Service Training

CARBURETOR TEXT

MODEL 4GC CARBURETOR for 1955 CADILLAC

ROCHESTER PRODUCTS

DIVISION OF GENERAL MOTORS

ROCHESTER, N. Y., U. S. A.

RP Form 1138
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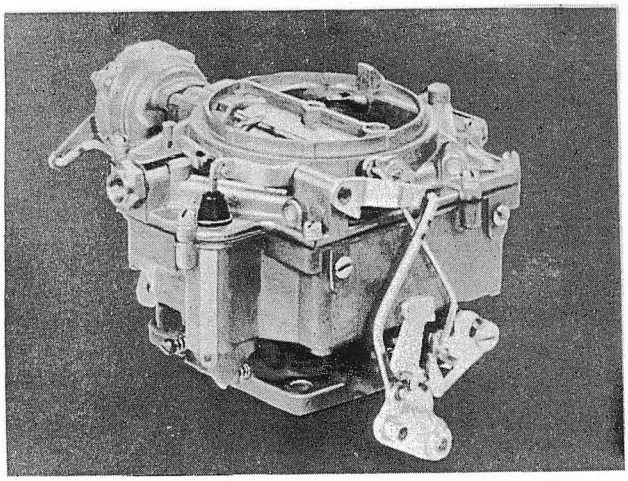
TRAINING TEXT for 1955 CADILLAC 4GC



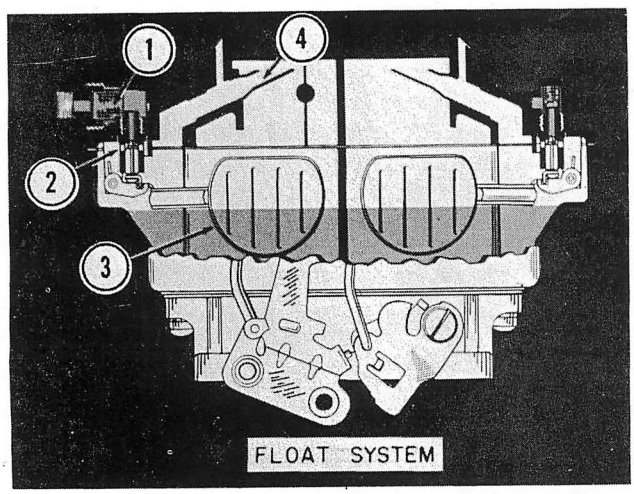
INTRODUCTION

The 1955 Cadillac 4GC Carburetor features a new By-pass Idle System, which is explained in detail in the "Carburetor Systems" section.

In conventional carburetors, air for idle operation is supplied past a slightly open throttle valve; this new design allows complete closure of the throttle valves and air is fed to the manifold through special passages in the throttle body, completely by-passing the throttle valves. A large adjustment screw provides a wide range of idle settings; adjustment procedure will be covered in the adjustment section.

CARBURETOR SYSTEMS

Incorporated in Rochester Carburetors are six basic systems: Float, Idle, Part Throttle, Power, Accelerating Pump, and Choke. The following explanation and illustrations show how each system operates to provide efficient carburetion through all operating conditions.

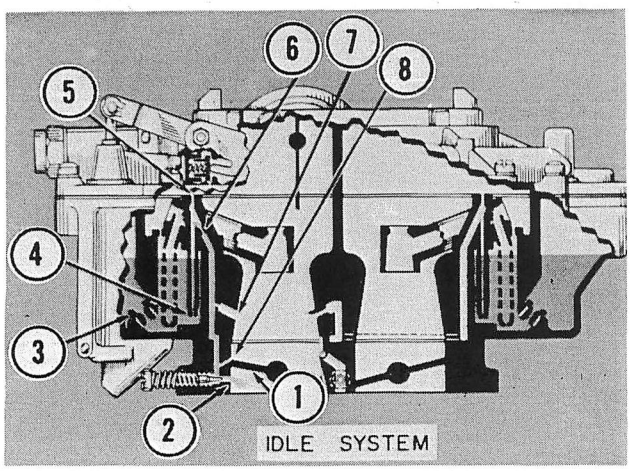


FLOAT SYSTEM

Fuel enters the carburetor on the primary side; a connecting passage in the air horn casting supplies the secondary side with fuel from the same source. Entering fuel passes first through the inlet screens (1), then through the fuel valves (2) into the float bowls. Flow continues until the fuel level raises the floats (3) to a position where they close the valves (2).

Both sides of the carburetor are individually and internally vented to transmit the pressures from beneath the air cleaner to the fuel in the float bowls.

A cored passage in the float bowl, slightly above the normal fuel level, links the primary and secondary float bowls together. In this way any temporary abnormal rise in level in one bowl will be absorbed by the other bowl and should not seriously disrupt engine operation.



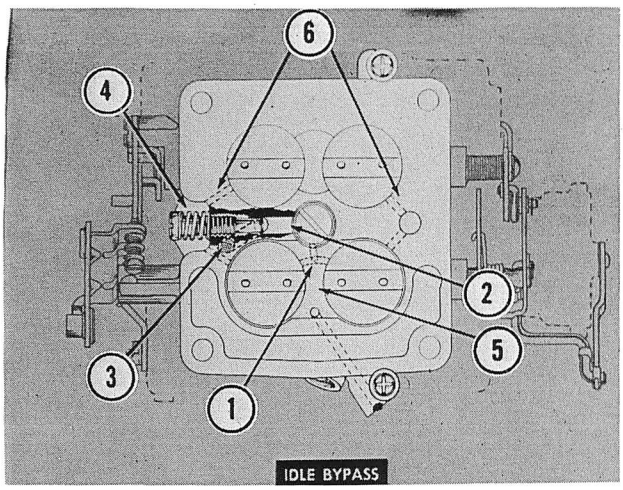
IDLE SYSTEM

At low idle the throttle valves (1) are completely closed. Low pressure at the idle needle holes (2) located below the throttle valves, causes the fuel to flow in the following manner:

Fuel from the bowl passes through the main metering jets (3) into the main well, where it is metered by the orifice at the lower end of the idle tube (4) and travels up the idle tube. At the top of the idle tube, air is bled in (5) and the mixture travels

down through a calibrated restriction (6). The mixture is bled further with air at the lower idle air bleed (7) and the secondary idle discharge holes (8). The mixture then passes through the idle needle hole (2) to combine with air from the bypass idle passages. The final mixture then flows into the intake manifold for low idle operation.

Vapor formed in the float bowl during low idle operation is vented through an atmospheric idle vent, opened by a tang on the pump lever whenever the throttle valves are in low idle position.



BY-PASS IDLE

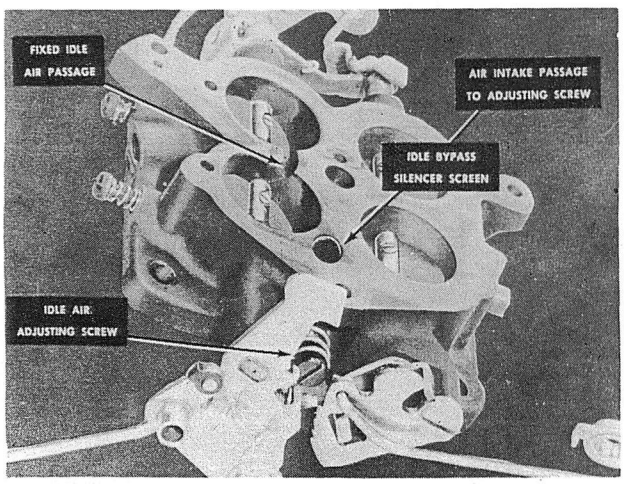
The Rochester 4GC Carburetor for the 1955 Cadillac incorporates a new system for low idle adjustment, known as a "by-pass idle system."

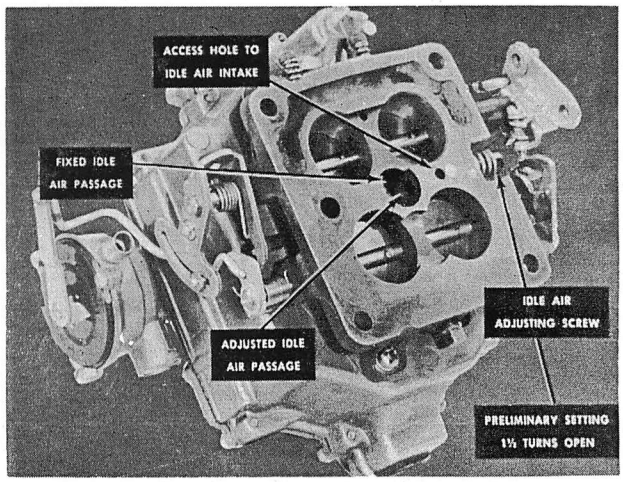
Unlike other systems in which air for idle mixtures flows past a slightly open throttle valve, the by-pass idle system operates with the throttle valves completely closed. All idle air by-passes the completely closed throttle valves through two idle air passages, one fixed (1) and one adjustable (2). The fixed passage (1) which carries the bulk of the idle air, extends from a slot above and between the primary throttle valves diagonally into the large attaching screw hole in the center of the throttle body.

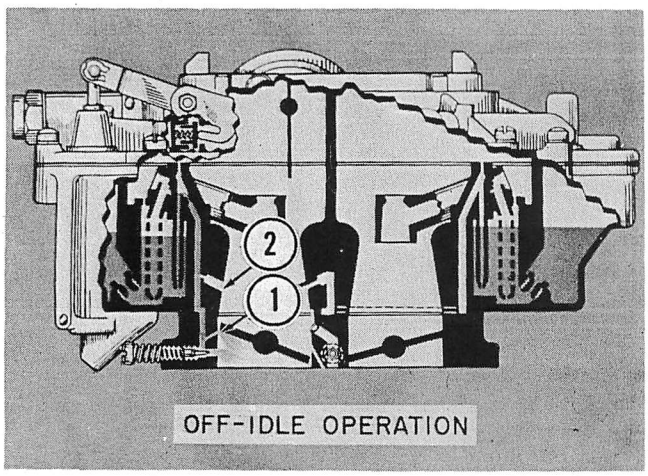
Air enters the adjustable passage (2) through a cutaway area opening to the primary bore between the bottom of the float bowl and the throttle body. It passes through a screen (3) which acts as a silencer to prevent any whistling noise from the adjusting screw passage. A large adjusting screw (4) provides easy adjustment of air for low idle, allowing an adjustment range from complete shutoff to full flow through the adjustable passage (2).

The adjusted air, like the fixed air, is delivered to the large center attaching screw hole and all air passes through the balance slot (5) between the primary bores below the throttle valves.

There are four vapor vent passages (6) above the throttle valves, vented to outside air and designed to eliminate heavy vapor under extreme heat. Two supplementary pictures are supplied to show more graphically the features and location of the by-pass idle system.



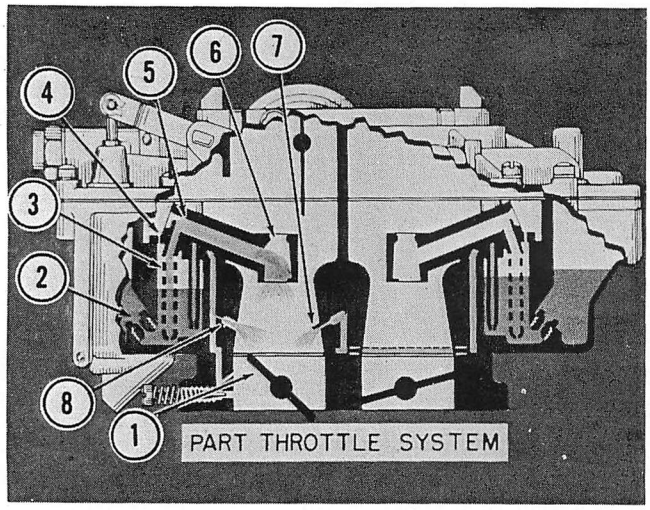




OFF-IDLE OPERATION

As the throttle valves are opened from low idle position, the air bleed of the secondary discharge holes (1) diminishes; when the valve has moved completely above them, they are exposed to manifold vacuum and become supplementary sources of fuel-air mixture for increased engine needs.

Further throttle valve opening raises the air velocity past the lower idle air bleeds (2) and secondary feed nozzles; then these become supplementary fuel sources through the part throttle and power ranges.



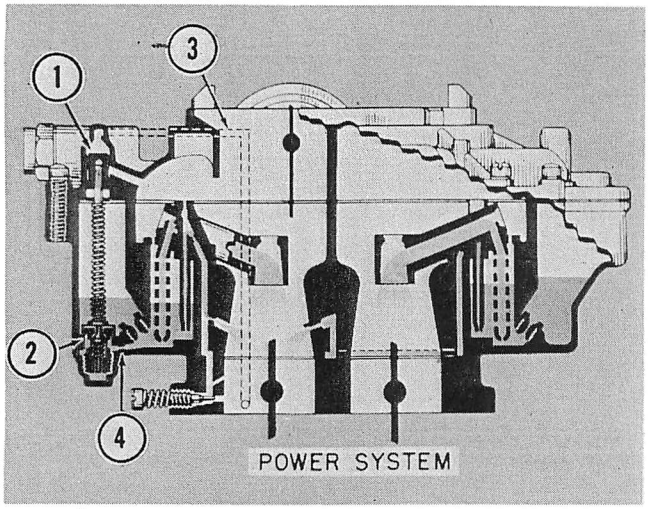
PART THROTTLE SYSTEM

As the throttle valves (1) open further, the increased demand for fuel is supplied in the following manner:

Fuel is drawn from the fuel bowl through the calibrated main metering jets (2) into the main nozzle (3) where it is mixed with air from the main well bleed (4). The mixture passes through the mixture passage (5) to the secondary venturi (6) and into the intake manifold.

Additional fuel is also supplied by the lower idle air bleeds (7) and the secondary feed nozzles (8).

primary throttle valves open 60° before secondary begins to open.



POWER SYSTEM

The spring loaded power piston (1) located in the primary side of the carburetor and regulated by vacuum, controls the power valve (2) to furnish additional fuel for high speeds and loads.

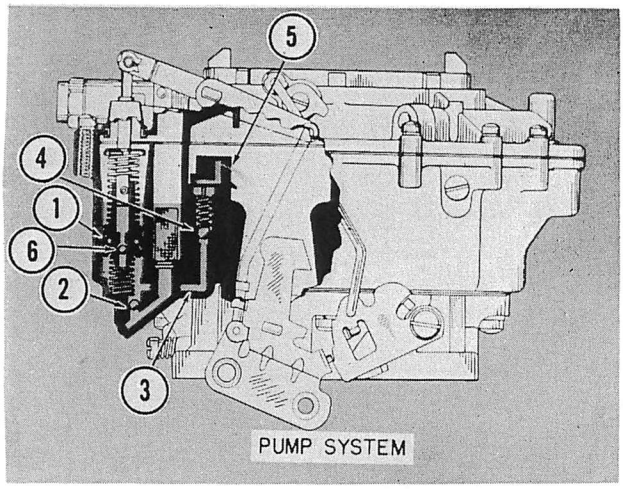
Through a connecting vacuum passage (3) from the base of the carburetor to the piston chamber, the power piston (1) is exposed to manifold vacuum at all times.

During idle and part throttle operation, the relatively high vacuum holds the power piston (1) up against spring tension and the power valve (2) remains closed.

Increase in load lowers manifold vacuum; when it has dropped sufficiently, the spring overcomes the upward vacuum pull and the piston moves downward, depressing the power valve to allow additional fuel to flow through a calibrated restriction (4) into the main well, so that fuel is added only as needed, regulated by manifold vacuum and the power piston position.

As load decreases, the resulting higher vacuum overcomes the spring and raises the power piston, closing the valve.

It is also in this range that the secondary side of the carburetor provides additional air and fuel for this increase in power.



PUMP SYSTEM

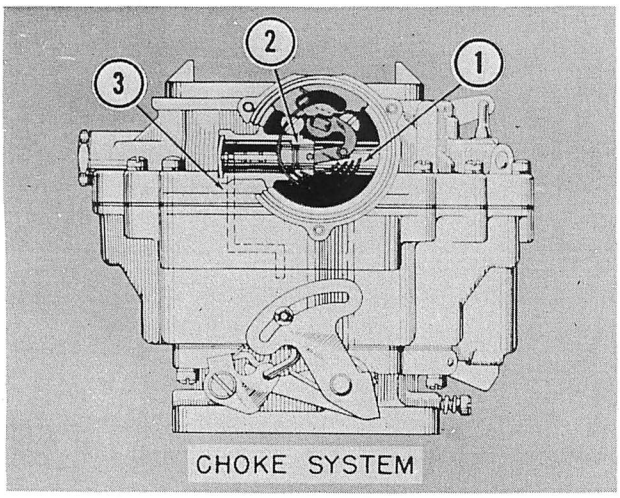
ACCELERATING PUMP SYSTEM

Fuel for acceleration is supplied by a double spring pump plunger (1). The top and bottom springs combine to move the plunger so that a smooth, sustained charge of fuel is delivered for acceleration.

Fuel is drawn into the pump chamber through the inlet ball check (2) on the intake stroke of the plunger.

Downward motion of the plunger seats the inlet check ball (2) and forces fuel through the discharge passage (3) where it unseats the discharge check (4) and passes on through the passage to the pump-discharge holes in the cluster (5) where it sprays into the venturi.

The ball check (6) in the plunger head serves as a vapor vent for the pump chamber (2). Without this vent, vapor pressure in the pump well might force fuel from the pump system into the engine manifold, causing hard starting when the engine is hot.



CHOKE SYSTEM

CHOKE SYSTEM

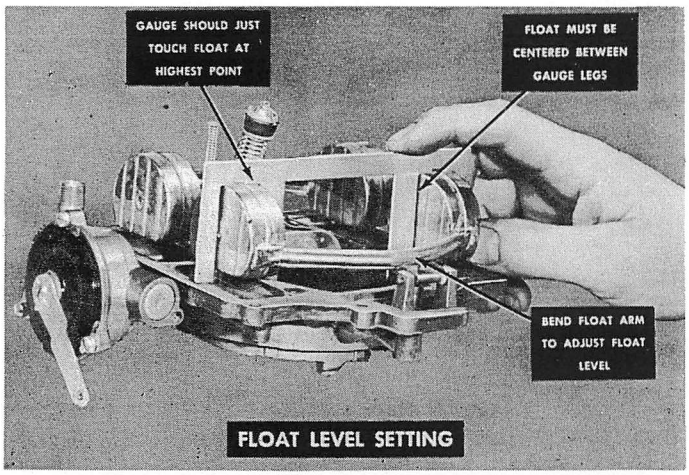
When the engine is cold the thermostatic coil (1) is calibrated to hold the choke valve closed. As the engine is started, air velocity against the offset choke valve causes the valve to open slightly against the torque of the thermostatic coil (1). In addition, intake manifold vacuum is applied to the choke piston (2) through the vacuum channel (3) which also tends to open the choke.

As the engine warms up, heated air is drawn into the choke housing through the choke heat tube by vacuum through the passage hole in the choke piston bore. As the engine temperature increases, causing the coil (1) to relax its tension, the choke valve is moved gradually to the full open position.

The choke modifier is used on this carburetor, to relax tension on the thermostatic coil (1) to prevent "loading up" on a cold engine, when the throttle is opened considerably (such as in going up a steep hill).

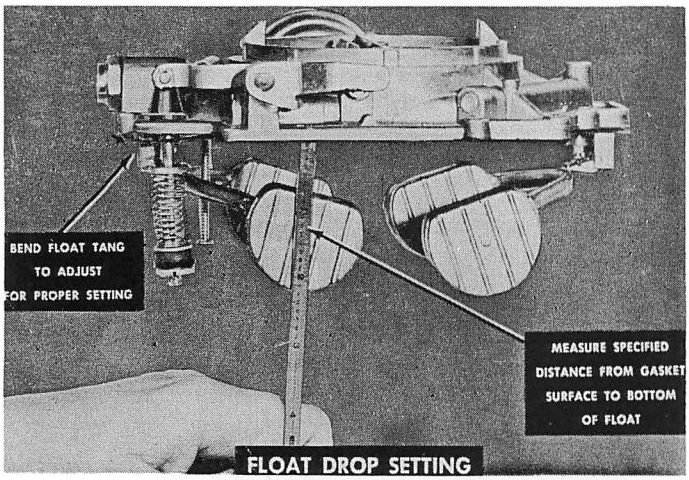
NECESSARY ADJUSTMENTS

The following material is designed to show graphically each adjustment which must be made for efficient operation and the tools used to make these important adjustments.



FLOAT LEVEL SETTING

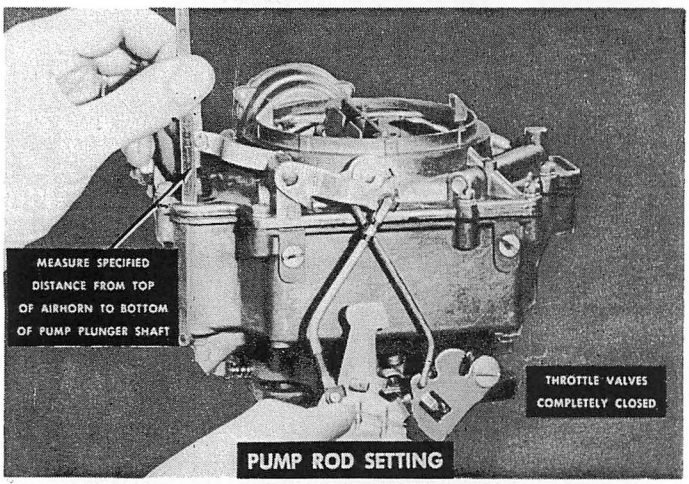
With the air horn inverted, gasket in place, position the float gauge over floats, so that the gauge is located against the curvature in the bore of the carburetor air horn. Bend the float arms at the rear of the assembly, so the floats just contact the gauge. Then bend the float arms horizontally until each float pontoon is centered between the gauge legs. Repeat the same adjustments on opposite floats (Gauge BT-101, Specification 1-19/32").



FLOAT DROP ADJUSTMENT

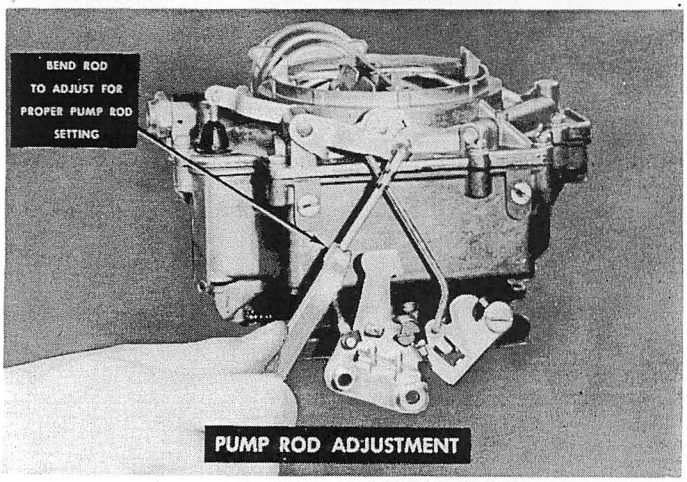
The float drop is correct when the distance from the air horn gasket to the bottom of the float is 2¼" with the air horn held upright.

To obtain the proper setting, bend the float drop tang at the rear of the float toward the needle seat to lessen drop, away from needle seat to increase drop (Gauge BT-93, Specification 2¼").



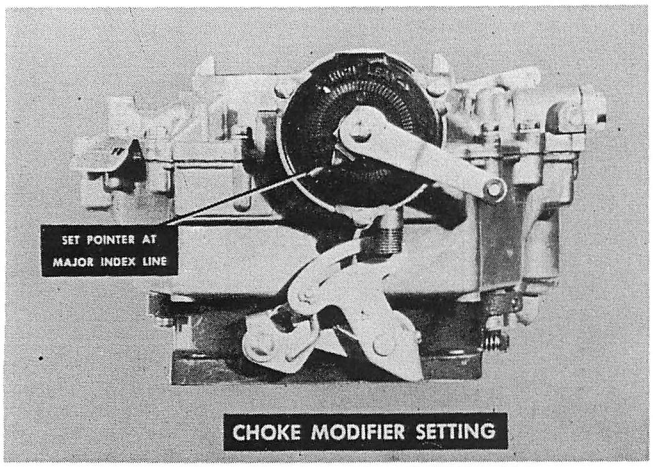
PUMP ROD SETTING

Back off the fast idle screw. With the throttle valves completely closed, measure from the top of the air horn casting to the bottom of the pump plunger rod. The distance should be 63/64".



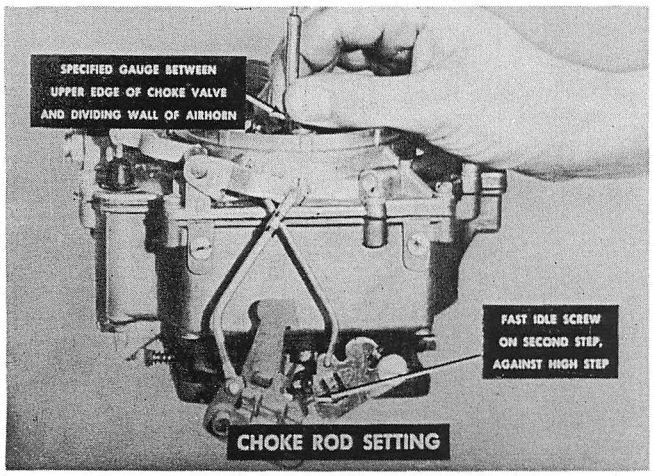
PUMP ROD ADJUSTMENT

Bend the pump rod as shown to obtain the correct setting.



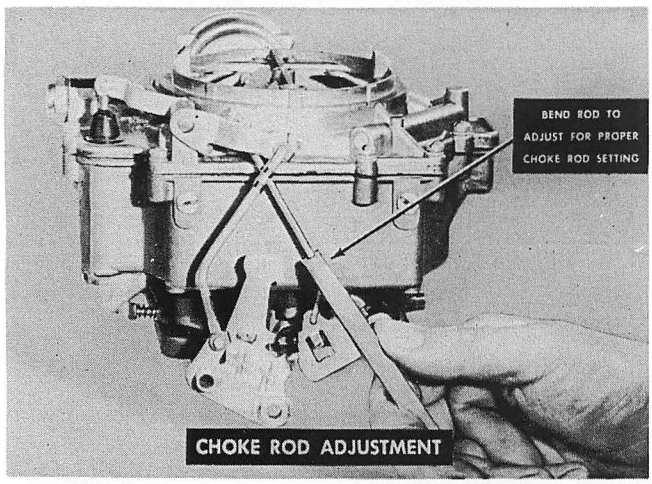
CHOKE MODIFIER ADJUSTMENT

With the fast idle adjusting screw still backed out and with the throttle valves tightly closed, loosen the choke modifier lock screw and rotate the index pointer counter-clockwise until the choke valve closes and the pointer is positioned at the major index mark on the choke coil cover, then tighten lock screw firmly.



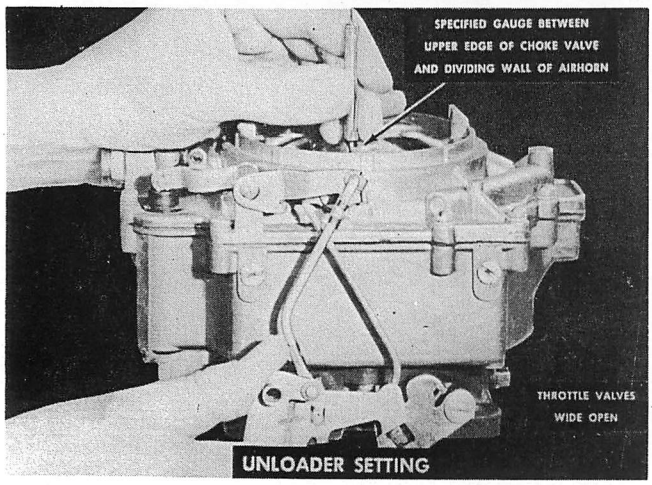
CHOKE ROD SETTING

With choke modifier set at index, turn the fast idle adjusting screw in until it contacts the second step of the fast idle cam, with the side of the screw against the side of the highest step of the cam. Be sure the choke trip lever is in contact with the choke counterweight lever. There should now be .040" clearance between the top edge of the choke valve and the dividing wall in the air horn. (Gauge BT-102, Specification .040").



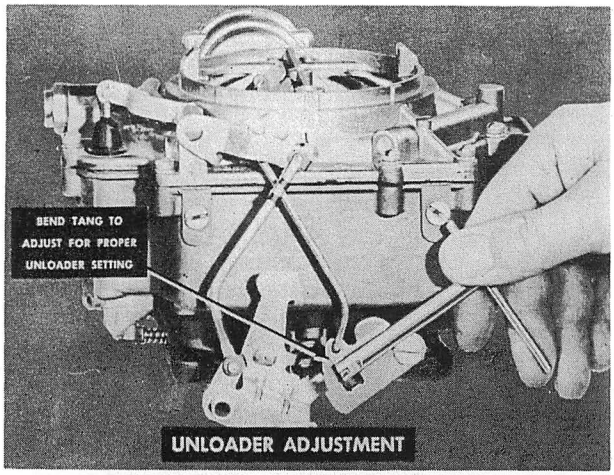
CHOKE ROD ADJUSTMENT

Bend the choke rod as shown to obtain proper clearance. (Gauge BT-102, Specification .040").



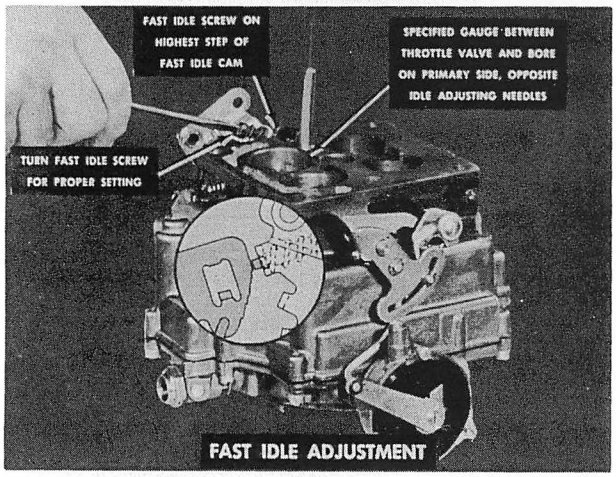
CHOKE UNLOADER SETTING

Move the throttle lever to full wide open position, making sure the choke trip lever is in contact with the choke counterweight. With the levers in this position there should be a clearance of .125" between the top edge of the choke valve and the dividing wall in the air horn. (Gauge BT-102, Specification .125").



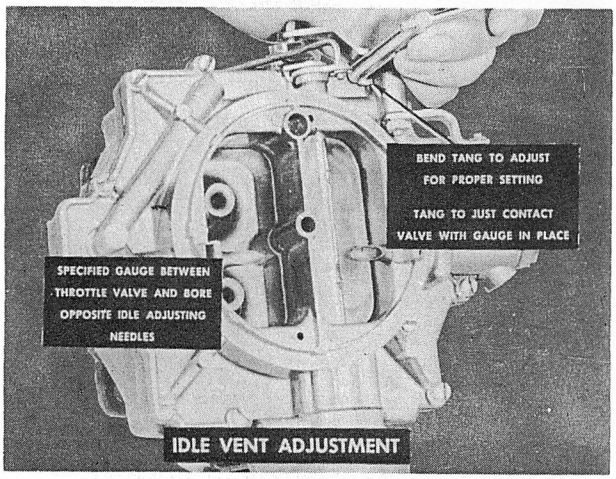
CHOKE UNLOADER ADJUSTMENT

To obtain the proper clearance, bend the tang on the fast idle cam.



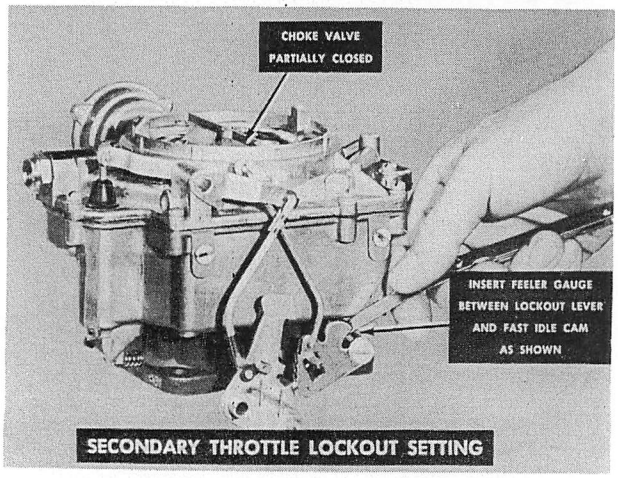
FAST IDLE ADJUSTMENT

With the choke valve fully closed, place a .020" wire gauge between the throttle valve and the wall of the throttle body opposite the idle adjusting needles. With the throttle valve resting against the .020" wire gauge, turn the fast idle screw in against the high step of the fast idle cam to obtain the proper clearance. (Gauge BT-67)



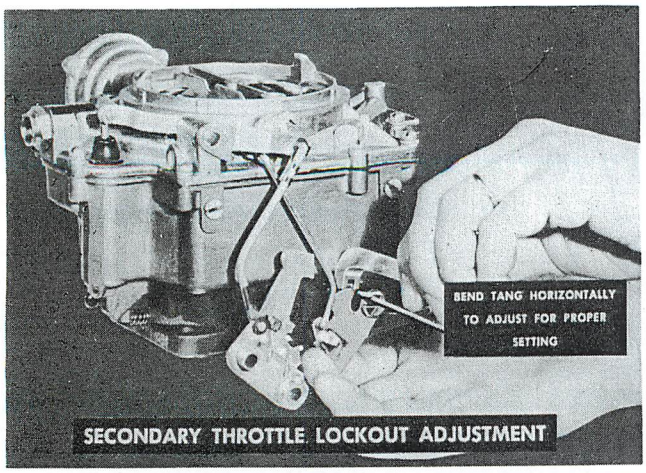
ATMOSPHERIC IDLE VENT ADJUSTMENT

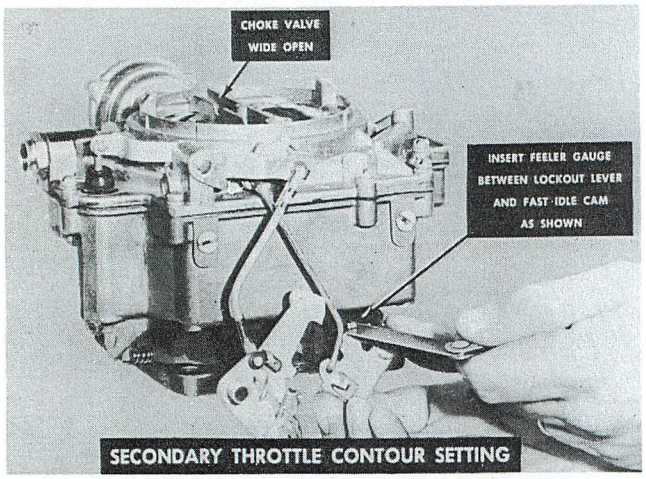
Insert a .063" wire gauge between the throttle valves and the primary bore of the throttle body on the side opposite the idle adjusting needles. With the throttle valves closed against the wire gauge, bend the atmospheric vent valve tang until it just contacts the atmospheric vent valve in the carburetor air horn. (Tools BT-69 and BT-79, Specification .063").

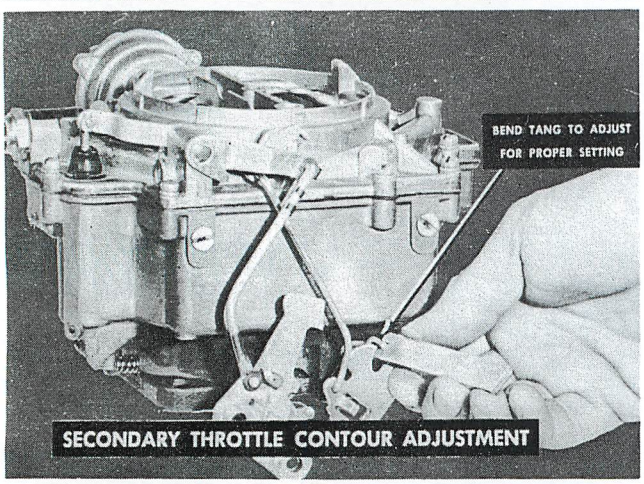


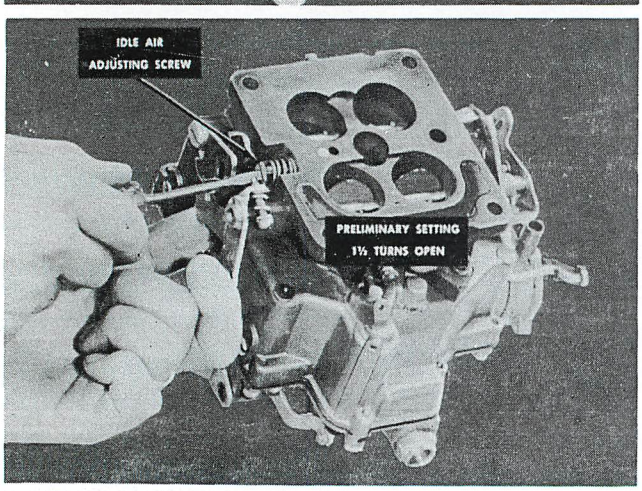
SECONDARY THROTTLE LOCKOUT SETTING

With the choke valve partially closed and the fast idle cam and secondary lockout lever in position as shown, there should be a clearance of .015" between the lever and cam.









SECONDARY THROTTLE LOCKOUT ADJUSTMENT

Using tool BT-18 bend the tang of the lever horizontally to obtain the proper .015" clearance.

SECONDARY THROTTLE CONTOUR CLEARANCE SETTING

With the choke valve held wide open and the fast idle cam and secondary lockout lever in position as shown, there should be a clearance of .015" between the lever and cam.

SECONDARY THROTTLE CONTOUR CLEARANCE ADJUSTMENT

Using bending tool BT-91 bend the lever tang to obtain the proper clearance.

LOW IDLE ADJUSTMENT

As a preliminary adjustment on the bench, turn the air adjusting screw and idle adjusting needles 1½ turns open (counter-clockwise) from clear in.

To make the low idle adjustment for the "By-pass Idle System" on the car, proceed as follows:

1—Set the hand brake securely, place the transmission in neutral and connect a tachometer to the engine.

2—Be certain that the engine is fully warmed up, that the choke is completely off and the carburetor is at low idle with all throttle valves tightly closed.

3—Put the transmission in "drive" and adjust the idle air adjustment screw to obtain a tachometer reading of 400 R.P.M.

4—Turn each idle adjusting needle to obtain the highest possible tachometer reading.

5—Reset idle R.P.M. at 400 R.P.M. as in step 3.

6—Recheck step 5 to insure the smoothest idle.

SPECIAL TOOLS SHOWN IN THESE PICTURES ARE AVAILABLE THROUGH UNITED MOTORS SERVICE DISTRIBUTORS

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