



PACKARD DIVISION

OF

STUDEBAKER-PACKARD CORPORATION

**Counselor**

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WCFB Carter Carburetor

Model 2394 S

A new 4-barrel Carter Carburetor, known as the "WCFB" Carburetor, Model 2394 S, is used on 1956 Clipper Custom Models (5660).

The 4-barrel carburetor provides the advantages of a compound installation of two 2-barrel carburetors in one compact unit. It is possible to use smaller venturi, leaner metering rods and jets when a carburetor only takes care of speeds up to approximately $\frac{3}{4}$ throttle opening. Greater throttle opening requires additional air and fuel which is supplied by the additional 2-barrels; therefore, the overall performance and efficiency are improved.

The 4-barrel carburetor is divided into a *primary section* and a *secondary section*.

The *primary section* is composed of the 2-barreled forward half of the assembly. This section is essentially a complete 2-barrel carburetor containing a float system, low speed system, high speed and power system and accelerating system. This section also includes the climatic control (automatic choke) mechanism.

The *secondary section* includes the 2-barreled rearward half of the carburetor assembly. This section is essentially a supplementary 2-barrel carburetor which cuts in to assist the primary section when a greater throttle opening or a greater engine load is reached. This section contains a float system, a high speed system (no metering rods). It has a separate set of throttle valves and a set of auxiliary valves which are located in the barrels above the throttle valves.

The *primary* throttle valves are operated by the accelerator pedal and the connecting throttle linkage. The *secondary* throttle valves are operated by the primary throttle valve shaft through delayed action linkage which permits an approximate $\frac{3}{4}$ opening of the primary valves before the secondary valves start

to open. The geometry of the linkage then causes both sets of throttle valves to reach the wide open position at the same time.

The auxiliary throttle valves permits the use of larger secondary venturi for improved performance and smoother secondary operation. Its shaft is counterweighted and the valves are offset mounted.

Air velocity through the carburetor controls the position of the auxiliary throttle valves according to engine requirements and no service adjustments are required.

When the accelerator is fully depressed, only the primary high-speed circuit will function until there is sufficient air velocity to overcome the weight on the auxiliary throttle lever and open the auxiliary throttle valves. When this occurs, fuel will also be supplied through the secondary high-speed circuit.

In other words, without auxiliary throttle valves, if the secondary throttle valves are opened at low car speeds, the air intake is greater than is required creating an undesired mixture. With the auxiliary throttle valves gradually opening with the air velocity, the proper mixture can be maintained from low to high car speeds.

The following paragraphs describe the adjustments necessary to service the 4-barrel carburetor. *It is important that the adjustments be performed in the exact sequence given:*

1. Remove the metering rods dust cover, "A" Fig. 1. Disconnect the metering rods from the vacumeter link by using a scratch awl or a pointed instrument and pushing outward on the eye of the rod and then extract the rod.

2. Unsnap the clips and remove the choke rod and the accelerator pump rod, "B" Fig. 1.

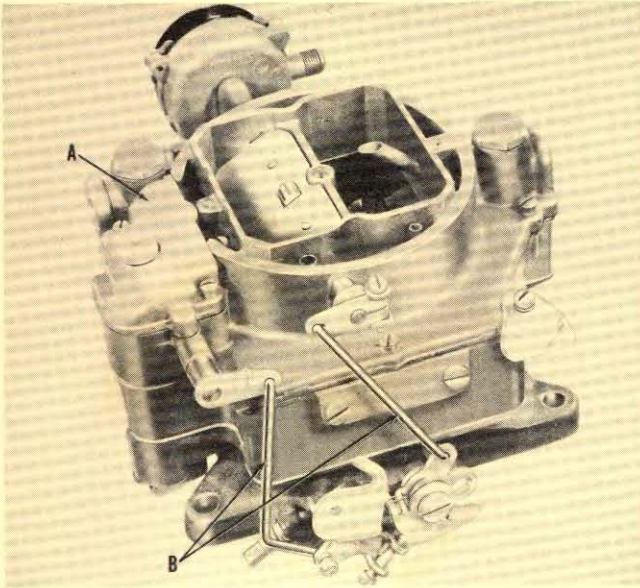


Fig. 1

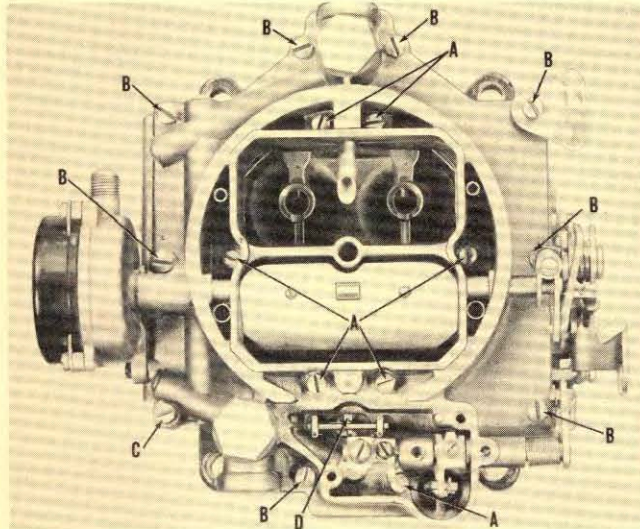


Fig. 2

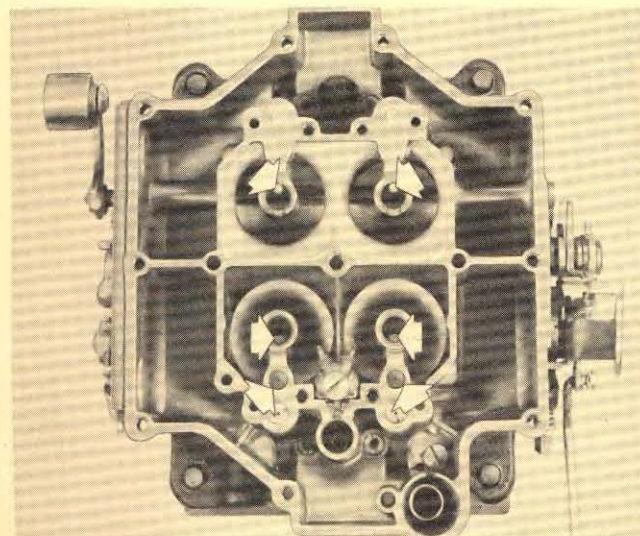


Fig. 3

Remove the air horn and floats assembly. NOTE: 7 long screws, "A," 8 short screws, "B," and 1 medium length screw, "C," attach the air horn to the carburetor main body as indicated in Fig. 2.

CAUTION: Under no circumstances should the discharge nozzles or the anti-percolator well plugs be removed when servicing this carburetor, indicated by "Arrows" in Fig. 3.

2. Float Settings: Do not mix up the floats or float needles from one side to the other as float needles and seats are mated and flooding may occur if the needles are not installed in their original seats. The float level adjustment is made with the bowl cover (air horn) gasket removed.

A. Float Level: Two separate float adjustments must be made—lateral and vertical.

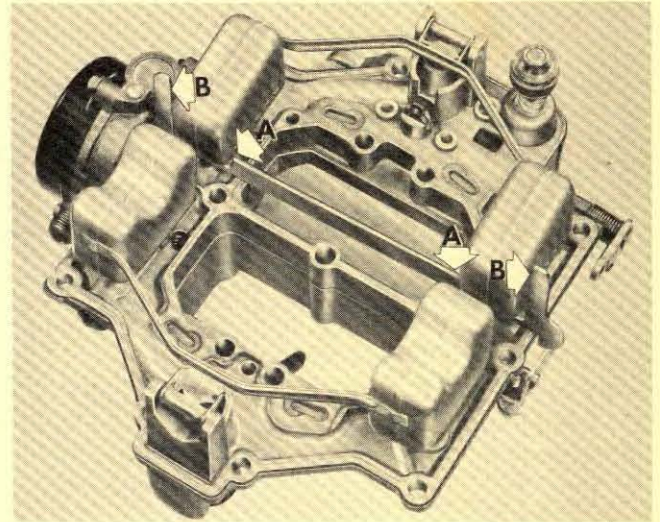


Fig. 4

Lateral Adjustment: With bowl cover assembly inverted and float resting on seated needle, place float gauge under floats with notched portion of gauge fitted over edge of casting. Side of floats should just clear the vertical uprights of the float gauge, "B" Fig. 4. Adjustment is made by bending arms of floats.

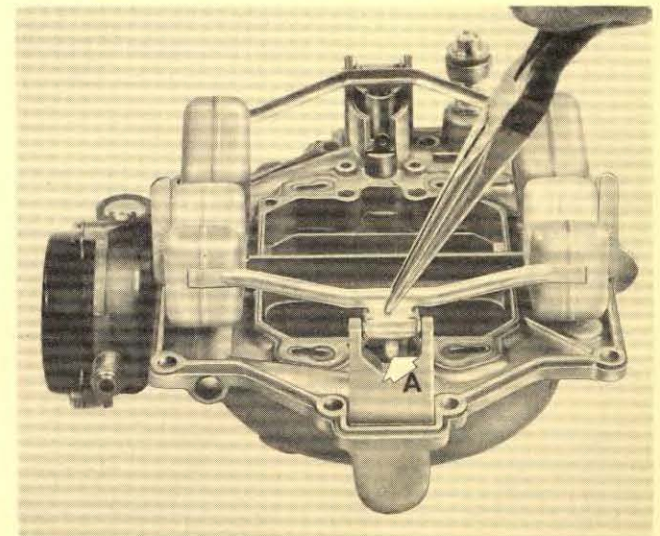


Fig. 5

Vertical Adjustment: With float gauge in same position, floats should just clear the horizontal section of gauge, "A" Fig. 4. Vertical distance between top of float and machined surface of bowl cover must be $\frac{1}{8}$ inch (gauge T109-232) for primary floats and $\frac{3}{16}$ inch (gauge T109-222) for secondary floats. Adjust by bending float arms as shown in Fig. 5.

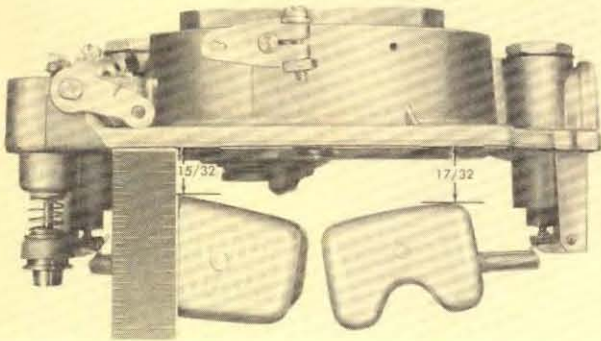


Fig. 6

B. Float Drop Adjustment: With the bowl cover (air horn) supported in an upright position, the distance from the machined surface on the bowl cover to the top of the secondary floats should be $\frac{17}{32}$ ", Fig. 6. The distance for the primary floats should be $\frac{15}{32}$ ", Fig. 6. Adjust by bending tang indicated by "A," Fig. 5.

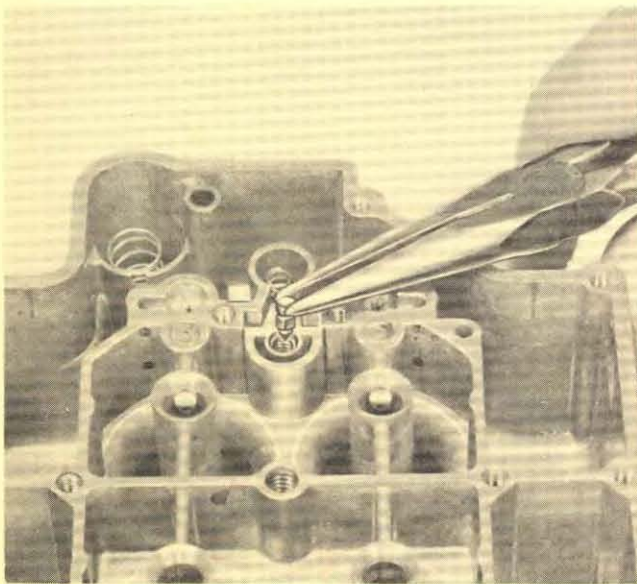


Fig. 7

Be sure to install the accelerator pump check needle shown in Fig. 7, before installing the pump jet gasket, jet housing and retainer screw. Install a new bowl cover gasket, "A" Fig. 8.

IMPORTANT: *Vacometer link must be installed with lip toward air horn.* (See "D," Fig. 2)

Place the accelerator pump plunger spring in its well and the vacometer piston spring in its well. Attach the vacometer piston to the vacometer link, "B" Fig. 8. Carefully start the accelerator pump plunger in its bore, "C" Fig. 8. Install the bowl cover

assembly to the carburetor body, and secure it with the screws, "A," "B," "C" Fig. 2.

3. Accelerator Pump Adjustment:

A. Block choke valve open with cardboard, "A" Fig. 9.

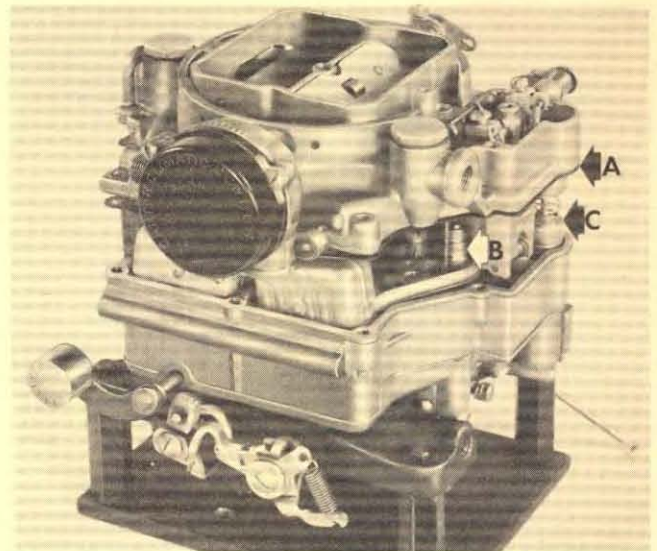


Fig. 8

B. Back off idle speed screw "B" approximately two full turns so that the throttle valves seat tight in the bores of the flange body. Be sure pump connector links is in outer hole (long stroke) of pump arm "C."

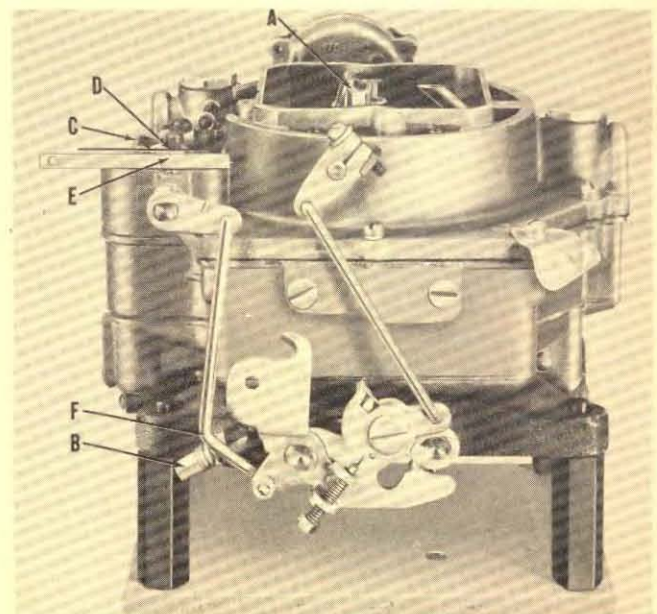


Fig. 9

C. Hold straight edge across top of dust cover boss at pump arm. The flat on top of the pump arm "D" should be parallel to straight edge, "E" Fig. 9. Adjust by bending pump rod at lower angle "F," using bending tool T109-213.

4. Metering Rod Adjustment: *The metering rods must be adjusted after the pump adjustment has been*

made. First, loosen the screw, "A" Fig. 10. With the idle speed screw backed out and the throttle valves seated in the bores of the flange body, press down on the vacuumer link with a scale "B" until the metering rods bottom. While holding the rods in this position, revolve the clamp "C" forward away from the air horn



Fig. 10

until lip of clamp contacts the vacuumer link, then tighten the clamp screw. To check for proper metering rod adjustment, hold the vacuumer link and rods at their bottomed position and open the throttle. There should be no lost motion before the link and rods move upward when the throttle lever is moved from its closed position. Install the dust cover using a new gasket.

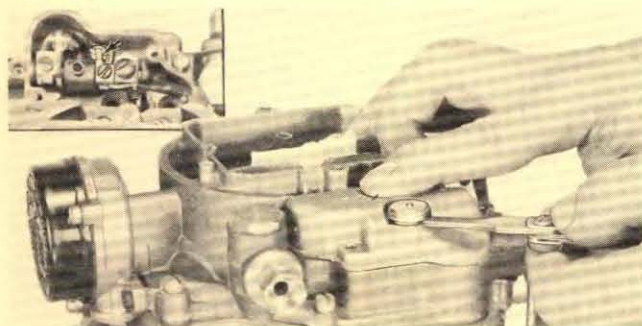


Fig. 11

5. Bowl Vapor Vent Adjustment: With the throttle valves closed and the choke blocked open, the vapor vent should open .062". Using a feeler gauge measure between the metering rod dust cover and the lower edge of the vapor vent cover Fig. 11. Adjustment of the vapor vent valve can be made by bending the tang on the vapor arm. "Insert Fig. 11."

6. Fast Idle Adjustment:

A. Loosen choke lever clamp screw on choke shaft, "A" Fig. 12. Insert .020" wire gauge Tool No. T109-29 between lip of fast idle cam and boss of flange casting, "B" Fig. 12. Hold choke valve tightly closed and take slack out of linkage by pressing choke lever toward closed position, hold in place and tighten clamp screw "A."

B. With choke valve tightly closed, adjust fast idle adjusting screw, "A" Fig. 13, until a .023" wire gauge Tool No. T109-189 can be inserted between the rear

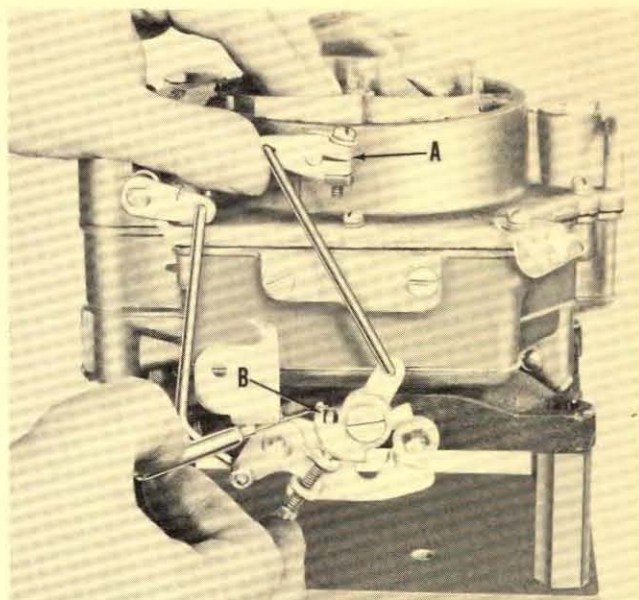


Fig. 12

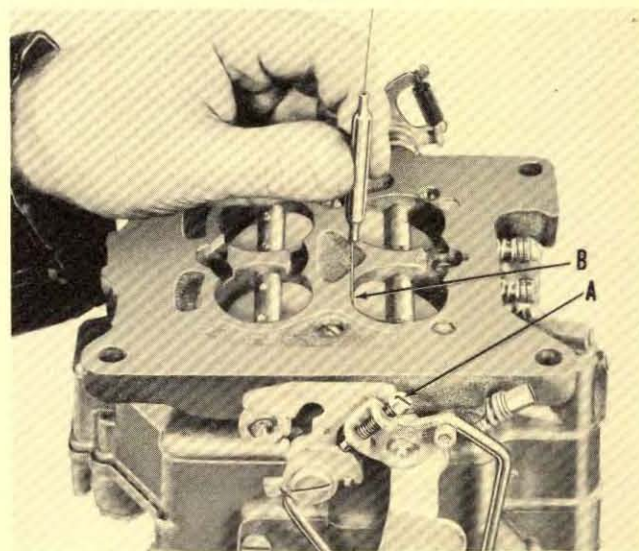


Fig. 13

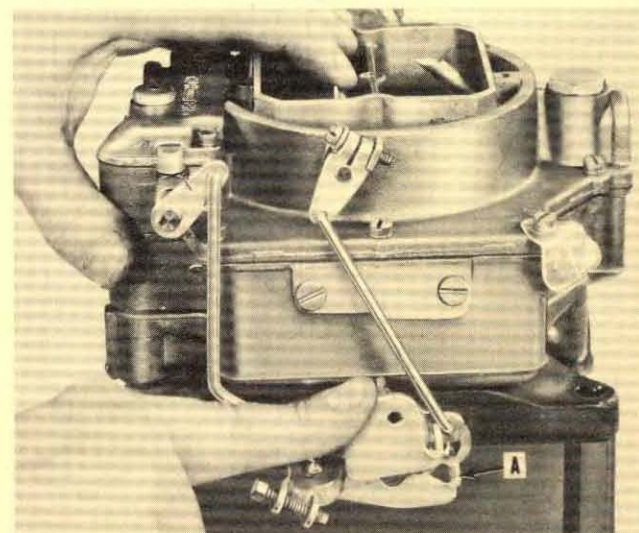


Fig. 14

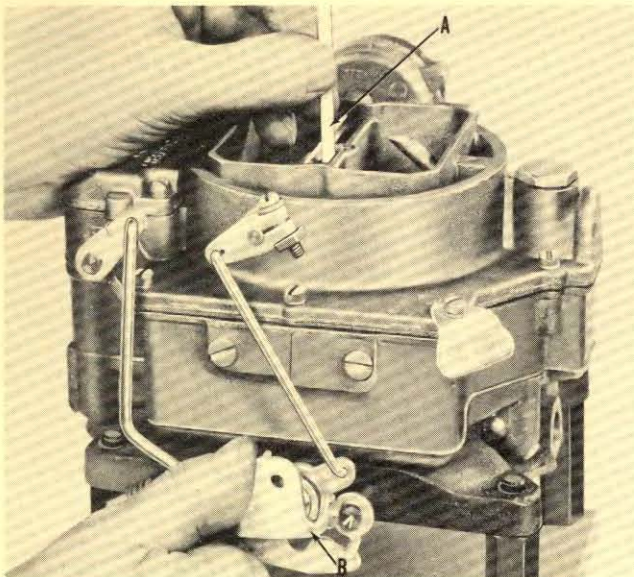


Fig. 15

side of the primary throttle valves and the throttle body bore, "B" Fig. 13. Be sure fast idle adjusting screw is on high step of cam while making this adjustment.

7. Unloader Adjustment: First hold the choke valve wide open, then push the throttle wide open, Fig. 14, release the choke so it will close. While holding the throttle wide open, there should be $3/16$ " clearance (Tool No. T109-28) between the upper edge of the choke valve and the inner wall of the air horn. "A" Fig. 15. Bend unloader lip "B" to get the proper choke valve clearance. Use bending Tool T109-41.

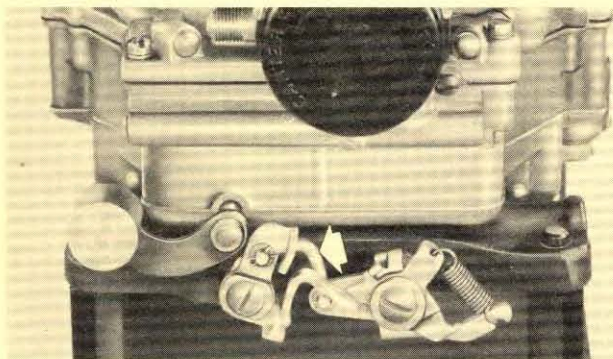


Fig. 16

8. Secondary Throttle Lever Adjustment: Primary and secondary throttle valves should reach wide open position at the same time. To adjust, bend operating rod at upper angle indicated by "arrow," Fig. 16. Use bending Tool T109-213.

9. Secondary Throttle Lock-out Adjustment: The secondary lock-out is provided to prevent the possibility of opening the secondary throttle valves with the choke closed or partially closed with a cold engine.

A. Crack throttle valves and hold choke valve tightly closed. Then close throttle. Tang "A," Fig. 17, on secondary throttle lever should freely engage in notch of lock-out lever. If necessary to adjust, bend tang on secondary throttle lever.

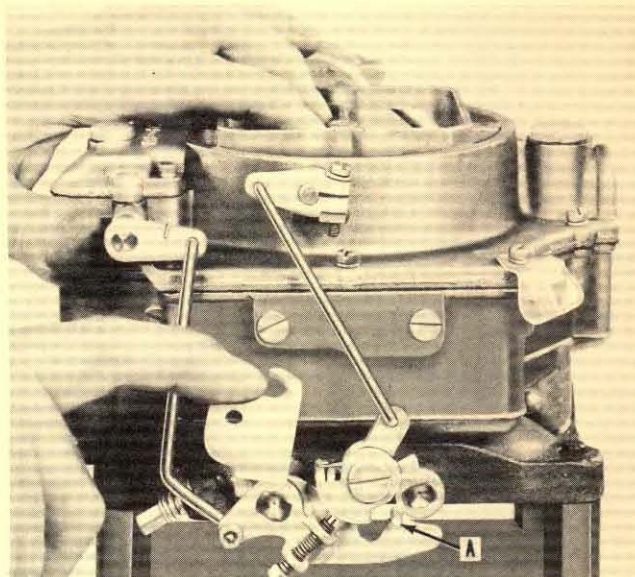


Fig. 17

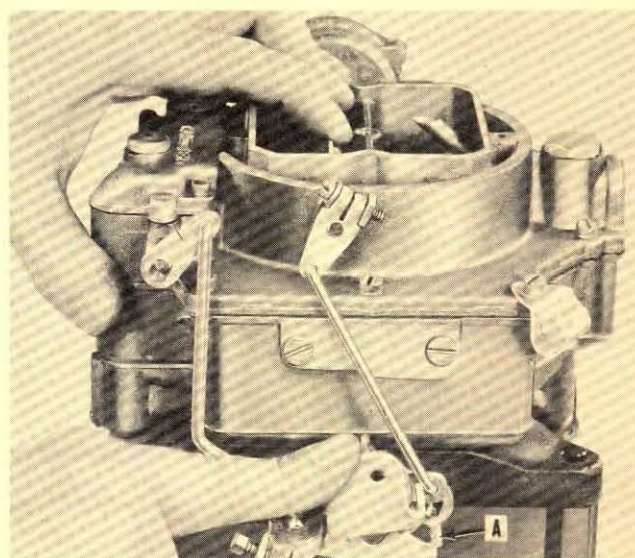


Fig. 18

B. Hold choke valve in wide open position. Open primary throttle valves all the way. With carburetor in upright position, the lock-out lever should fall free allowing secondary throttle valves to be opened before primary throttle valves are fully open. If necessary, bend tang, "A" Fig. 18, on secondary throttle lever to provide clearance for proper operation of lock-out lever.

WGD Carter Carburetor Model 2393 S

A new 2-barrel Carter Carburetor, known as the "WGD" carburetor, Model 2393 S, is used on 1956 Clipper Deluxe and Clipper Super Models (5640).

The following paragraphs describe the adjustments necessary to service the 2-barrel carburetor. *It is important that the adjustments be performed in the exact sequence given:*

1. Remove the metering rods dust cover, "A" Figure 1. Disconnect the metering rods from the vacuumer link by using a scratch awl or a pointed instrument and pushing outward on the eye of the rod and then extract the rod.

Unsnap the clips and remove the choke rod and accelerator pump rod, "B" Figure 1.

Remove the eight fuel bowl cover retaining screws and lift off the cover and float assembly.

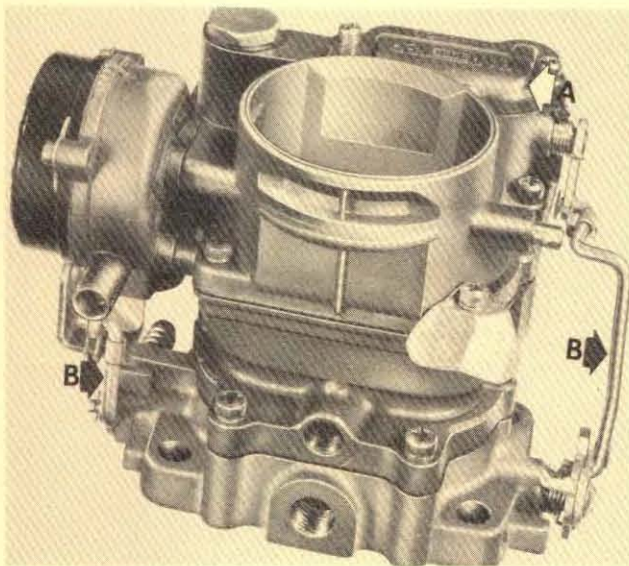


Fig. 1

CAUTION: Under no circumstances should the discharge nozzles or the anti-percolator well plugs (the plugs at each side of the pump jet housing) be removed when servicing this carburetor.

2. FLOAT ALIGNMENT

Check float alignment before setting the float level. Side of float should be parallel to the outer edge of the air horn casting so that the float will not touch the sides of the fuel bowl. Adjust by bending float lever.

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

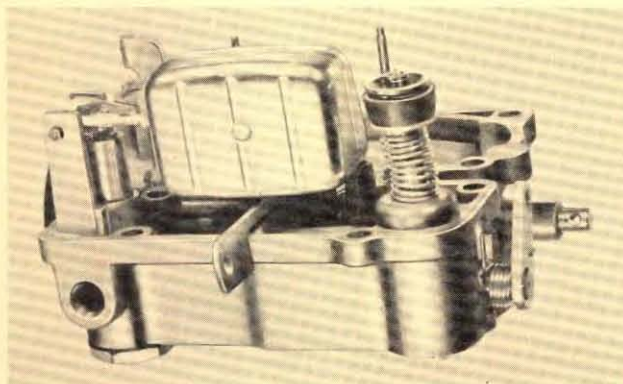


Fig. 2

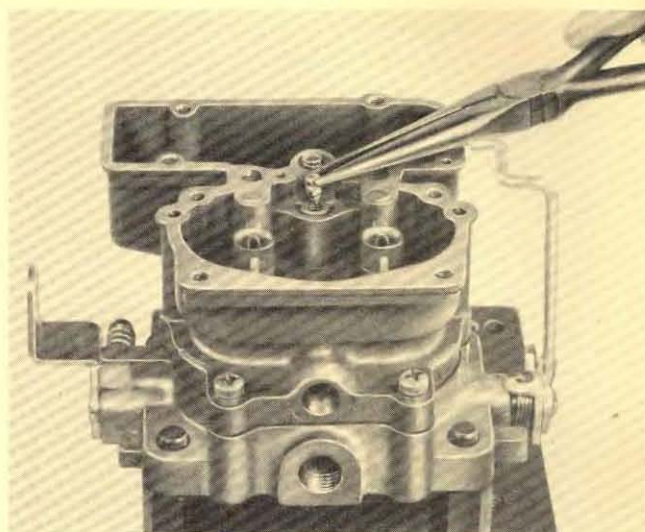


Fig. 3

3. FLOAT SETTING

With bowl cover assembly inverted, the float level should be set to $3/16$ " using float level gauge T109-28 as shown in Figure 2. The gauge should be placed under the float at its lowest point.

If adjustment is necessary, bend the small lip in the V-shaped section of the float arm near its pivot point. Do not bend the arm.

Before installing the bowl cover assembly, make sure that the accelerator pump check needle is properly installed "See Figure 3."

Place the vacuumer piston spring in its well as shown in Figure 3.

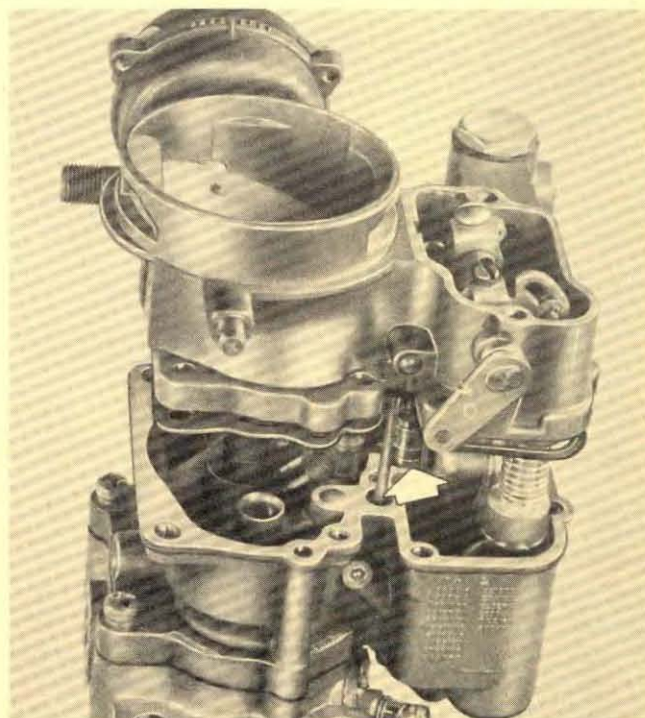


Fig. 4

Attach the vacuumer piston "see arrow" Figure 4, to its link and install the gasket and cover assembly

as shown in Figure 4, and then install the eight retaining screws.

Install the metering rods reversing the removal procedure. Be sure to place the hooked ends of the metering rod spring around the shank of the rods before inserting them.

4. ACCELERATOR PUMP ADJUSTMENT

Block the choke valve open with cardboard, "A" Figure 5.

Back out the idle speed screw approximately two full turns so that the throttle valves seat tight in the bores of the flange body.

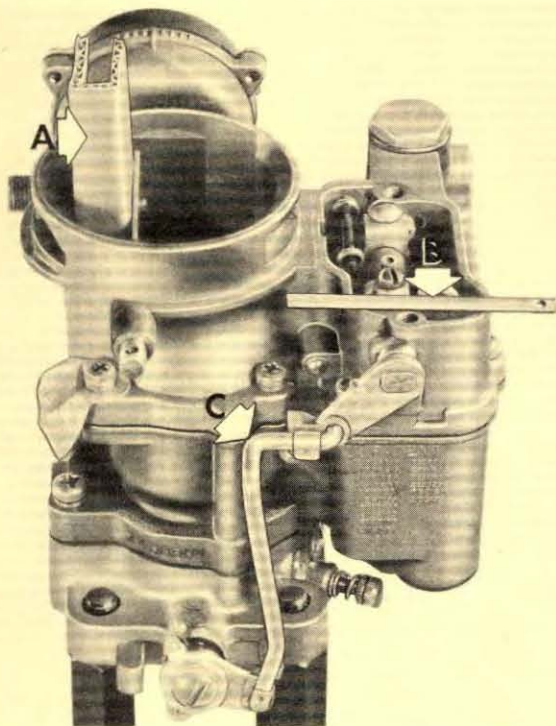


Fig. 5

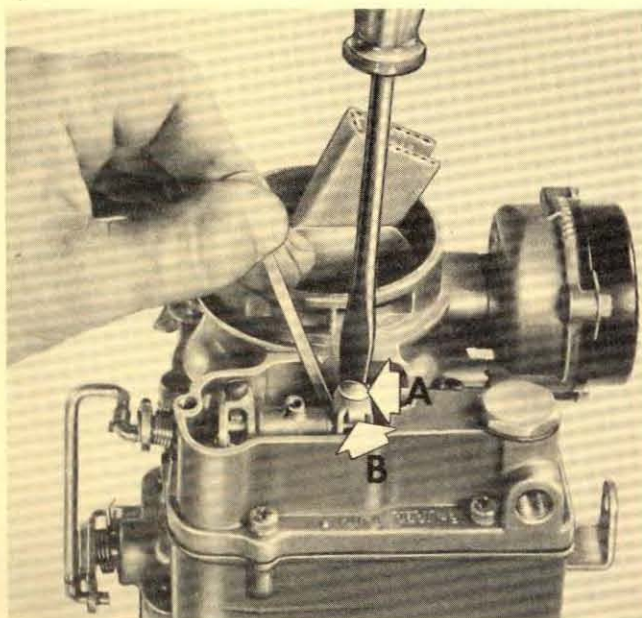


Fig. 6

With the throttle valves held tightly closed, hold a straight edge across top of dust cover boss at pump arm. The flat on top of pump arm "B" should be parallel to straight edge as shown in Figure 5. Adjust by bending pump rod at the upper angle "C" using bending tool T-109-213.

5. METERING ROD ADJUSTMENT

The metering rods must be adjusted after the pump adjustment has been made. First, loosen the screw "A" Figure 6. With the idle speed screw backed out and the throttle valves seated in the bores of the flange body, press down on the vacuumer link with a scale or small screw driver until the metering rods bottom. While holding the rods in this position, revolve the clamp "B" forward away from the air horn until lip of clamp contacts the vacuumer link, then tighten the clamp screw. To check for proper metering rod adjustment, hold the vacuumer link and rods at their bottomed position and open the throttle. There should be no lost motion before the link and rods move upward when the throttle lever is moved from its closed position. Install the dust cover using a new gasket.

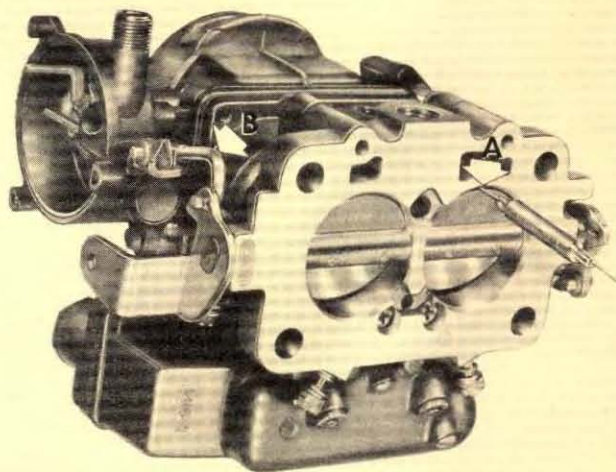


Fig. 7

6. FAST IDLE ADJUSTMENT

This adjustment must be made before the unloader adjustment. Remove the choke thermostatic coil and housing, gasket, and baffle plate. Crack the throttle valve, then close the choke valve. While holding the choke valve closed, close the throttle. Using gauge T109-189 (.024"), check the clearance between the throttle valve and the bore "A" Figure 7, on the side opposite the idle mixture screws. Be sure that fast idle link is on high step of cam.

If adjustment is necessary, bend the choke connector rod at the lower angle "B" using bending tool T-109-213.

7. UNLOADER ADJUSTMENT

Hold the throttle wide open, close the choke valve as far as possible without forcing. There should be $\frac{1}{8}$ " clearance, using gauge T109-36, between the top edge of the choke valve and the inner wall of the air horn, "A" Figure 8. If adjustment is necessary, bend the choke trip lever arm, "B" Figure 8, to obtain the $\frac{1}{8}$ " clearance at the choke valve. Using bending tool T-109-213.

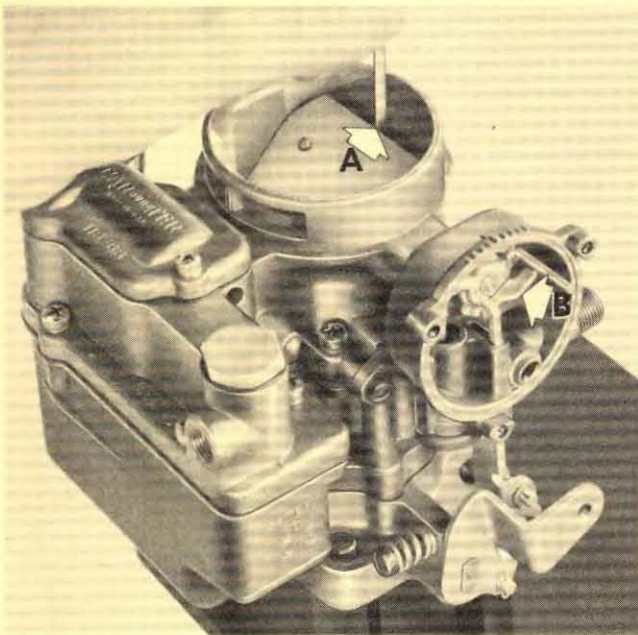


Fig. 8

Install the choke thermostatic coil and housing, the baffle plate should be installed ahead of the gasket. The coil housing should be set two points rich before the retaining screws are tightened.

Rochester Carburetor Model 4GC

The 4-barrel Rochester Carburetor, Model 4GC, is used on 1956 Packard Models (5680).

All adjustments are made in the same manner and to the same measurements as described in Service Counselor Vol. 29, No. 2, February, 1955 and in the Fuel and Exhaust Section of your new Service Manual.

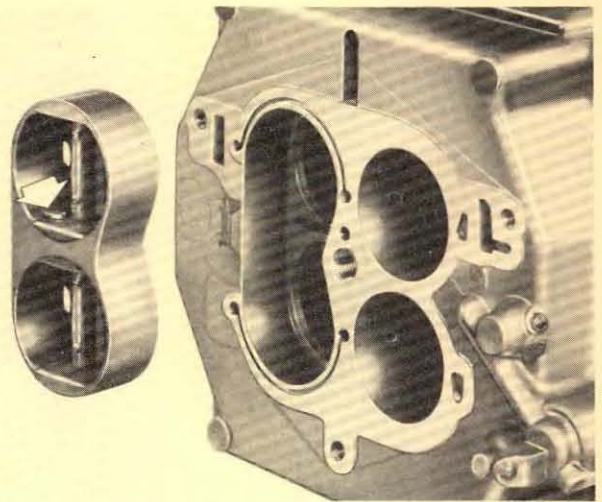
NOTE: The Atmospheric Idle Vent has been eliminated, "Shown in Fig. 9 in the Service Counselor and Fig. 29 in the Service Manual." Therefore, no adjustment is required. The vent contact arm has been bent away so it will not contact and open the valve.

The 1956 Model 4GC Carburetor has a pair of spring-loaded, velocity-operated auxiliary throttle valves located in the secondary bores above the secondary throttle valves.

When air velocity is high, metering control is good and the auxiliary valves are held open. During low-speed wide open throttle operation, the air velocity through four bores often becomes too low to allow good metering control; the lowered velocity allows the auxiliary valves to close the secondary bores, thus effectively doubling the air flow through the primary bores. In this way, effective metering control is possible through a wider range of wide-open throttle operation.

REMOVAL OF AUXILIARY THROTTLE VALVE ASSEMBLY

The assembly will usually be removable by grasping with the thumb and forefinger and lifting the assembly



from the carburetor body. In the event that the assembly sticks, carefully tap it from the body from above with a long punch. Be careful to not distort the valves.

CAUTION: Do not disassemble the auxiliary throttle valves or change the screw setting indicated by the arrow in the illustration. The spring tension is set correctly at the factory; any change in calibration will completely upset the operation of the secondary side of the carburetor. If wear or damage has occurred replace the complete auxiliary valve assembly.

INSTALLATION OF AUXILIARY THROTTLE VALVE ASSEMBLY

Invert carburetor body and press the auxiliary throttle valve assembly into place in the casting, making sure that it does not project below the carburetor body. Be sure that the assembly is installed with the valve shaft below the valves as shown in the illustration.

Service Manual—Electrical Section

(Correction)

Please make the following correction in the Electrical Section of your new 55th Series Service Manual.

On page 39 under Trouble Shooting and Corrective Measures, item—15, change the "Correction" to read, "Polarize the generator by momentarily connecting a jumper across from the *armature* ("A") terminal to the battery ("B") terminal on the regulator."

Twin Ultramatic Transmission Fluid

(Correction)

Please refer to your Service Counselor Vol. 29, No. 8, August, 1955, on the above subject.

In the last paragraph of the article, change the AQ-AFT to read AQ-ATF.