into the fuel by the two air bleeds in the top of the cross bar channel. The mixture is then discharged through the main discharge nozzle into the small venturi; here, it mixes with additional air and moves on through the bore of the carburetor and into the intake manifold. See Figure 3-74.

The calibration of the main metering jet and air bleeds in the cross bar maintain economical air/fuel ratios throughout the main metering or cruising range. Therefore, no adjustments are necessary in the main metering system.

e. Operation of Power System

A vacuum operated power system is used in the carburetor to provide additional fuel for extreme high speed operation or for heavy engine load. A direct manifold vacuum passage connects to the

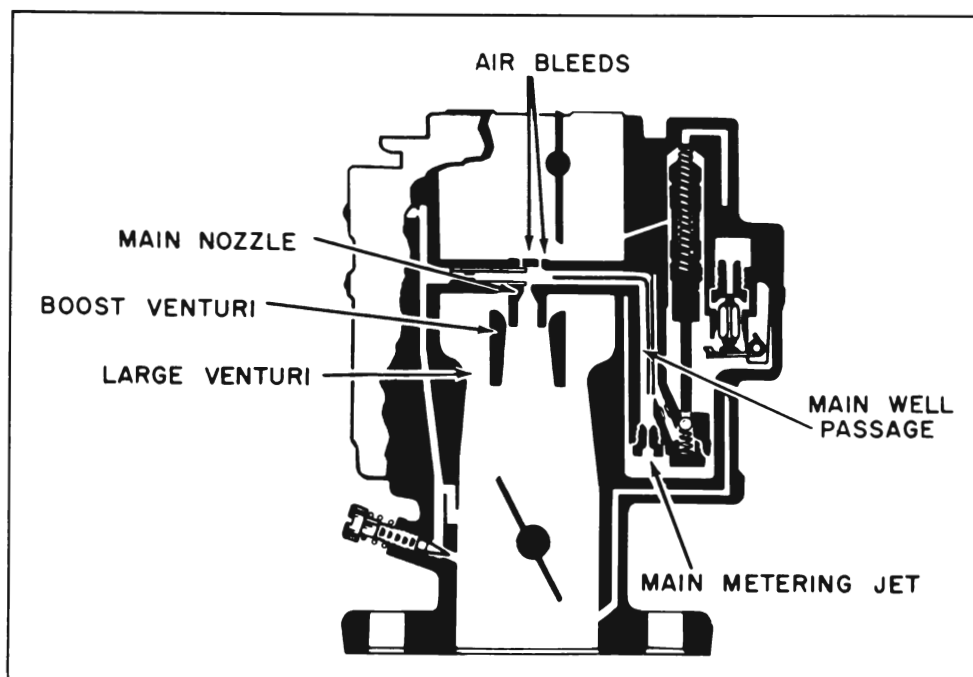


Figure 3-74—High Speed System

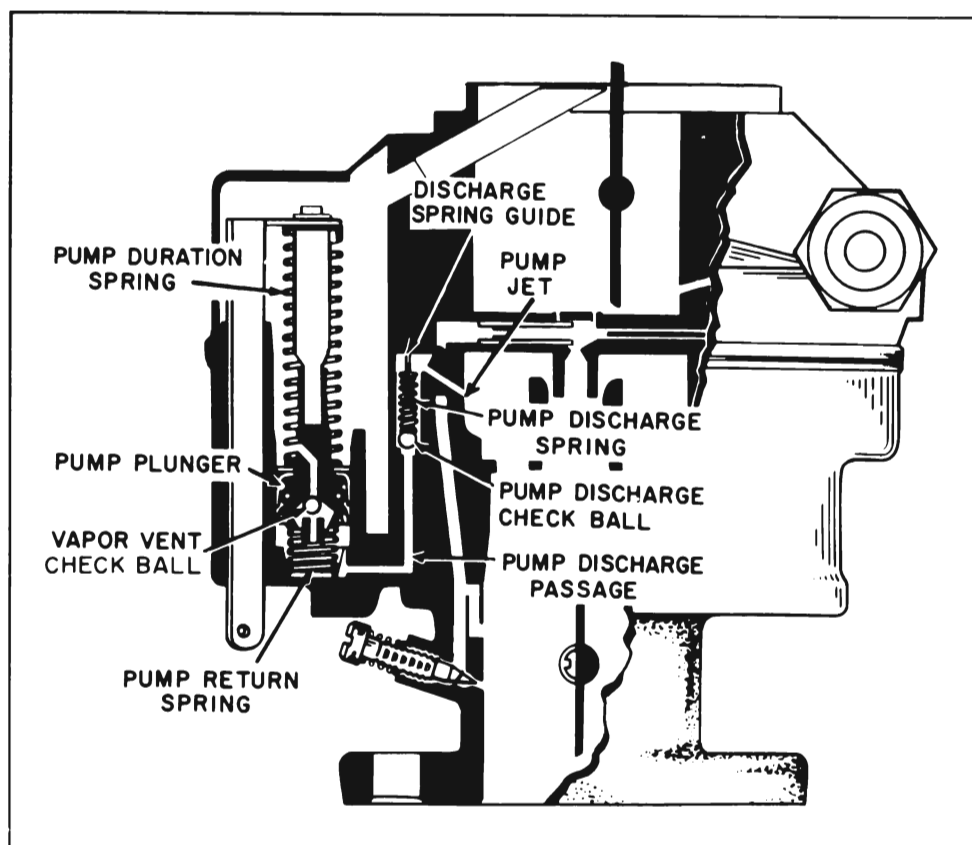


Figure 3-76—Accelerating Pump System

power piston. Under heavy engine load the manifold vacuum drops, thereby allowing a spring to force the power piston downward. The power piston spring is calibrated to force the power piston downward at a specified vacuum. See Figure 3-75.

The downward motion of the power piston unseats the spring loaded ball in the power valve assembly. Fuel passes around the ball in the base of the main well support. The calibrated power restriction meters the fuel prior to joining the fuel from the main metering jet. Conversely, as the manifold vacuum rises above a specific point, the power piston is drawn up and the spring loaded ball of the power valve closes, returning the carburetor to the economical part throttle mixture. There is no power system adjustment.

The relief passage which is drilled from the bore of the air horn to the power piston chamber serves to relieve any vacuum

build-up around the piston diameter. This vacuum, if unrelieved, would draw fuel vapors from the float bowl past the piston and down the vacuum passage into the manifold, resulting in an overly rich mixture.

f. Operation Accelerating (Pump) System

Rapid opening of the throttle valve causes an immediate increase in air velocity in the carburetor venturi and bore area. Since fuel is heavier than air, it requires a short period of time to "catch up" with the air flow. To avoid a leanness during this momentary lag, the accelerator pump squirts a quantity of liquid fuel into the air stream to mix with the incoming air and maintain the proper air/fuel mixture.

When the throttle valve is closed, the pump plunger moves upward in its cylinder allowing fuel to

flow from the float bowl through a slot in the side of the pump well, into the pump well, past the plunger head, through the vapor check ball and on into the bottom of the pump well. The pump discharge ball is seated at this time to prevent fuel from draining from the pump discharge passage. See Figure 3-76.

When the pump plunger is moved downward for acceleration, the force of the stroke first seats the vapor check ball in the pump plunger head to prevent fuel flow back into the float bowl. Continued downward motion of the pump plunger forces fuel up through the discharge passage (lifting the pump discharge ball from its seat) and then passes on through the pump jets into the venturi.

g. Operation of Choke System

The choke system includes a thermostatic coil, choke housing, choke piston, choke valve, fast idle cam and linkage. It is controlled by a combination of manifold vacuum, air velocity against the off-set choke valve, and tension of the thermostatic coil. See Figure 3-77.

When the engine is cold, tension of the thermostatic coil holds the choke valve closed. Starting the engine causes air velocity to strike the off-set choke valve which tends to open it along with the action of intake manifold vacuum connected by a passage directly to the choke piston bore. After a slight opening of the choke valve, the tension of the thermostatic coil balances the force of air on the valve and the pull of vacuum at the choke piston.

As the engine warms up, the manifold vacuum which exists in the choke housing pulls hot air from the choke stove through an air passage to heat the thermostatic coil.

A baffle plate inside the choke housing serves to distribute heat from its entry point at the side of the coil evenly throughout the choke housing. This prevents hot spots which would cause uneven opening of the choke valve. The thermostatic coil relaxes gradually until the choke valve is fully opened.

During warm-up it is necessary to provide a faster idle to prevent engine stalling. This is accomplished by a fast idle cam which is connected by a link to the upper choke lever on the choke shaft. The idle screw on the throttle lever contacts graduated steps on the fast idle cam to provide a faster idle than normal. When the engine is fully warm and the choke valve is wide open, the fast idle cam rotates so the idle screw rests on the low step on the fast idle cam where normal curb idle is obtained.

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

3-23 DISASSEMBLY, CLEANING AND INSPECTION OF ROCHESTER 1-BARREL CARBURETOR

a. Disassembly of Choke

1. Loosen 1/2" fitting on choke suction tube. Push fitting and gasket seal downward on the tube.
2. Remove three choke cover attaching screws and retainers. Remove choke cover, cover gasket, and thermostatic coil assembly from carburetor.

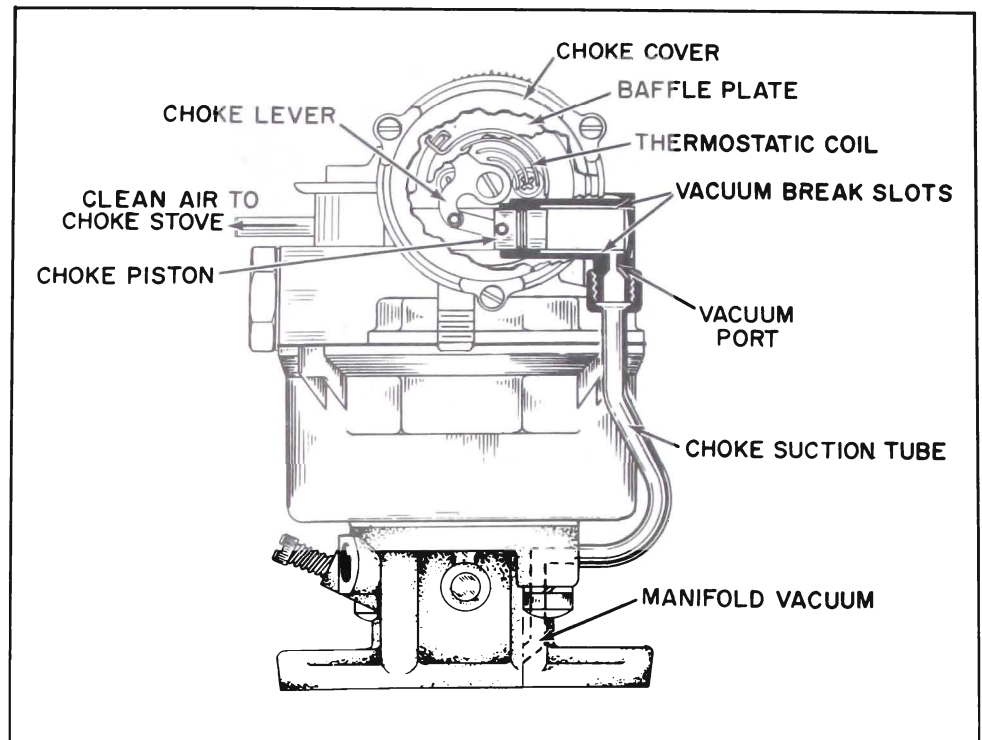


Figure 3-77—Choke System

3. Remove baffle plate inside choke housing.

4. Remove choke piston and lever assembly from inside choke housing by removing lever attaching screw from center of choke shaft.

5. The choke piston may be removed from the choke piston lever by shaking out the choke piston pin.

6. Remove two choke housing attaching screws inside choke housing, then remove choke housing from the air horn.

7. Remove fast idle cam attaching screw. Then the fast idle cam and choke rod can be removed from upper choke lever by carefully rotating assembly upward and sliding end of rod out of upper choke lever.

8. To remove choke valve, remove air cleaner hold-downs. Then remove the two choke valve attaching screws from the choke shaft and pull upward on choke valve to remove from shaft. Choke shaft and lever assembly can now be removed from air horn.

Note position of choke trip lever in relation to upper choke lever tang for ease in reassembly.

b. Air Horn Disassembly

1. Remove fuel filter inlet nut and gasket with 1" wrench. Then remove filter, filter spring and gasket between filter element and back side of inlet nut.

2. Remove four air horn attaching screws. Lift air horn straight up from bowl so as not to damage float. Place air horn, float side up, on a flat surface.

3. Remove float hinge pin and lift float assembly from air horn. Remove float needle.

4. Remove float needle seat and gasket with 1/2" bit screwdriver or wide blade screwdriver.

5. Remove main metering jet from bottom of main well support.

6. Remove hex head power valve check ball retainer from bottom of support, then remove power valve spring and ball.

7. Remove screw at base of main well support, then remove the main well support from air horn.

8. Remove power piston and power piston spring from air horn.

NOTE: Do not remove idle pick up tube from air horn as it is pressed in place.

9. Remove air horn gasket.

c. Float Bowl Disassembly

1. Remove small "O" ring seal around power piston vacuum tube on top of inner bowl parting surface.

2. Using a pair of long nosed pliers, remove pump discharge guide. Pump discharge spring and ball may now be removed by inverting bowl and shaking into palm of hand.

3. Remove two hair pin clips from pump link and then remove pump link from throttle lever and pump plunger rod.

4. Remove the pump plunger from the float bowl by pulling straight upward.

5. Remove pump return spring from bottom of pump well.

NOTE: Do not remove choke suction tube from throttle body.

6. Place carburetor bowl with suction tube projected over edge of flat surface and remove two throttle body attaching screws. Throttle body and gasket may now be removed.

d. Throttle Body Disassembly

1. Remove idle mixture adjusting needle and spring.

2. Remove throttle stop screw from throttle lever if necessary to replace.

NOTE: Due to close tolerance fit of the throttle valve in the bore of the throttle body, do not remove

the throttle valve or shaft from the throttle body.

e. Cleaning and Inspection

1. Thoroughly clean carburetor castings and metal parts in carburetor cleaning solvent.

CAUTION: Pump plunger and any synthetic or plastic parts should not be immersed in commercial carburetor cleaner.

2. After cleaning, blow out all passages and castings with compressed air until dry.

3. Check all parts for wear. If wear is noted, defective part must be replaced.

NOTE: Especially the following:

(a) Check float needle and seat for wear.

(b) Check area on float arm above float needle for wear and floats for dents. Check floats for leaks by shaking.

(c) Check throttle and choke shaft bores in throttle body and air horn castings for wear or out of round.

(d) Check idle mixture needles for burrs or ridges.

(e) If wear is noted on the steps of the fast idle cam, it should be replaced as it may upset engine idle during the engine warm-up period.

(f) Inspect pump plunger leather. Replace plunger if leather is scored, hardened or damaged.

(g) Check pump plunger vent ball to make sure that it is free inside pump plunger head. This may be done by shaking, ball should rattle freely.

(h) Inspect for burrs on the power piston or a distorted power piston stem or spring.

4. Always use new gaskets in re-assembly.

5. Check to make sure that the

lower end of the choke suction tube is tight in the throttle body.

6. Inspect choke suction tube hex nut packing. If packing is unduly compressed, out of round, or torn, it should be replaced.

7. Clean all dirt or lint out of the fuel inlet filter. If filter remains plugged, replace it. Check relief spring for distortion, replace it if necessary.

3-24 ASSEMBLY OF ROCHESTER 1-BARREL CARBURETOR

a. Throttle Body Assembly

1. Install throttle stop screw in throttle lever, if removed.

2. Screw idle mixture adjusting needle and spring into throttle body until it is finger tight. Back needle out 1-1/2 turns as a temporary idle mixture adjustment.

3. Using a new gasket, attach throttle body to bowl using two screws and lock washers. Tighten screws evenly and securely.

b. Float Bowl Assembly

1. Install 3/16" steel ball into pump discharge cavity. Carefully insert pump discharge spring and guide on top of ball. Tap the discharge guide lightly to seat flush with the float bowl casting.

NOTE: The pump discharge guide is installed correctly when it is at right angles with the pump discharge jet.

2. Place pump return spring in pump well and bottom spring in well by forcing downward with index finger.

3. Install pump plunger assembly in bowl, making sure not to curl plunger cup during installation.

4. Install small "O" ring seal around power piston vacuum tube

on top of inner bowl parting surface.

5. Attach pump link to pump plunger rod and throttle lever using two hair pin clips.

NOTE: Dog leg in pump link will face away from throttle shaft when installed correctly.

c. Air Horn Assembly

1. Install float needle seat and gasket using a screwdriver with 1/2" bit or a wide blade screwdriver.

2. Place new air horn gasket on top air horn, check to be sure that all air horn and gasket holes are in line.

3. Install power piston spring and power piston in vacuum cavity.

NOTE: Piston should ride free in cavity.

4. Install power valve ball (small steel ball), power valve spring, and retainer in main well support.

5. Attach main well support to air horn assembly and tighten attaching screw securely. Tighten power valve retainer securely.

NOTE: Check for free motion of power piston.

6. Install main metering jet in main well support.

7. Place float needle in float needle seat.

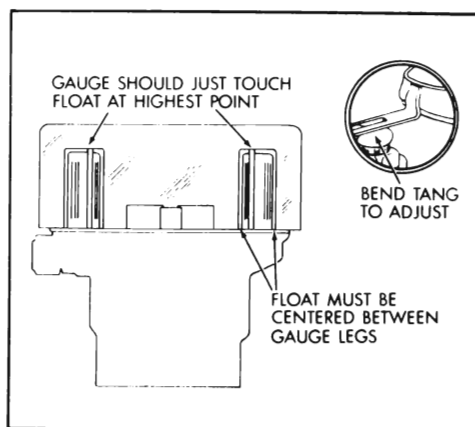


Figure 3-78—Float Level Adjustment

8. Place float carefully in position with drop tang pointing downward towards air horn and install float hinge pin.

d. Float Level Adjustment

With air horn inverted and gasket in place, position Gauge J-5127-2 over the float with the gauge tang inserted in the discharge nozzle. Bend the small tang over the float needle up or down until the top of each float just touches the gauge and the float is centered between the 1-9/32" gauge legs. See Figure 3-78.

e. Float Drop Adjustment

Bend the float tang at the rear of the float arm, next to the needle seat, as necessary to obtain a distance of 1-3/4" from the gasket surface to the bottom of the float with the air horn held in the upright position and the float hanging free. Measure with Gauge J-5127-2. See Figure 3-79.

9. Install air horn to bowl assembly being careful to lower the air horn straight down so that the floats will not be bent during installation.

10. Install four air horn to float bowl attaching screws and tighten evenly and securely.

11. Install 2 gaskets and filter element in fuel inlet nut. Install filter relief spring in air horn. Install nut and assembled parts into air horn. See Figure 3-80.

f. Choke Assembly

1. Install choke housing to air horn with two Phillips screws. Tighten screws evenly and securely.

NOTE: Install choke suction tube fitting and packing over choke suction tube. Engage tube in choke housing before assembling housing to air horn.

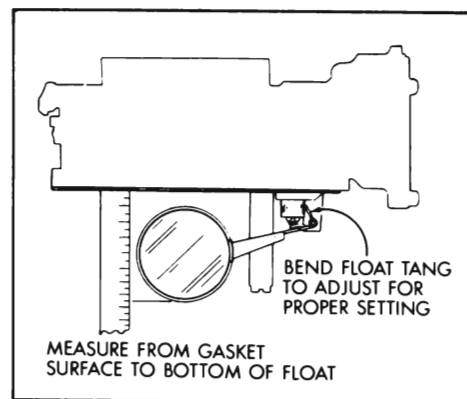


Figure 3-79—Float Drop Adjustment

2. Tighten choke housing suction tube fitting.

3. Install plastic upper choke rod lever on choke shaft. Tang on lever should point towards air horn casting.

4. Assemble choke shaft into air horn from the throttle lever side. Tang on the trip lever should be above the tang on the upper choke lever. See Figure 3-71.

5. Install choke valve into the slot in the choke shaft. RP trade mark should face upward. Install two choke valve attaching screws.

6. To insure proper end clearance between the choke trip lever and choke rod lever, move the choke shaft horizontally to obtain .020 clearance between the two levers. Then tighten the two choke valve attaching screws securely and stake in place.

7. Assemble choke piston to the

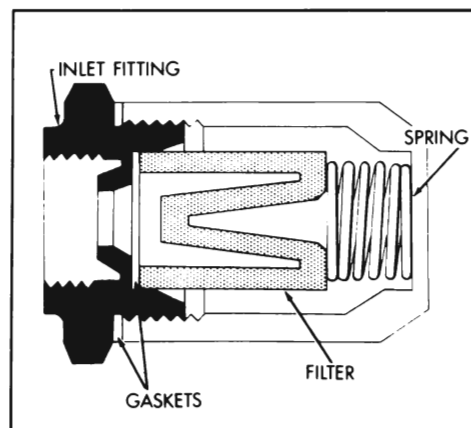


Figure 3-80—Fuel Inlet Filter

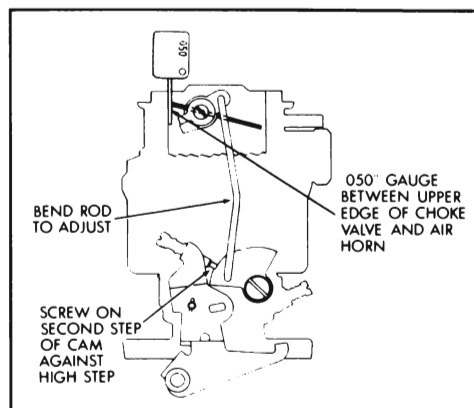


Figure 3-81—Choke Rod Adjustment

choke piston lever with small piston pin. Install choke piston and lever assembly into choke housing by placing choke piston into the choke piston bore.

8. Align flats on the choke shaft with the flats in the choke piston lever. Install attaching screw into the end of the choke shaft and tighten securely to retain choke piston lever to the choke shaft.

9. Install baffle plate into the choke housing. Place new choke cover gasket onto the thermostatic coil and cover assembly and then install the thermostatic coil to the choke housing.

10. Rotate the thermostatic cover

and coil assembly clockwise until the tang on the thermostatic coil picks up the tang on the choke piston lever and begins to close the choke valve. Keep rotating in a clockwise direction until the marks are indexed.

11. Install three retainers and attaching screws to the choke cover and housing. Tighten securely. Install air cleaner hold-down.

12. Install the choke rod to the fast idle cam, then carefully insert the upper end of the choke rod into the upper choke lever. See Figure 3-71. The dog leg of rod must face towards the idle mixture adjusting needle.

14. Attach the fast idle cam to the throttle body assembly with the fast idle cam screw and tighten securely. The steps on the fast idle cam should face towards the idle speed screw.

3-25 EXTERNAL ADJUSTMENT OF ROCHESTER 1-BARREL CARBURETOR

a. Choke Rod Adjustment

With the idle screw resting on the second step of the fast idle cam

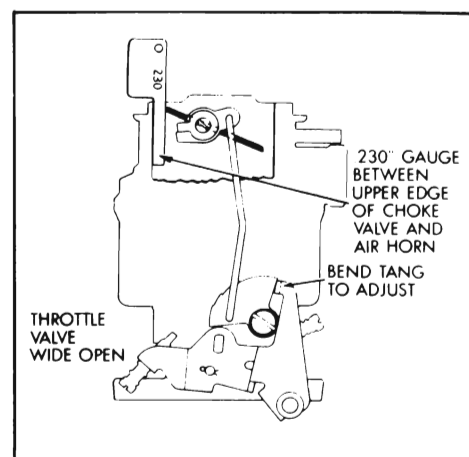


Figure 3-82—Choke Unloader Adjustment

and against the shoulder of the high step, bend the choke rod as shown to obtain sufficient clearance to allow the insertion of the .050" gauge between the upper edge of the choke valve and the air horn. See Figure 3-81.

b. Choke Unloader Adjustment

Bend the unloader tang on the throttle lever as necessary to allow the insertion of the .230" gauge between the upper edge of the choke valve and the air horn, with the throttle valve held wide open. See Figure 3-82.