ROCHESTER PRODUCTS

DIVISION

ROCHESTER GM NEW YORK

Model "BC" Carburetor
SERVICE MANUAL

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Figure 1. Model "BC" Carburetor

The Model "BC" Carburetor incorporates several distinct new features. Foremost of these features is the concentric float bowl, which completely encompasses the main bore of the carburetor. This float bowl concentricity in conjunction with the centrally located main discharge nozzle prevents any fuel loss on road inclines. Regardless of any angle the car may assume, the fuel level is at all times below the nozzle spill point.

A second feature of the Model "BC" Carburetor is the unique design of the Main Well Assembly. This assembly contains the main metering jet and power valve. It is attached to the carburetor air horn and suspended in the float bowl.

In the Model "BC" Carburetor, due to the suspension of the main well in the bowl, engine heat cannot be directly transmitted to the main passageway through the main metering jet.

The Model "BC" Carburetor incorporates the conventional six systems of carburetion: Idle, Part Throttle, Power, Pump, Float and Choke. Each of the systems is basically simple and can be readily traced and understood.

IDLE SYSTEM

The Idle System controls and delivers the proper fuel/air mixture for idling and up to approximately 30 MPH.

As shown on Figure 2, the idle fuel first passes from the bowl through the calibrated Main Metering Jet attached to the bottom of the Main Well Assembly. This fuel is then drawn up the Main Well by manifold vacuum (suction) to the crossbar in the Air Horn. Air joins the fuel through the calibrated air bleeds in the center of the crossbar. This fuel/air mixture is then calibrated as it passes through the Idle Restriction and is drawn down the passage in the Float Bowl to the Throttle Body.

The idle fuel is then metered to the engine by the idle adjusting needle hole which is below the throttle valve. As the throttle valve is opened to a greater degree, the idle hole which was above the closed throttle valve, is exposed to manifold vacuum and delivers additional fuel to meet the increased engine demand.

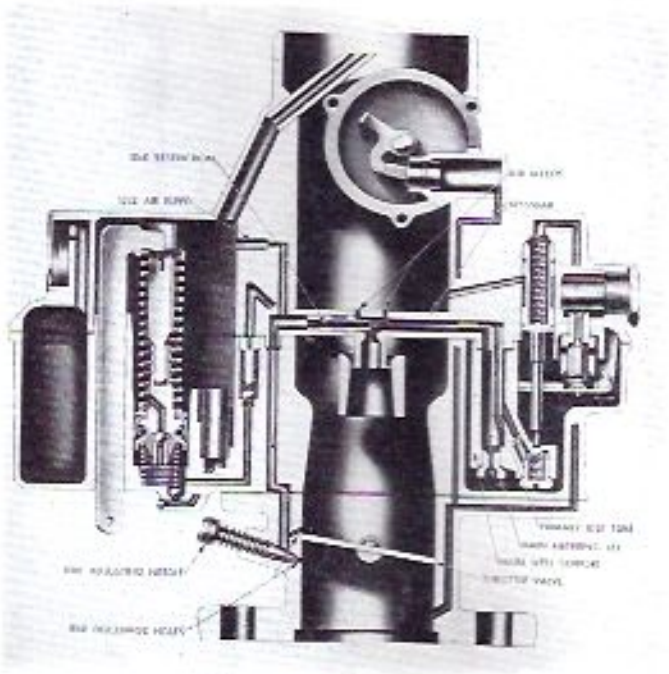

Figure 2. Idle System

PART THROTTLE SYSTEM

As the throttle valve is opened further, (as shown in Figure 3), air at a higher velocity is drawn down the carburetor throat. This creates a pressure drop or suction in the venturi at the main discharge nozzle in the crossbar. As a consequence, fuel and air begin to pass from the main nozzle to meet the increased engine demand. Further throttle opening will result in greater air velocity passing through the carburetor with resultant higher fuel flow from the nozzle and decreased flow from the idle system until it eventually cuts out altogether.

The calibration of the Main Metering Jet and the Air Bleeds in the crossbar maintain economical fuel/air ratios throughout the part-throttle or cruising range.

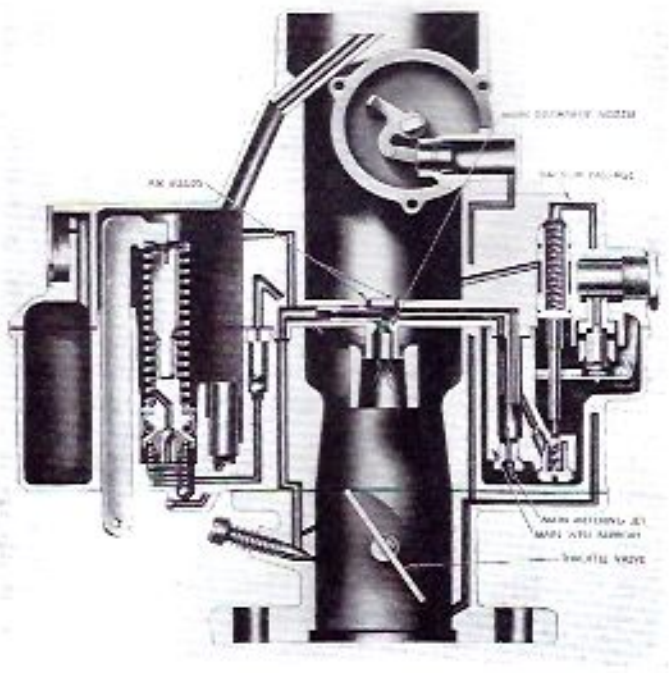

Figure 3. Part Throttle System

POWER SYSTEM

As shown in Figure 4, a vacuum operated Power System is included in the carburetor to provide additional fuel for sustained high speed operation or increased road load power.

A direct manifold vacuum passage within the carburetor to the engine intake manifold operates this system. At any manifold vacuum above approximately 5" Hg., the power actuating piston is held in the "UP" position against the compression of the power spring by manifold vacuum. As a consequence, no fuel passes through the ball type power valve.

In accordance with the principle that any sudden acceleration causes a drop in intake manifold vacuum, the power spring has been calibrated so that at any vacuum below approximately 5" Hg., it forces the power actuating piston "DOWN".

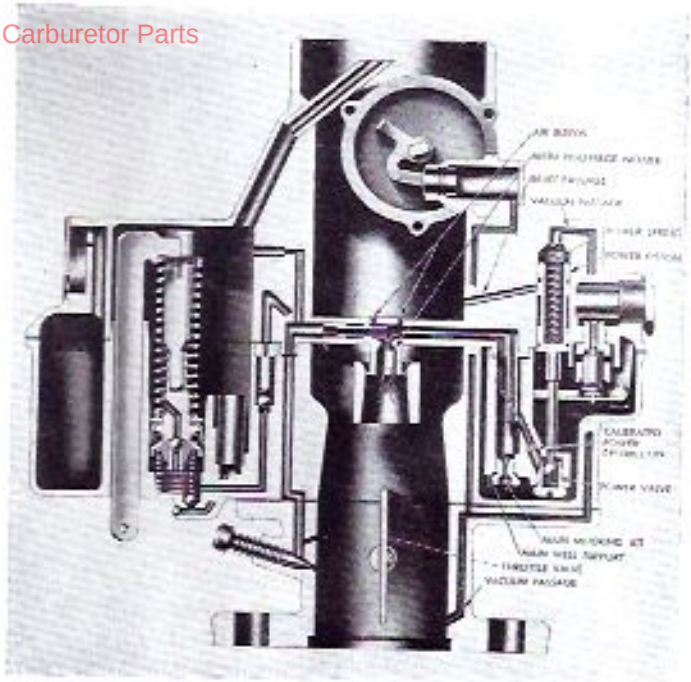

Figure 4. Power System

The end of this piston then unseats the spring-loaded ball in the power valve. Fuel passes readily around the ball into the base of the Main Well Support. The calibrated power restriction meters the fuel prior to its joining the fuel from the main metering jet. Conversely as the manifold vacuum rises above approximately 5" Hg., the power piston is drawn immediately to the "UP" position, and the spring-loaded ball of the power valve closes, returning the carburetor to the economical part throttle mixtures. *There is no adjustment required for the part throttle or Power Systems.*

The relief passage which is drilled from the bore of the air horn into the power piston passage serves to relieve any vacuum built up around the piston diameter. This vacuum if unrelieved, would draw fuel past the piston and down the vacuum passage into the manifold resulting in an overly rich condition

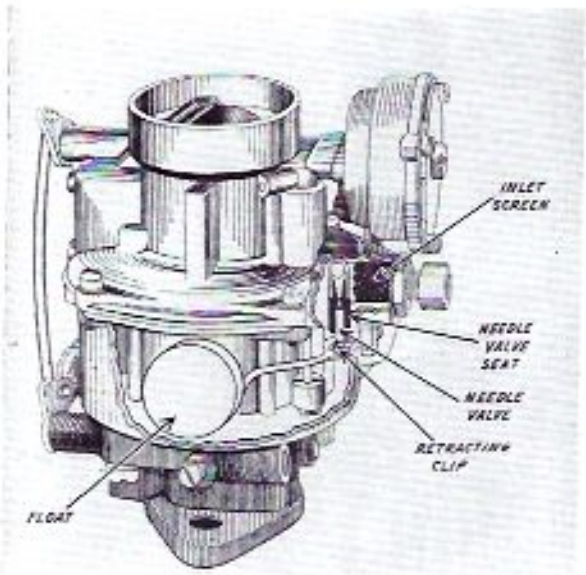

Figure 5. Float System

FLOAT SYSTEM

The Model "BC" Carburetor employs the conventional float needle and seat to control the fuel level in the float bowl. In accordance with concentric float bowl design, dual floats are used to maintain fuel level. (As shown in Figure 5) For some applications a small clip connects the float needle to the float. In this manner, the float needle is drawn from its seat by the float as the fuel level lowers, thereby permitting an ample entry of fuel into the bowl to meet increase engine demand.

This feature also serves to retract the needle from its seat, if for any reason a gum residue might tend to cause a sticking condition.

PUMP SYSTEM

To provide fuel for smooth quick acceleration a double spring pump plunger is used in the Model "BC" Carburetor. (As shown in Figure 6.) The rate of compression of the top spring versus the bottom spring is calibrated to insure a smooth, sustained charge of fuel for acceleration.

To exclude dirt, all fuel for the pump system first passes through the pump screen in the bottom of the float bowl. It is then drawn past the ball check into the pump well on the intake stroke of the plunger. Upon acceleration the force of the pump plunger seats the ball check and forces fuel up the discharge passage. The pressure of the fuel lifts the pump outlet ball check from its seat. The fuel is then sprayed on the edge of the venturi by the pump jet and delivered to the engine.

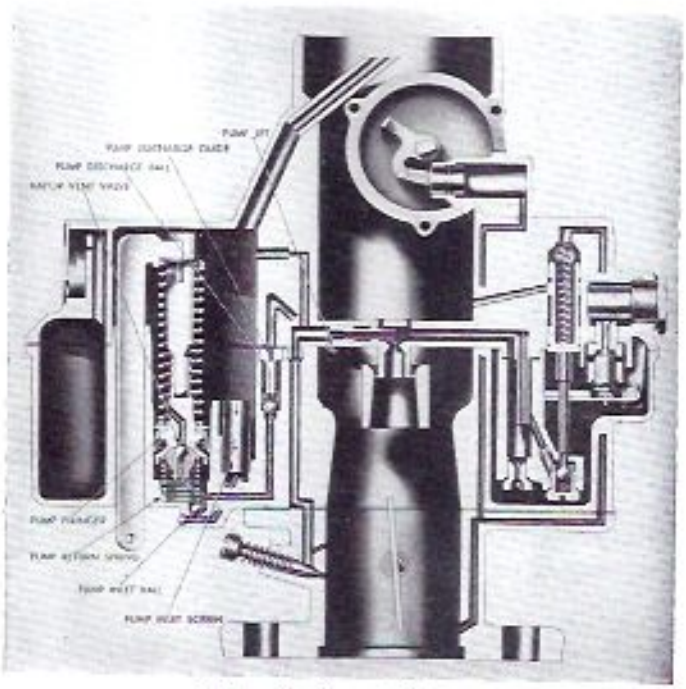

Figure 6. Pump System

The pump plunger head has been designed to eliminate fuel percolation in the pump system. This has been accomplished by the unique design of a ball check and seat in the plunger head. When the engine is not operating, any build up of fuel vapors in the pump well rise and by-pass the ball. This allows the hot fuel and vapors to circulate up the passage in the plunger head and return to the float bowl. Without this feature, any vapor pressure built up would evacuate the fuel in the pump system into the engine manifold, causing poor initial acceleration due to lack of fuel in the pump system as well as difficult hot weather starting.

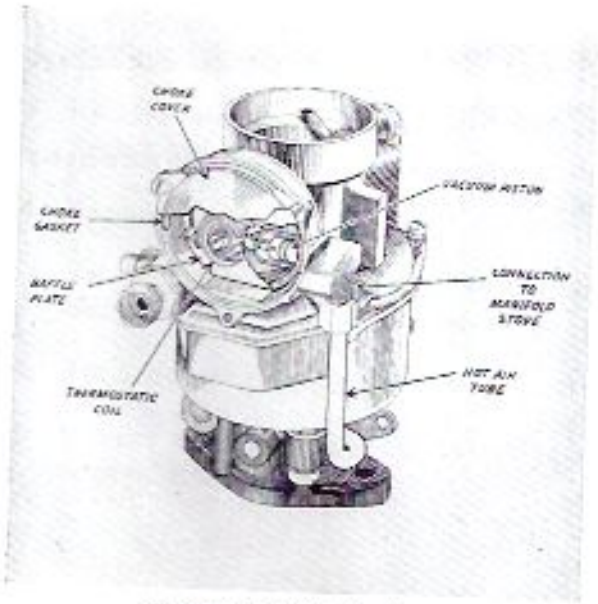

Figure 7. Choke System

CHOKE SYSTEM

To insure proper starting and driving during cold weather operation, the Model "BC" Carburetor employs a fully automatic choke. (As shown in Figure 7.) This choke system is composed of a thermostatic coil, choke piston, choke valve and fast idle cam and linkage. It is controlled by a combination of intake manifold vacuum, the offset choke valve, atmospheric temperature, and exhaust manifold heat.

The thermostatic coil, which is linked to the choke valve shaft, holds the choke valve closed when the engine is cold. As the engine is started, air velocity against the offset choke valve causes the valve to open slightly against the torque of the thermostatic coil. In addition, as the engine starts, intake manifold vacuum is applied to the choke piston, which also tends to pull the choke valve open.

As a consequence, the choke valve assumes a position where the torque of the thermostatic coil is balanced against the vacuum pull upon the choke piston and air velocity against the offset choke valve, thereby causing a regulated air flow into the carburetor which provides a proper mixture during the warm-up period.

During warm-up, the choke piston serves to modify the choking action to compensate for varying engine loads or acceleration. Any acceleration or increased road load decreases the vacuum exerted on the choke piston. This allows the thermostatic coil torque to momentarily increase choke valve closure to provide the engine with a sufficiently richer mixture for acceleration.

As the engine warms up, hot air from the exhaust manifold "stove" is drawn into the thermostatic coil cover by the vacuum behind the choke piston. This hot air causes a rise in temperature which causes the coil to slowly relax its tension. Thus the choke valve is allowed to move gradually to the full open position.

To prevent stalling during the warm-up period, it is necessary to run the engine at an idle speed slightly higher than that for a warm engine. This is accomplished by the fast idle cam which is linked to the choke valve shaft and holds the throttle valve open sufficiently during the warm-up period to give the increased idle RPM, until such time as the choke valve moves to the full open position.

While the automatic choke is in operation, the driver may wish to advance the throttle to the full wide open position. Since this would decrease vacuum pull on the choke piston, thereby closing the choke valve, it is necessary to provide increased carburetor air flow by opening the choke valve mechanically.

To accomplish this, a tang on the throttle lever is made to contact the fast idle cam linkage at wide open throttle position so as to partially open the choke valve

This will also relieve excess choking on starting by allowing more air to enter the carburetor when the engine is cranked with the accelerator held fully depressed.

CARBURETOR DISASSEMBLY, INSPECTION, AND ADJUSTMENT

CHOKE DISASSEMBLY

1. Loosen ¼" brass fitting on choke suction tube.

2. Remove three attaching choke cover screws and retainers, then remove choke cover, cover gasket and thermostat coil assembly from carburetor.

3. Remove baffle plate.

4. Remove pin spring and rod end clip from respective ends of choke rod and remove rod.

5. Remove retaining screw at end of choke shaft and carefully pry off choke trip lever, spacing washer and choke counterweight.

6. Remove two choke valve screws and then remove choke valve.

7. Rotate choke shaft clockwise to free choke piston from housing and then remove piston and choke shaft from carburetor.

8. Remove choke piston pin and piston from choke shaft.

9. Remove two choke housing attaching screws. Choke housing and gasket may now be removed from air horn.

AIR HORN DISASSEMBLY

1. Remove filter screen retainer nut and gasket with ¾" wrench and remove filter screen.
   NOTE: Some applications do not use a filter screen.

2. Remove screws and lift air horn from bowl.

3. Place air horn upended on flat surface. Remove float hinge pin and lift float assembly from air horn. Float needle may now be removed from float.

4. Remove float seat and gasket with ½" bit screwdriver.

5. Remove main metering jet from main well support.

6. Remove main well support. Air horn gasket may now be removed.

7. Remove power piston and spring.

   NOTE: Do not remove primary idle tube from air horn.

BOWL DISASSEMBLY

1. Remove slotted brass pump discharge guide by using a small bit screwdriver to compress top portions of guide slightly as shown in Figure 8. Spring will cause guide to pop out. Remove pump discharge guide spring and ball. If guide is of the stamped type, remove with long nosed plyers.
2. Remove two pin springs from pump link and remove pump link from throttle lever and pump plunger arm.
3. Remove pump plunger from bowl. Remove pump return spring and inlet ball from pump well.
4. Carefully remove pump inlet screen from bowl.

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

Figure 8. Bowl Assembly

THROTTLE BODY DISASSEMBLY

1. Remove idle adjusting needle and spring.
2. Remove idle screw from throttle lever.
3. Remove fast idle cam.

   NOTE: Due to close-tolerance fit of the throttle valve in the bore of the throttle body, it is not necessary to remove the throttle valve or shaft from the throttle body.

CLEANING AND INSPECTION

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

   CAUTION: Choke coil and housing and pump plunger should not be immersed in solvent. Clean pump plunger in clean gasoline only.
2. Blow all passages in castings 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 this may enlarge orifice and seriously affect carburetor calibration.

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. If the wear is noted the assembly must be replaced.

   (b) Check float button for wear and float 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) Inspect idle adjusting needle for burrs or ridges. Such a condition requires replacement.

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

5. Check to see that lower end of suction tube is tight in seal in throttle body. If not, a new seal will have to be installed after the carburetor is assembled or poor choke operation will result from vacuum leak.

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

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

ASSEMBLY AND ADJUSTMENT

1. Install idle stop screw in throttle lever

2. Screw idle adjusting needle and spring into throttle body until it is finger tight. Back out screw 1½ turns as a temporary idle adjustment. Make final adjustment on engine.

3. Install fast idle cam with letters RP facing outward

4. With bowl upended and suction tube projected over edge of flat surface, place new throttle body gasket into position and attach throttle body. Tighten screws evenly and securely.

   NOTE: New choke suction tube seal, if needed, will be installed after carburetor is completely assembled.

BOWL ASSEMBLY

1. Drop small aluminum ball into pump well hole, and replace pump return spring. Press spring with finger to center it in pump well.

2. Install large steel ball in pump discharge cavity. Place spring and spring guide atop ball. Spread spring guide slot slightly with screwdriver blade to keep in place.

3. Press pump filter screen carefully into position.

4. Install pump plunger assembly and attach pump link to pump plunger arm and throttle lever. Attach pin springs to each end of pump link.

NOTE: The dog leg in the pump link must face away from throttle shaft.

AIR HORN ASSEMBLY

1. Install float needle seat and gasket, using screwdriver with ½" bit.

2. Place power piston spring and power piston into vacuum cavity. Piston should ride free in cavity.

3. Place new gasket atop air horn, check to be sure that all air horn and gasket holes are aligned.

4. Attach main well support to air horn securely.

5. Install main metering jet in main well support.

6. Assemble float needle to float and place float carefully into position. Tang at rear of float must face cover. Install float hinge pin as shown in Figure 9.

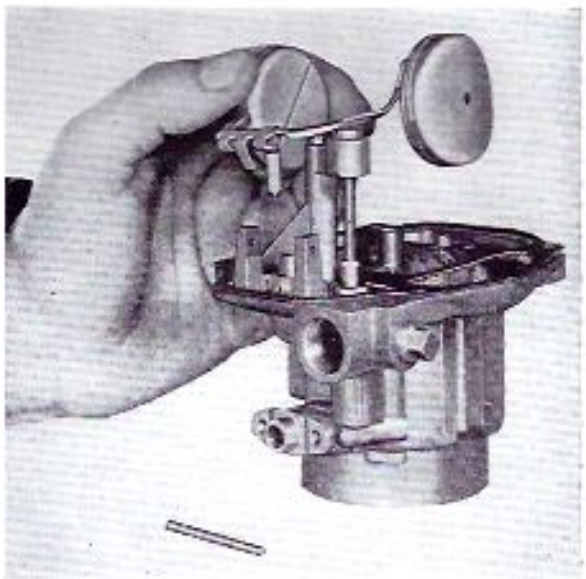

Figure 9. Air Horn Assembly

NOTE: The float adjustment may be made at this point. For correct settings see the carburetor adjustment bulletin.

7. Attach air horn to bowl with attaching screws. Tighten screws evenly and securely.

8. Install filter screen, strainer nut and gasket assembly in air horn.

9. Place new gasket into position and attach choke housing to air horn. Tighten screws securely.

10. Place new hex fitting packing on choke suction tube and tighten fitting on choke housing. Fitting must be tight to prevent loss of vacuum.

11. Assemble choke piston to shaft with pin and place into choke housing bore as shown in Figure 10. Rotate choke shaft counter-clockwise so that piston rides in housing cavity.

12. Install choke valve on choke shaft with letters "RP" facing upward. Center choke valve before tightening screws. Place baffle plate and choke cover gasket into position as shown in Figure 11, and install choke coil and cover. Rotate cover clockwise until index marks on cover and housing are aligned.

13. Attach three retainers and screws to choke housing and tighten securely.

    NOTE: Choke valve should be lightly closed at room temperature (75°F) when index mark on cover and housing are aligned.

14. Place choke counterweight on end of choke shaft with tang facing choke housing. Install spacing washer and trip lever so that tang of trip lever is atop counterweight tang, when choke valve is full open as shown in Figure 12.

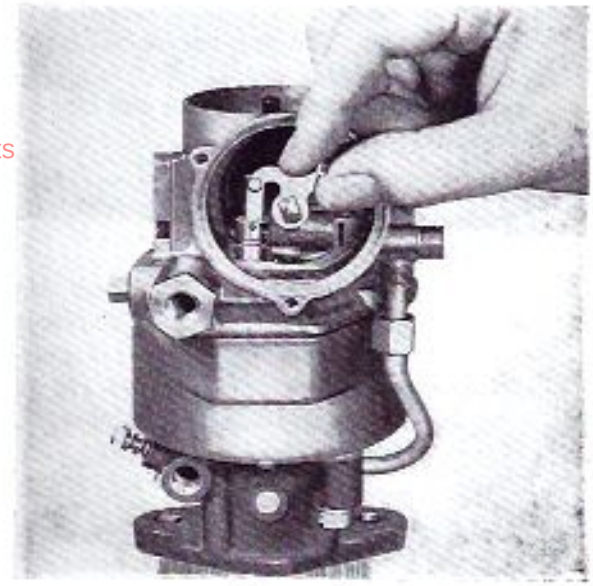

Figure 10

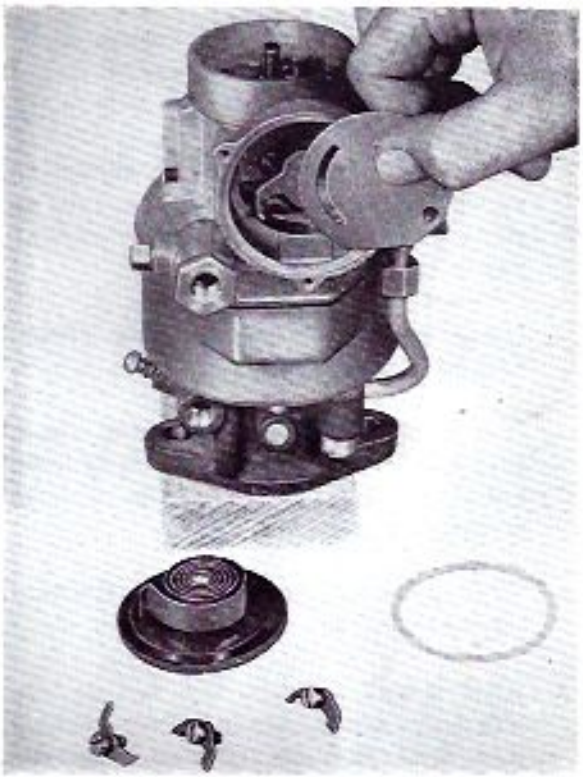

Figure 11

15. Install choke rod to counterweight and fast idle cam. The dog leg of rod must face idle adjusting needle.
Assemble pin spring and rod end clip to respective ends of rod.

NOTE: Check choke valve for free movement.

16. If the choke suction tube and seal assembly in the Throttle Body requires replacement proceed as follows: Figure 13. This operation must be performed after carburetor is completely assembled.

a. Loosen Throttle Body to Bowl attaching screws.

b. Place flared end of tube with seal into throttle body. Using Tool BT-45, tap lightly to hold seal in Throttle Body. Rotate tube while tapping seal so that it is started uniformly in Throttle Body.

c. Install hex fitting and new packing on upper end of tube and fasten tube to choke housing by turning hex nut up finger tight.

d. Using tool BT-45 and hammer spread seal into throttle body securely.

e. Completely loosen hex nut and check that tube is tight in throttle body (will not turn). Then tighten hex nut to choke housing securely.

f. Tighten throttle body to bowl attaching screws evenly and securely.

g. After installing carburetor on car, run idling to warm up engine, check packing joint with gasoline. If there is a leak, engine will stall or roll.

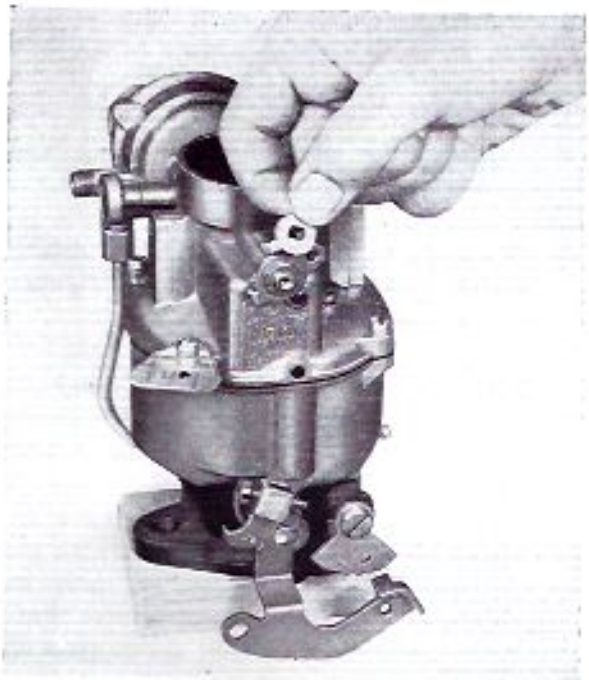

Figure 12

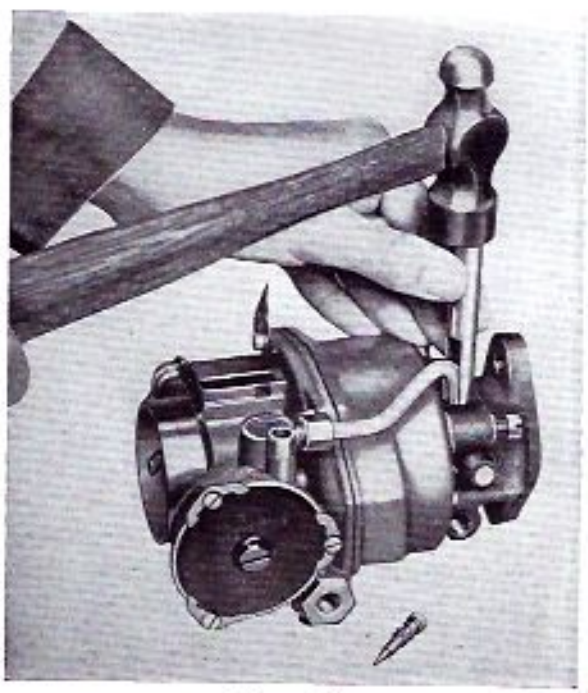

Figure 13