Section VIII
FUEL AND EXHAUST SYSTEM

CONTENTS

DATA AND SPECIFICATIONS

MODEL	LC-1	LC-2	LC-3	LY-1
FUEL PUMP				
Make	Carter	Carter	Carter	Carter
Model	M-2663S	M-2663S	M-2663S	M-2663S
Type	Mechanical	Mechanical	Mechanical	Mechanical
Driven By	Camshaft	Camshaft	Camshaft	Camshaft
Pump Pressure (pounds)	5 to 7	5 to 7	5 to 7	5 to 7
CARBURETOR				
Make	Ball and Ball	Carter	Carter	Carter
Type	Dual Downdraft	4 Barrel Downdraft	4 Barrel Downdraft	4 Barrel Downdraft
Model	BBD-2685S	AFB-2650S	AFB-2651S	AFB-2651S
THROTTLE BORE (Primary and Secondary)	.....	1 7/16 inch	1 7/16 inch	1 7/16 inch

DATA AND SPECIFICATIONS (Cont,d)

MODEL	LC-1	LC-2	LC-3	LY-1
MAIN VENTURE				
Primary and Secondary	.....	1 3/16 inch	1 3/16 inch	1 3/16 inch
LOW SPEED JET PRIMARY	.....	.031 inch	.031 inch	.031 inch
ADJUSTMENTS				
Idle Mixture (both screws)	One Full Turn Open	One Full Turn Open	One Full Turn Open	One Full Turn Open
Idle Speed	500 rpm.	500 rpm.	500 rpm.	500 rpm.
Accelerator Pump	1 1/32 in. + or − 1/64	Middle Hole of Arm	Middle Hole of Arm	Middle Hole of Arm
Pump Setting (top of Plunger to Air Horn)	.....	.429 or 7/16 inch	.429 or 7/16 inch	.429 or 7/16 inch
Float Setting (casting to top of Floats)	9/32 + or − 1/64	5/16 inch	5/16 inch	5/16 inch
Float Drop	.....	3/4 inch	3/4 inch	3/4 inch
Choke Unloader (wide open kick)	1/4 inch	1/4 inch	1/4 inch	1/4 inch
Choke Setting	One Notch Rich	One Notch Rich	One Notch Rich	One Notch Rich
Fast Idle	.015 inch	.012 inch	.012 inch	.012 inch
Fast Idle Speed Setting				
New Yorker and Imperial		1350 to 1400 rpm.		
Saratoga		1375 to 1425 rpm.		

SPECIAL TOOLS
CARBURETOR

C-3225 ..... Stand, Carburetor Repair
C-3400 ..... Repair Stand
T-109-22 ..... Bending Tool
T-109-28 ..... Gauge, Unloader—3/16 inch
T-109-29 ..... Closing Shoes Clearance Gauge (wire) (.017 to .022 inch)
T-109-31 ..... Choke Unloader Gauge—(1/4 inch)
T-109-41 ..... Bending Tool
T-109-44 ..... Wire Gauge, Fast Idle (.015 to .018 inch)
T-109-58 ..... Screw Driver Bit (1/4 inch)
T-109-59 ..... Screw Driver Bit (3/16 inch)
T-109-107 ..... Float Gauge (5/16 inch)
T-109-193 ..... Choke Piston Lever Adj. Gauge (wire)
T-109-197 ..... Gauge, Bowl Vent Cap
T-109-200 ..... Fast Idle Gauge (wire) (.012 inch)
T-109-200 ..... Secondary Throttle Adj. Gauge (wire) (.010 inch)
T-109-213 ..... Bending Tool
T-109-214 ..... Bending Tool
T-109-236 ..... Gauge Float Lever (5/32 inch)
T-109-237 ..... Thickness (.005 inch)
T-109-282 ..... Gauge, Float Setting
T-109-284 ..... Gauge, Float Level (9/32 inch)
T-109-287S ..... Elevating Legs (set of 5)

Section VIII

FUEL AND EXHAUST SYSTEM

FUEL PUMP

The fuel pump (Fig. 1) is driven by an eccentric on the camshaft, which actuates the rocker arm. This action lifts the pull rod and diaphragm assembly upwards against the main spring, thus creating a vacuum in the valve housing, which opens the inlet valves and fuel is drawn into valve housing chamber from fuel tank.

On the return stroke of rocker arm, the main spring pressure forces the diaphragm to down position, which expels fuel in valve chamber through outlet valve, to carburetor.

When the carburetor float chamber is filled with fuel, the float in carburetor shuts off the needle valve, creating pressure in fuel pump chamber. This pressure holds fuel pump diaphragm upward against spring pressure until carburetor requires more fuel.

As the engine consumes fuel the float level in the carburetor bowl drops and needle valve opens to admit fuel into float chamber, which releases the pump pressure and starts the pumping cycle again. Actually, change in float level is negligible.

1. TESTING FUEL PUMP (On Car)

If fuel pump fails to pump fuel to carburetor, following checks should be made to determine cause of failure before removing fuel pump from car:

a. Fuel Lines

Make certain that fuel lines are not blocked and that fittings are tight. Check flexible hoses for cracks or deterioration which would cause leakage or retard flow of fuel to fuel pump.

b. Fuel Pump Breather Hole

Check for gasoline or oil leakage at fuel pump breather hole. A gasoline leak at this point indicates a defective diaphragm. An oil leak at this point indicates presence of a deterio-

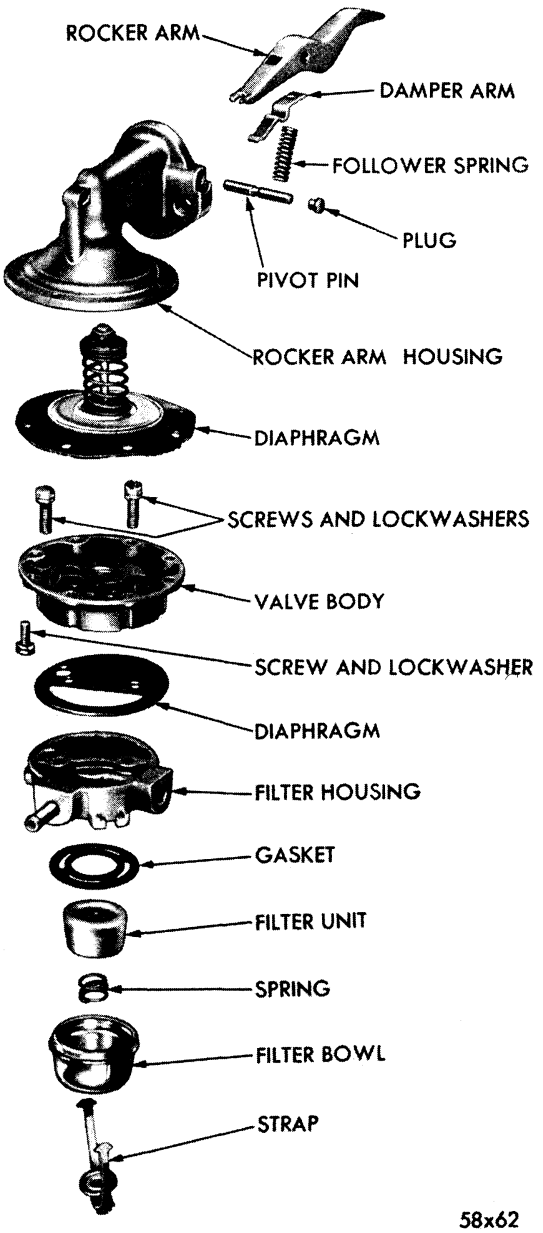


Fig. 1—Fuel Pump (Exploded View)

rated or damaged oil seal on the diaphragm pull rod. In either case, the diaphragm assembly should be replaced.

2. PRESSURE TEST

Insert a "T" fitting in the fuel line at the carburetor, as shown in Figure 2.

The hose between the "T" fitting and gauge Tool C-483 should not exceed 6 inches. (A longer hose may collect fuel and the additional weight of the fuel would be added to the pressure of the pump and would result in an inaccurate reading).

Vent the fuel pump for a few seconds (to relieve air trapped in the fuel chamber) by allowing it to pump at full flow into a container. (If air is trapped in the fuel chamber, the pump will not operate at full capacity and a low pressure reading will result).

Connect a tachometer, then start the engine and run at 500 r.p.m. The reading should be from 5 to 7 p.s.i.

If the Pressure Is Too Low—A weak diaphragm main spring, or improper assembly of diaphragm, may be the cause.

3. ADDITIONAL CHECKS

Check for leakage at fuel pump diaphragm which might be caused by loose mounting bolts. Check fuel pump mounting bolts to insure that no oil leakage exists around mounting flange. If fuel pump fails to operate satisfactorily, disconnect fuel pump inlet and outlet lines and remove fuel pump assembly from engine. (On cars equipped with air conditioning remove fuel pump from bottom side of engine compartment).

4. VACUUM TEST

The vacuum test should be made with the fuel line disconnected from the carburetor. (This will allow the pump to operate at full capacity, which it must do to prime a dry carburetor).

The vacuum reading should be at least (10°) hg. Vacuum at 500 r.p.m. with the fuel line disconnected at the carburetor.

5. VOLUME TEST

The fuel pump should supply 1 quart of fuel in 1 minute or less at 500 r.p.m.

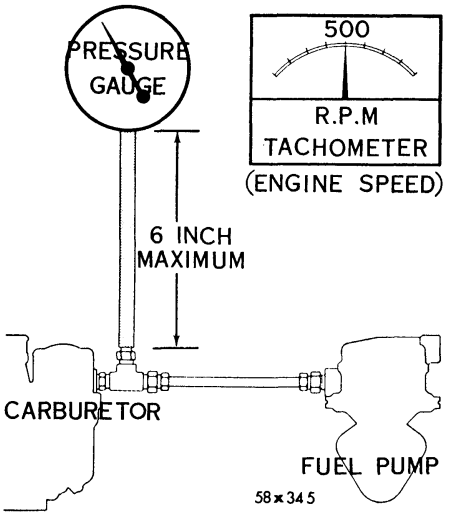


Fig. 2—Pressure Testing Fuel Pump

If the pump does not perform to the above test requirements, the fuel pump should be removed from the vehicle and overhauled.

6. SERVICING THE FUEL PUMP (FIG. 1)

Mark the various pump housings in such a manner that they may be reassembled with the inlet and outlet ports in correct location.

Remove the rocker arm follower spring by prying up and over the dimple in the housing. Disengage the rocker arm damping lever from rocker arm and remove from pump. Remove the rocker arm pivot pin plug, using plug removing Tool T-109-43. Turn pump on its side (pivot pin down) and rap gently to remove the pivot pin. Disengage rocker arm diaphragm pull rod and remove from housing.

Remove the screws that attach the rocker arm housing to the valve body. Separate housing and body, then lift out diaphragm. Remove the screws that attach the valve body to the filter housing. Remove the outlet dome diaphragm. Loosen the filter bowl retaining screw, then disengage retaining strap from housing, by pressing up from bottom. Remove filter bowl, spring, ceramic unit and gasket.

7. CLEANING AND INSPECTION

Clean all fuel pump parts (except diaphragm) in a suitable solvent, then blow dry with compressed air. Examine the diaphragm for cracks, torn screw holes or ruptures. Check the condition of the rubber oil seal on diaphragm pull rod. If deteriorated, install a new diaphragm

and pull rod assembly. Check the rocker arm for wear or scoring on the face that contacts the camshaft eccentric. If arm is scored or worn, install new rocker arm.

The component parts of the valve body are not available for service. If inspection reveals the need for new valves, install new valve body assembly.

8. REASSEMBLING THE FUEL PUMP

When reassembling the fuel pump, **do not use shellac or other adhesive sealer on the diaphragm.**

Place the outlet dome diaphragm in position on filter housing with the inlet passage hole over passage. Place valve body over diaphragm and align scribe marks. Install attaching screws and tighten securely. Slide the diaphragm and pull rod assembly into position in the rocker arm housing. Now press up on bottom of diaphragm until sufficient clearance has been obtained to allow engagement for rocker arm. Slide rocker arm into housing and engage slot in end of arm with pull rod, **below** the plastic washers. Align arm, then install pivot pin and plug.

Place the rocker arm and diaphragm assembly in position on valve body, with scribe marks and screw holes aligned. Install attaching screws (threading carefully through diaphragm holes) and tighten alternately.

Engage the tongue end of damper arm in slot of the rocker arm with the recess in damper arm pressing against pivot pin. Hold in this position, then install follower spring. (Be sure follower spring ends are over dimple in housing and tang on damper arm.) Invert pump and install filter gasket. Engage ends of bowl retaining strap in slots of filter housing. Tilt retaining strap to the side far enough to install the ceramic filter, tension spring, and bowl. Center bowl, then tighten retaining screw securely.

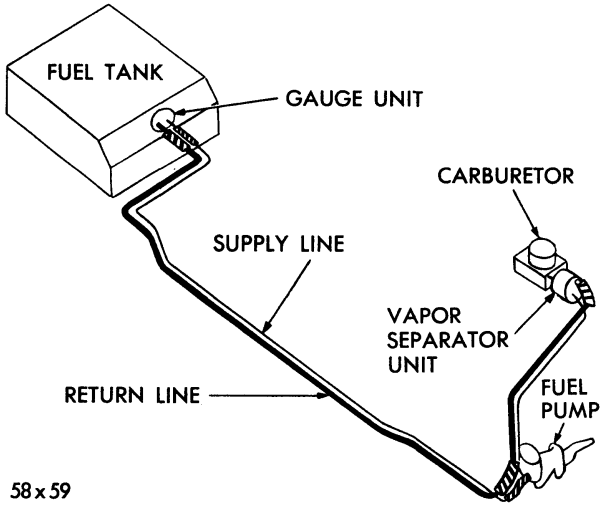


Fig. 3—Vapor Separator Package (Schematic)

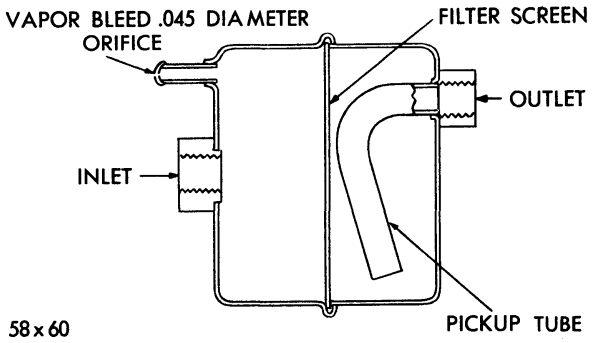


Fig. 4—Vapor Separator Unit (Sectional View)

Check the pump pressure as described in paragraph 2. Install pump on car, using a new mounting gasket. Tighten bolts securely.

9. THE VAPOR SEPARATOR (MODEL LC1—WITH AIR CONDITIONING ONLY)

The vapor separator package, as shown in Figure 3, is used on the Windsor models equipped with air conditioning only and is used to prevent vapor lock. The vapor separator consists of a $\frac{5}{16}$ inch fuel supply line between the fuel tank and fuel pump, and between the fuel pump and the vapor separator unit which is attached directly to the carburetor fuel inlet connection. A $\frac{1}{4}$ inch return line from the top side of the unit parallels the supply line back to the fuel tank.

The vapor separator (serviced only as a unit consists of a stamped steel can, a filter screen, an inlet and outlet fitting and a metered return line orifice fitting, as shown in Figure 4.

a. Operation

Fuel is drawn from the fuel tank by the fuel pump through the supply line, into the pump and thence into the vapor separator unit, until the unit is filled with fuel. The unit outlet fitting is connected to a short section of tubing through which solid fuel from the bottom of the separator unit flows into the carburetor for

distribution to the engine. Any fuel vapor (caused by excessive heat) that has gathered in the indrawn fuel, rises to the top of the separator unit and is forced out of the metered fitting into the return line, back to the fuel tank for condensation to solid fuel.

b. Servicing the Vapor Separator

As previously mentioned, the vapor separator unit is serviced only as an assembly. Checking to see if the unit is installed correctly (with the return line fitting uppermost) and that the metered orific in the return fitting is open, is the extent of service.

To check the vapor separator unit for a restricted or plugged screen, disconnect the fuel inlet and return lines at the unit. Remove unit from carburetor. Reconnect fuel inlet line and plug return.

With a suitable container under the outlet connection, turn engine over with starting motor. Check the quantity of fuel pumped through the unit. See volume in Paragraph 1. If the flow appears to be restricted, install a new vapor separator unit.

If vapor lock is evident, remove the coupling hose at the unit and check to see if orifice is open. If clogged, bend a paper clip and insert through opening to clear. If necessary, use air pressure to clear return line, **after removing tank filler cap.**

SERVICE DIAGNOSIS

10. FUEL PUMP LEAKS—FUEL

a. Tighten loose housing screws.

b. Install new diaphragm.

c. Tighten loose inlet or outlet or outlet fuel fittings.

11. FUEL PUMP LEAKS—OIL

a. Install new diaphragm.

b. Tighten fuel pump mounting bolts.

c. Install new pump to block gasket.

d. Install new pull rod oil seal.

12. INSUFFICIENT FUEL DELIVERY

a. Tighten fuel line fittings.

b. Install new diaphragm.

c. Thaw out frozen fuel lines.

d. Install new valve body.

e. Install correct fuel pump.

13. FUEL PUMP NOISE

a. Tighten fuel pump mounting bolts.

b. Install new rocker arm.

c. Install new rocker arm follower spring.

d. Lubricate at rocker arm pivot and pull rod with Lubriplate.

CARBURETOR
MODEL BBD-2685S (MODEL LC-1)

The Ball and Ball (BBD) (Fig. 5) series carburetor is of the dual downdraft type. Each throat has its own throttle valve, idle and main metering systems and are supplemented by the float, accelerating and power systems.

14. CARBURETOR MODEL IDENTIFICATION

On each BBD series carburetor, model number is stamped on metal tag attached to air horn. Do not remove or destroy this tag, as it is the only means provided for carburetor model identification. Before attempting to repair or overheal carburetor, refer to model number and secure a repair kit for number indicated on tag.

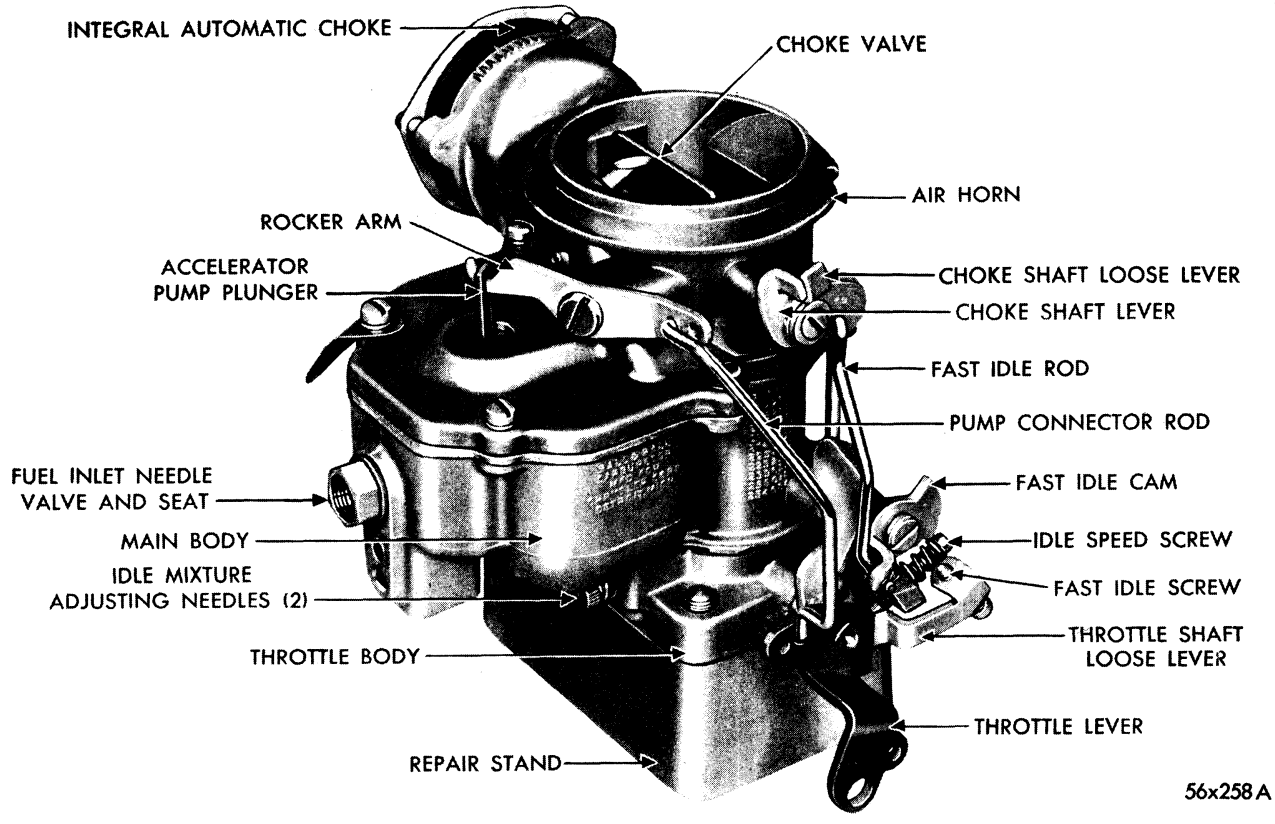


Fig. 5—Carburetor Assembly (BBD-2685S)

SERVICE PROCEDURES

15. REMOVAL OF CARBURETOR FROM ENGINE

Remove air cleaner, gasket, fuel line, choke heat tube and vacuum spark advance tube. Disconnect throttle linkage, remove the carburetor from intake manifold. Discard mounting flange gasket.

The carburetor must be disassembled, all parts carefully cleaned in suitable solvent, such as "Metalclene" or equivalent. Inspect all parts for damage or wear and replace as necessary.

16. CARBURETOR DISASSEMBLY (FIG. 6)

Place carburetor assembly on repair stand Tool C-3225, (if available). This Tool is used to protect throttle valves from damage and provide a suitable base for working. Remove hair pin clips that retain fast idle and pump connector rods, disengage from choke and throttle levers, as shown in Figure 7. Remove air horn and integral automatic choke, as shown in Figure 8, discard gasket. Remove fuel inlet needle valve, seat, gasket and float fulcrum pin retainer. Lift out floats, as shown in Figure 9. Remove step-up piston screw, lift step-up piston and rods up out of carburetor bowl, as shown in Figure 10. Remove step-up piston spring and gasket from piston cylinder.

Remove main metering jets and gaskets, as shown in Figure 11. Remove vented screws that attach venturi cluster to main body. Lift cluster up and away from carburetor, as shown in Figure 12, discard cluster gaskets. Invert carburetor and drop out the discharge check ball. The metering of fuel from accelerator pump is controlled by two drilled holes in the venturi cluster. Be sure these holes are clean.

Do not remove the idle orifice or main vent tubes from the venturi cluster. They can easily

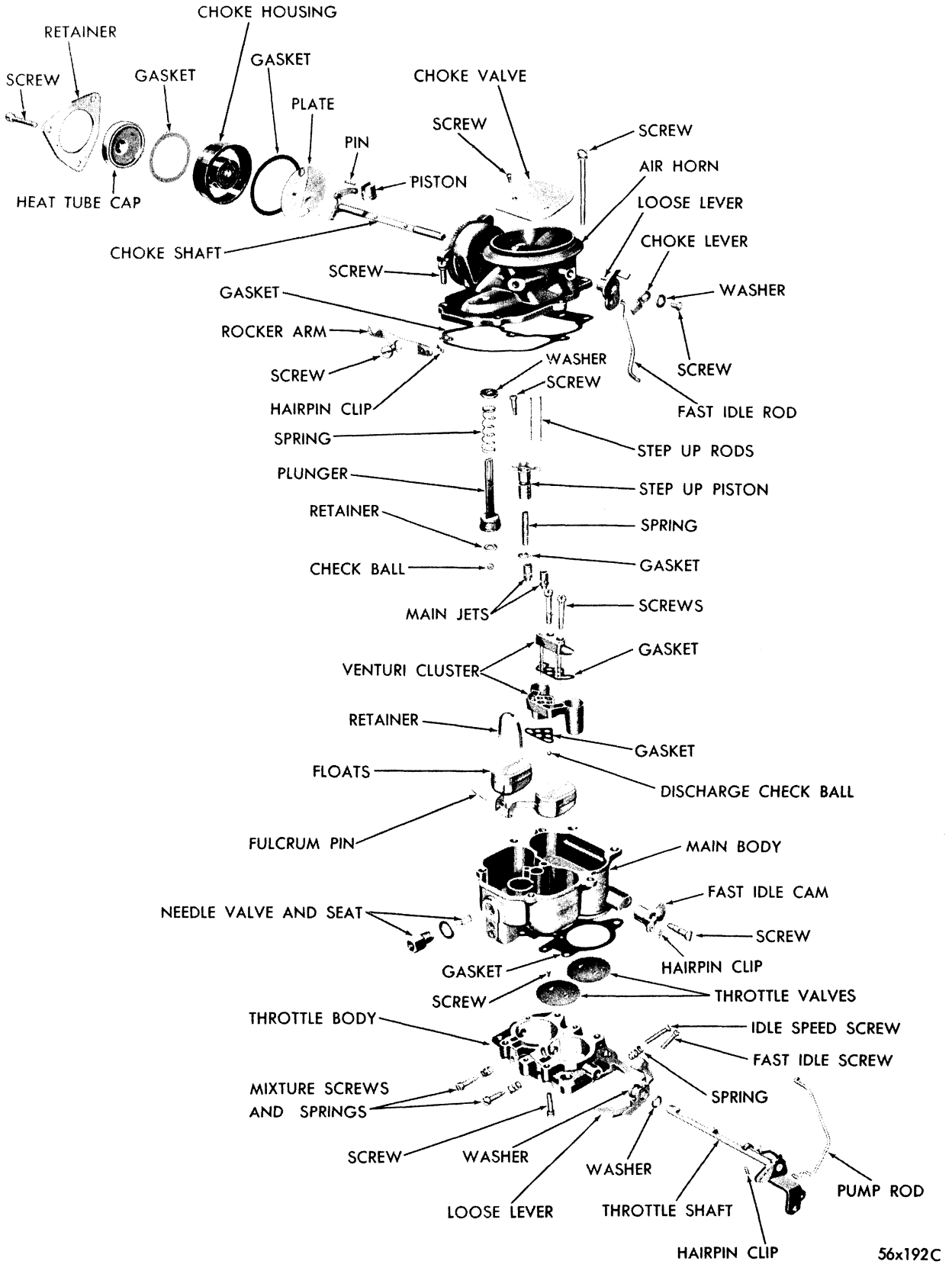


Fig. 6—Carburetor Assembly (BBD-2685S)
(Disassembled View)

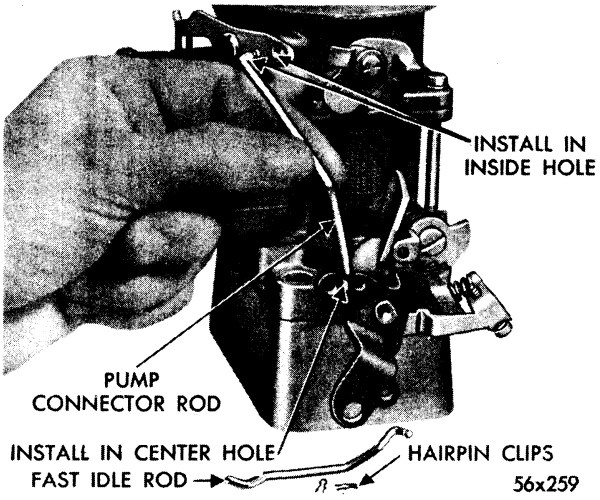


Fig. 7—Removing or Installing Fast Idle and Pump Connector

be cleaned in solvent and dried with compressed air. The discharge cluster is serviced **only** as an assembly.

Remove idle mixture adjusting needles and springs from throttle body. Invert carburetor and remove screws that attach throttle to main body. Separate bodies and discard gasket.

Disengage accelerator pump plunger from rocker arm, by pushing up on bottom of plunger and sliding slotted end off rocker arm hook, as shown in Figure 13. If pump plunger leather is worn, hard or cracked, a new pump plunger should be installed at reassembly. Place plung-

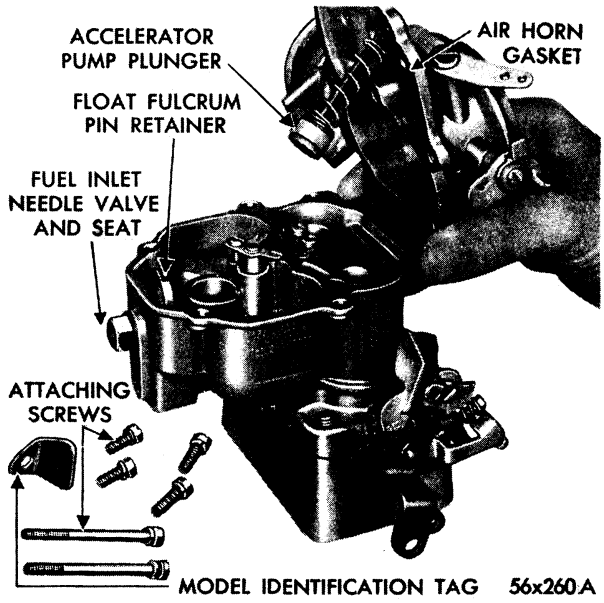


Fig. 8—Removing or Installing Air Horn

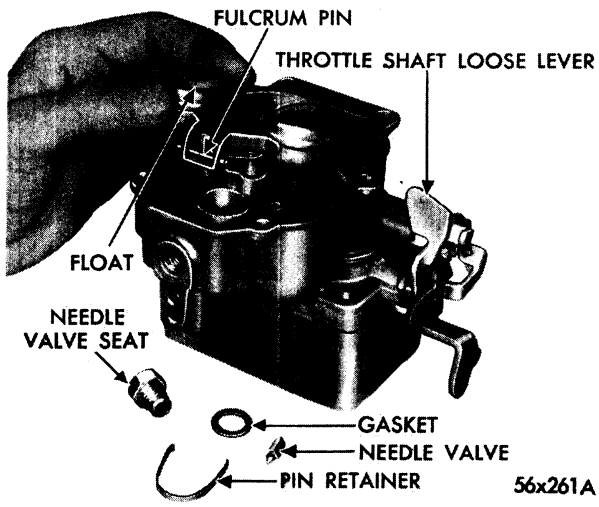


Fig. 9—Removing or Installing Float

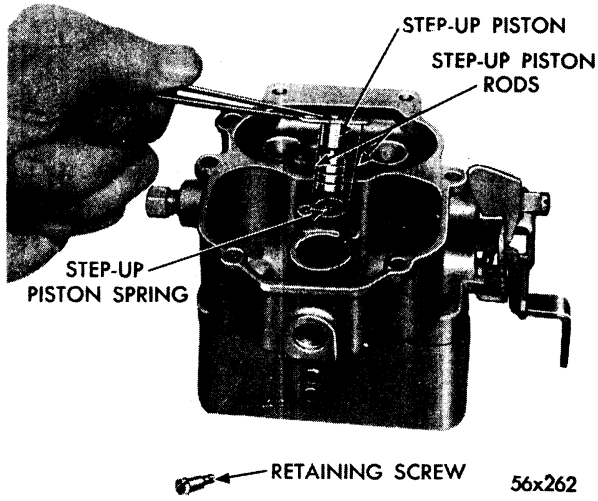


Fig. 10—Removing or Installing Step Up Piston and Rods

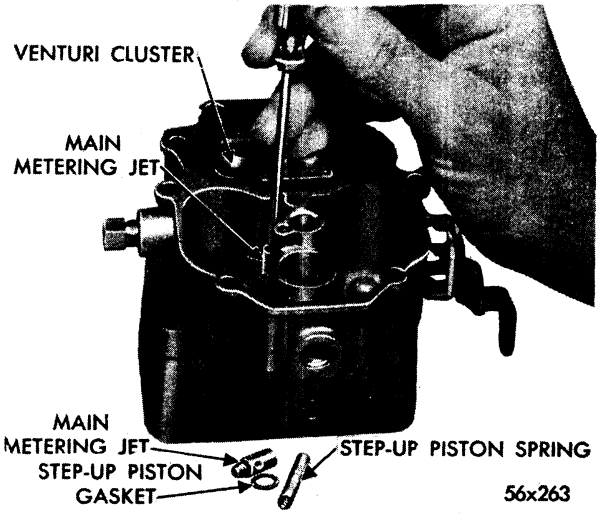


Fig. 11—Removing or Installing Main Metering Jets

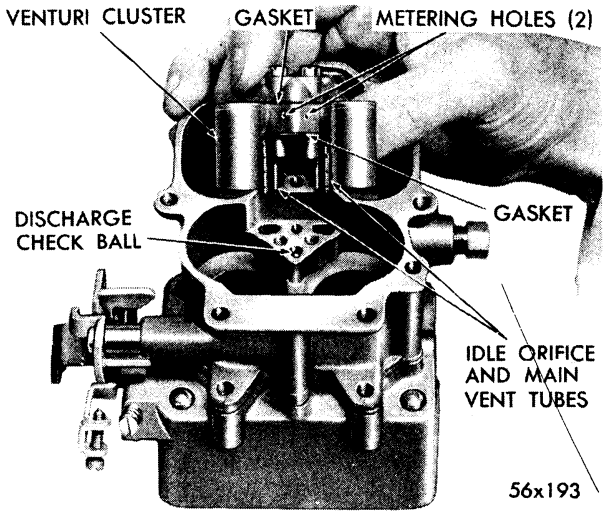


Fig. 12—Removing or Installing Venturi Cluster

er in a jar of clean gasoline or kerosene to prevent leather from drying out.

Remove screws that attach the thermostatic coil housing and cap to air horn. Remove coil housing, thermostatic coil, cap, gaskets and baffle plate, as shown in Figure 14. Using a file or other suitable tool, remove staking portion of screws that attach choke valve to choke shaft. Remove screws and slide choke valve out of air horn. The choke valve screws are staked to prevent loosening and care must be used at removal so as not to break off in shaft.

Remove screw that attaches choke shaft lever to choke shaft. Hold choke shaft lever firmly with fingers, as shown in Figure 15, so as not to jam choke piston in its well. Slide choke lever, loose lever and washer off end of choke shaft as shown in Figure 16. Turn choke shaft

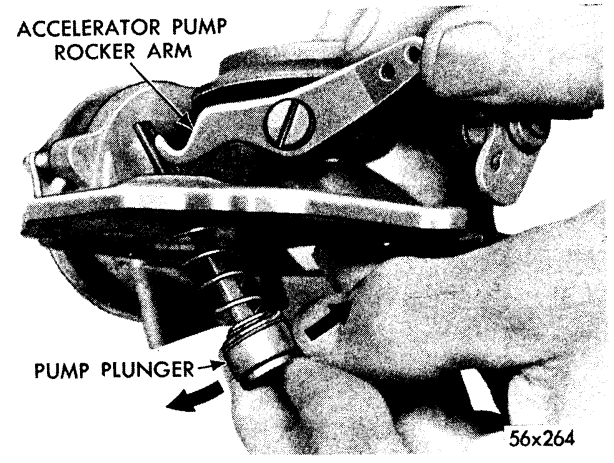


Fig. 13—Removing or Installing Accelerator Pump Plunger

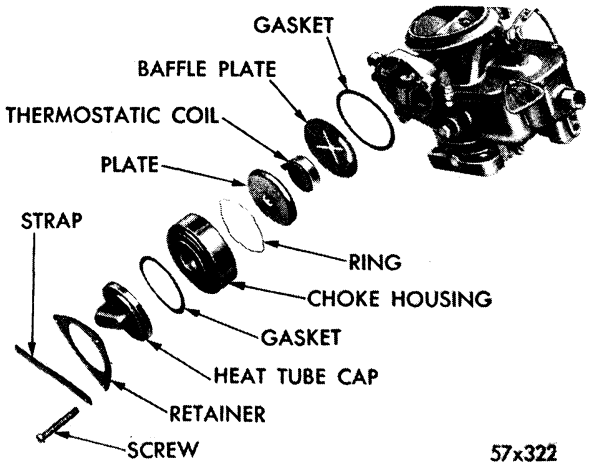


Fig. 14—Removing or Installing Choke Baffle Plate and Gasket

clockwise until choke piston clears the top of its cylinder, then withdraw the choke piston, link and shaft from air horn, as shown in Figure 17.

The carburetor now has been disassembled into three units, namely, the air horn, main body and throttle body, and component parts of each disassembled as far as necessary for cleaning and inspection. It is usually not advisable to remove throttle shaft or valves, un-

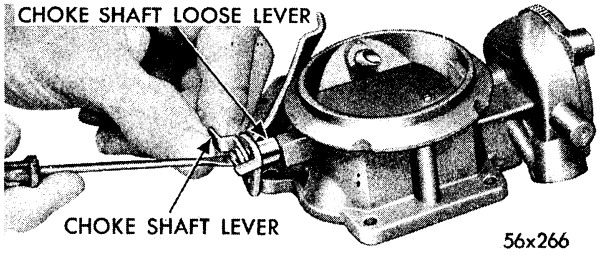


Fig. 15—Removing or Installing the Choke Shaft Lever

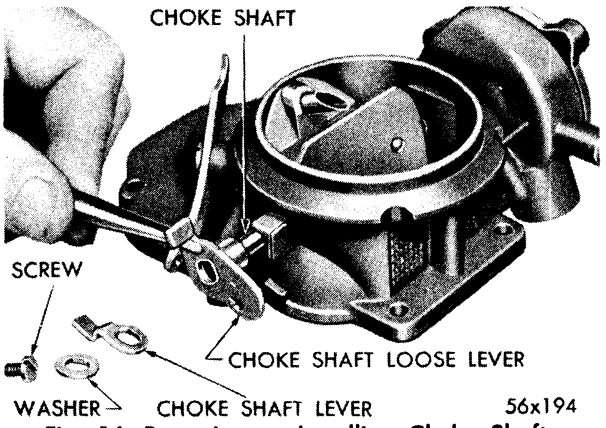


Fig. 16—Removing or Installing Choke Shaft Loose Lever

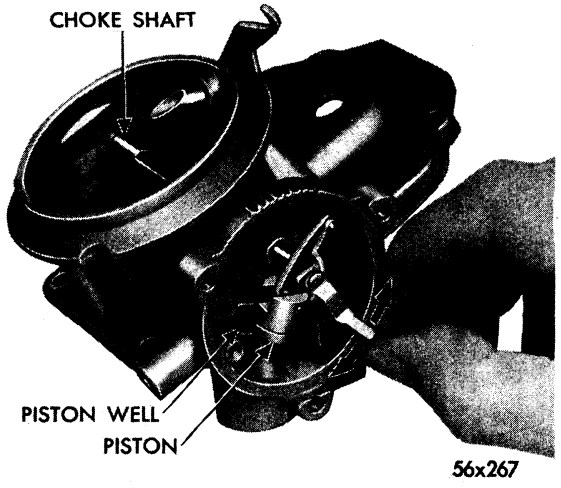


Fig. 17—Removing or Installing Choke Shaft Piston

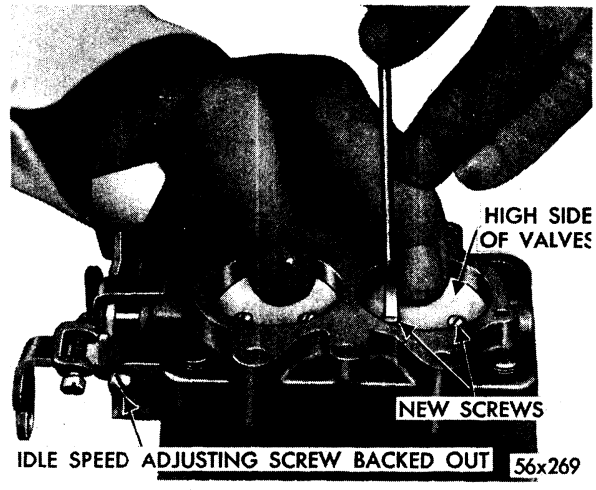


Fig. 19—Removing or Installing Throttle Valves

less wear or damage necessitates installation of new parts. To install new valves or throttle shaft, refer to Inspection and Reassembly Paragraph 18.

17. CLEANING CARBURETOR PARTS

The recommended solvent for gum deposits is denatured alcohol. There are other commercial solvents or cleaners, however, such as Metalclene (or equivalent) which may be used with satisfactory results.

IMPORTANT

If the commercial solvent or cleaner recommends the use of water as a rinse, it should be HOT. After rinsing, all trace of moisture must be blown from passages with air pressure. Never clean jets with wire, drill or other mechanical means as the orifices may become enlarged, making fuel mixture too rich for proper performance.

18. INSPECTION AND REASSEMBLY

Check throttle shaft for excessive wear in

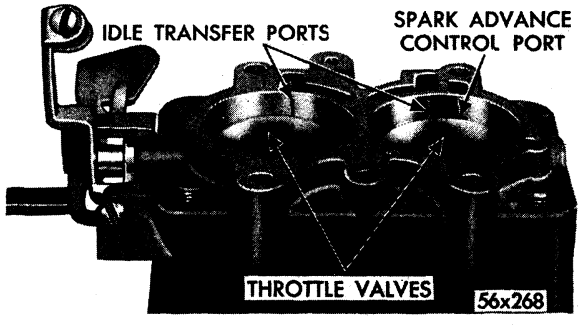


Fig. 18—Ports in Relation to Throttle Valves

throttle body. If wear is extreme, it is recommended that throttle body be replaced rather than installing a new throttle shaft in old body.

During manufacture, location of idle transfer port and spark advance control ports to valves is carefully established for one particular assembly (See Fig. 18). If a new shaft should be installed in an old worn throttle body it would be very unlikely that original relationship of ports to valves would be obtained. Changing port relationship would adversely affect normal car operation between speeds of 15 and 30 miles per hour. If it has been determined however, that new valves and shaft are to be installed, adhere closely to following instructions: Mark valves to be sure each is replaced in same bore from whence removed. Using file or other suitable tool, remove staking portion of screws that attach throttle valves to throttle shaft. Remove screws and slide throttle valves out of bores. The throttle valve screws are staked on opposite side to prevent loosening and care must be used at removal so as not to break off in shaft.

Slide throttle shaft out of throttle body. Position new shaft in body, then back off idle speed screw (adjusting). This will allow valves to be fully seated for instalation operation. The letter "C" in a circle stamped on valves must be toward idle ports and visible from bottom of throttle body when valves are installed. Slide valves into their respective bores, insert NEW attaching screws, but do not tighten. Hold valves in place with fingers, as shown in Figure 19 (fingers pressing on high side of valves).

Tap valves lightly with screwdriver to seat fully in bores. Holding valves in this position, tighten screws securely, then stake by squeezing with pliers. Install two idle mixture adjusting needles and springs in throttle body. (The tapered portion must be straight and smooth. If tapered portion is grooved or ridged, a new idle mixture adjusting needle should be installed to insure having correct idle mixture control).

Idle Mixture Needle Adjustment

The adjusting should be made with fingers. **DO NOT USE A SCREWDRIVER.** Turn needles lightly against their seats, then back off one full turn for approximate setting.

Assembling the Automatic Choke

To function properly, it is important that all choke parts be clean and move freely when installed. It is possible, under extremely dust conditions, that fine particles of dirt may be found deposited on various choke parts. A heavy, black, hard carbon deposit on choke parts will indicate the possibility of a leak in the heat tube, in exhaust manifold. Check tube and install a new one if necessary. Examine for wear or damage. Worn or damaged parts must be replaced in order to insure proper choke operation.

The thermostatic coil, heat retainer plate and coil housing are serviced as an assembly **only.** If housing is cracked or broken, install a complete new assembly. The index mark cut in rim of housing is only correct for one coil originally installed. Do not attempt to separate thermostatic coil from heat retainer plate.

To remove coil and heat retainer plate from housing, hit housing sharply against palm of hand (coil side down). Clean dirt, dust or other foreign material that may be present from retainer plate and out of choke housing. When reassembling, match lug in the housing, with notch on plate, as shown in Figure 20. Install plate and press down until it is seated in housing. Be sure retaining spring in plate is clear of notch.

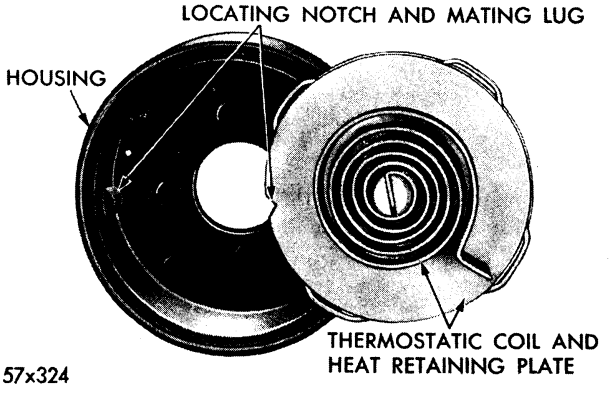


Fig. 20—Installing Heat Retainer Plate

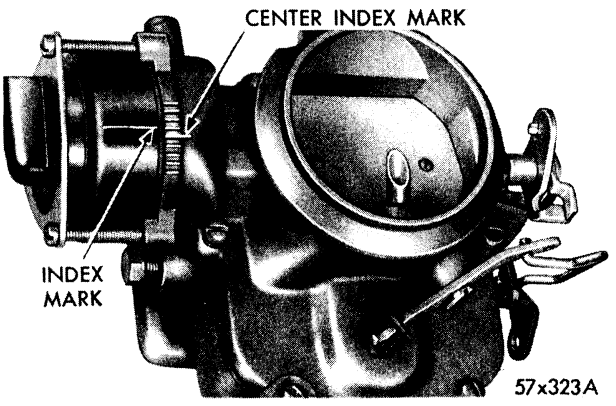


Fig. 21—Alignment of Index Marks of Choke

Slide choke shaft and piston into air horn. Be sure that groove in piston is clean. Turn choke shaft clockwise until piston clears choke cylinder. (Refer to Fig. 17). Turn choke shaft counter-clockwise, allowing choke piston to enter its cylinder. Slide choke valve down into position, then start new screws. Holding valve in closed position, tap gently with screw driver to center and locate valve, then tighten screws securely. Stake by squeezing with pliers. Hold air horn up-right and close choke valve. The valve should open freely of its own weight. Do not lubricate any of choke operating parts.

Install choke baffle plate and gasket. Place coil housing retaining ring over housing and heat tube cap, and, with index mark in down position, install coil housing. Turn the housing clockwise until index mark lines up with one notch rich mark on carburetor, as shown in Figure 21. Install screws and tighten securely. Slide choke shaft loose lever and sleeve over choke shaft, followed by choke shaft lever, washer and screw (Refer to Figure 16. Tighten screw securely. Place new gasket on throttle body. Invert assembly and install attaching screws. Just **snug** screws down, do not tighten at this time.

Place discharge check ball on its seat, test accelerator pump action as follows: Remove accelerator pump plunger from jar of gasoline.

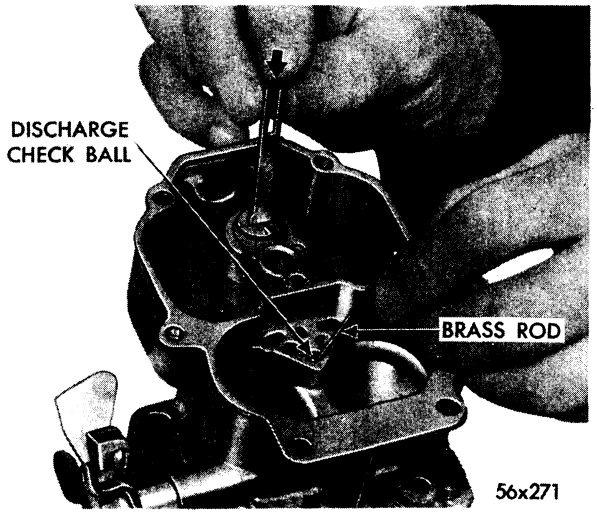


Fig. 22—Accelerator Pump Test

Flare back leather several times, slide into pump cylinder. Pour clean gasoline into float chamber (approximately ½ inch deep).

Raise plunger and press lightly on end of plunger shaft, forcing plunger down into cylinder. Do this several times, until all air has been removed from discharge passage. Using a small clean brass rod, hold discharge check ball firmly on its seat, as shown in Figure 22.

Raise pump plunger and press downward, no fuel should be emitted from either accelerator pump intake or discharge passage. If fuel does emit from either passage, it is an indication of dirt or a damaged check ball. Remove ball, reclean passage, and, if necessary, install new check ball. Retest as described above.

If fuel still emits from passage, place a small drill rod on check ball. Lightly tap with hammer to form a new ball seat. Install new check ball and test as previously described. If condition still exists, install a new main body. Remove plunger and pour out gasoline after test.

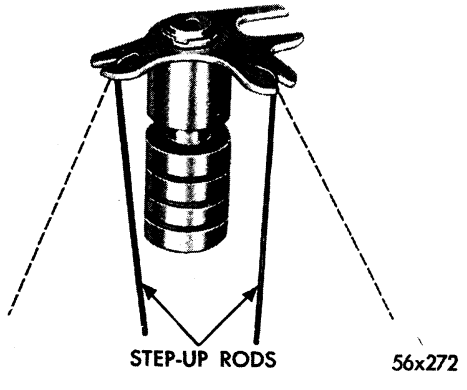


Fig. 23—Positioning Step-up Rods

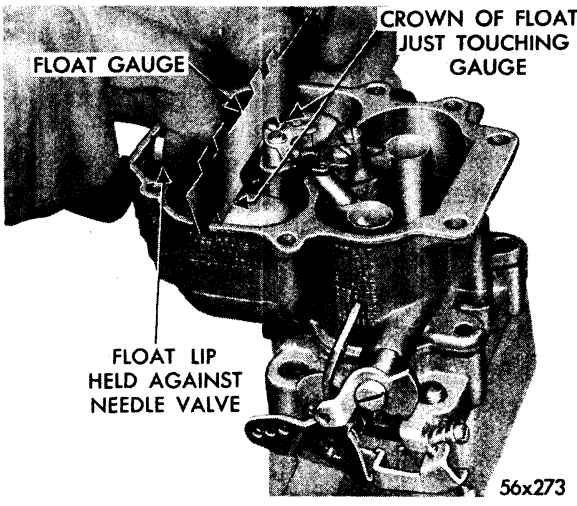


Fig. 24—Checking Float Height

Reinstall the venturi cluster, gaskets and idle bleed screws. Tighten screws securely. (Refer to Fig. 12). Install main metering jets and gaskets, step-up piston gasket, spring, piston and rods. (Refer to Fig. 11). Before installing the step-up piston, be sure the step-up rods are able to move freely each side of vertical position, as shown in Figure 23. Be sure step-up piston slides freely in its cylinder. A step-up piston stuck in the **UP** position will cause a rich mixture at part throttle, whereas a piston stuck in **down** position will cause a lean mixture at wide open throttle and poor acceleration. Install retaining screw and tighten securely.

Install float, fulcrum pin and retainer. (Refer to Fig. 9). Install fuel inlet needle valve, seat and gasket. If needle valve is ridged, grooved, or shows signs of wear, a new needle valve and seat should be installed.

Checking Float Height

When checking float height, be sure and remove air horn gasket. Place float gauge Tool T-109-282 in position over floats, as shown in Figure 24. Both floats should just touch gauge when float lip is held firmly against inlet needle. To adjust, bend float lip to raise or lower floats until correct setting has been obtained. If one float is lower than the other, equalize by bending float arm.

If Tool T-109-282 is not available, use a steel scale and measure distance from crown of float

(in the center) to top of fuel bowl. This measurement should be $\frac{9}{32} \pm \frac{1}{64}$ inch. Remove accelerator pump plunger from jar of gasoline, slide spring and cup washer over shaft. Slide assembly up through air horn and engage with rocker arm. Using a new gasket, place air horn on main body and install screws. Be sure plunger leather enters pump cylinder evenly.

Install accelerator pump and fast idle rods and secure with hairpin clips. Tighten all air horn and throttle body attaching screws securely.

19. CARBURETOR ADJUSTMENTS

The following adjustments should be made with the carburetor on a bench (for ease of working), and, should be made in the following order: Fast idle adjustment, choke shaft lever adjustment, unloader adjustment (wide open kick) and accelerator pump adjustment.

a. Fast Idle Adjustment

To make the fast idle adjustment, hold the choke valve tightly closed. Tighten the fast idle adjusting screw (on the high step of the fast idle cam), until wire gauge Tool T-109-44 (.015 inch) can be inserted between the throttle valve and the bore (side opposite port), as shown in Figure 25. The index mark on the fast idle cam should be in direct line with the fast idle screw shank.

b. Choke Shaft Lever Adjustment

Invert the carburetor and open the throttle

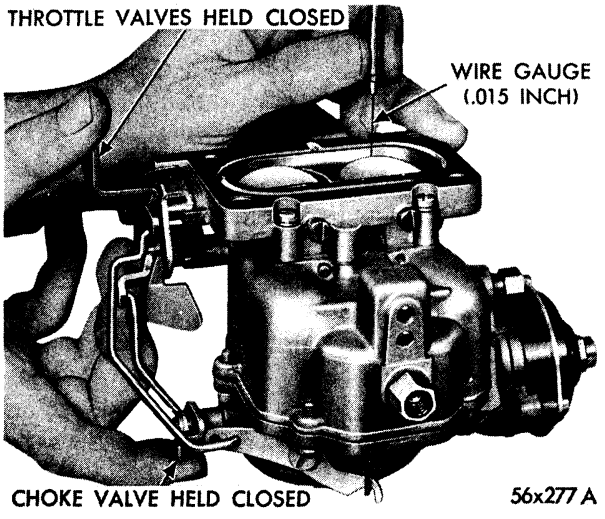


Fig. 25—Correct Throttle Opening for Fast Idle

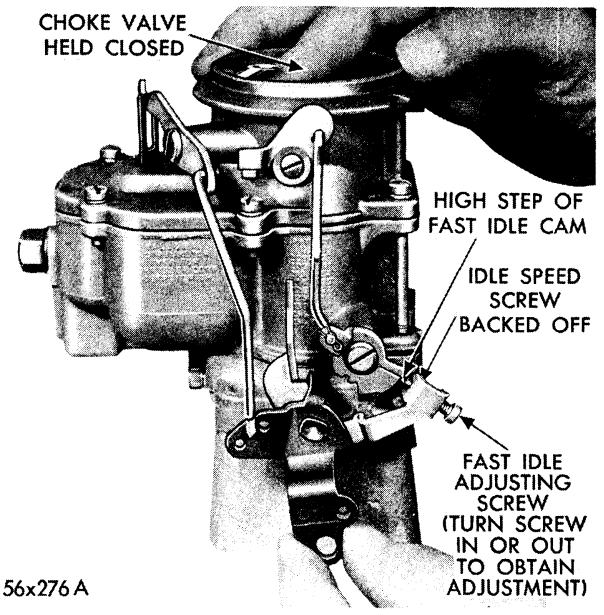


Fig. 26—Checking Fast Idle Setting

valves to wide open position. Close the choke valve tightly and then close the throttle valves. This will position the fast idle cam to fast idle. The index mark on the cam should split the center of the fast idle adjusting screw, as shown in Figure 26. If an adjustment is necessary, bend the choke lever, using Tool T-109-22, as shown in Figure 27, until the index mark on the cam indexes the fast idle adjusting screw.

c. Choke Unloader Adjustment (Wide Open Kick)

To make unloader adjustment, lightly hold choke valve closed, then open throttle valves

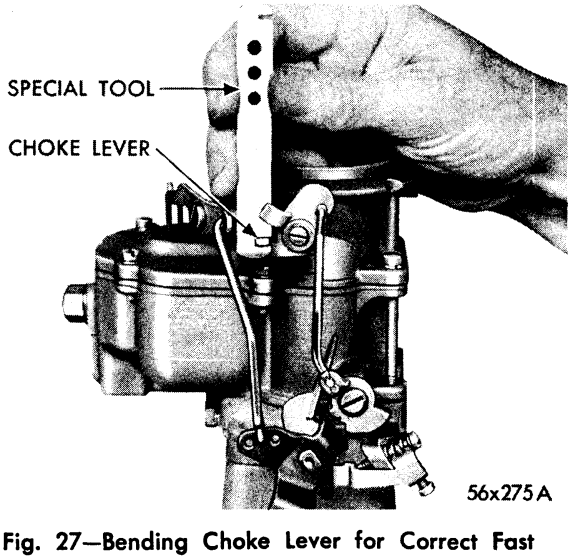


Fig. 27—Bending Choke Lever for Correct Fast Idle Cam Setting

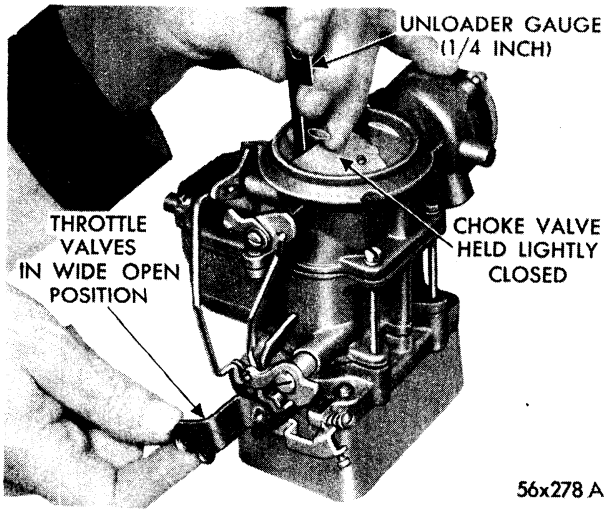


Fig. 28—Checking Choke Unloader Adjustment

to wide open position. The choke valve should open sufficiently to allow unloader gauge Tool T-109-31 (¼ inch) to be inserted between choke valve and wall of air horn, as shown in Figure 28. Adjust if necessary, by bending the arm on throttle lever, using Tool T-109-213, as shown in Figure 29, until correct clearance has been obtained.

d. Accelerator Pump Adjustment

To make accelerator pump adjustment, be sure pump connector rod is located in center hole of throttle lever and in inside hole of rocker arm. Back off idle speed adjusting screw until throttle valves are fully seated in their bores. (Make sure fast idle adjusting screw is off fast idle cam.) With throttle valves seated,

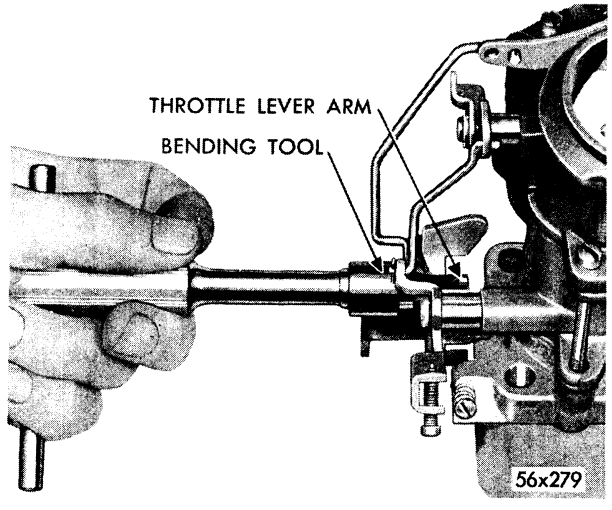


Fig. 29—Bending Throttle Lever Arm for Unloader Adjustment

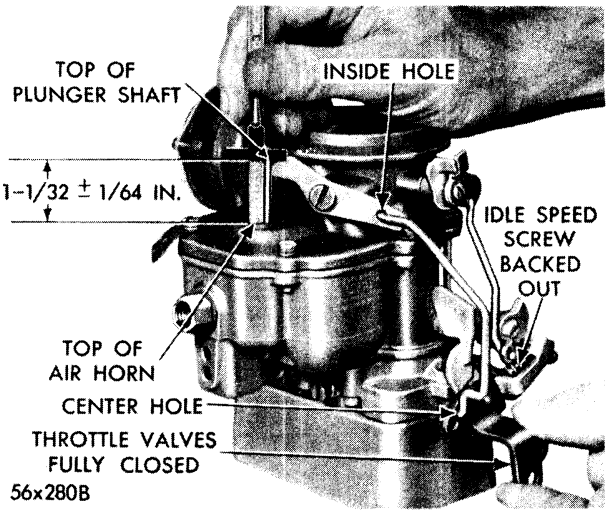


Fig. 30—Checking Accelerator Pump Travel

distance from top of plunger shaft to top of air horn bowl cover, should be 1 $\frac{1}{32}$ inch ± or minus $\frac{1}{64}$ inch when measured with a steel scale, as shown in Figure 30. To adjust pump setting, bend pump connector rod, using Tool T-109-213, as shown in Figure 31, until correct pump travel distance has been obtained.

20. INSTALLATION OF CARBURETOR ON ENGINE

Install a new carburetor mounting gasket on intake manifold, then install carburetor. Before tightening attaching nuts, start fuel and vacuum lines, to prevent stripping threads on these connections. Complete tightening of attaching nuts, fuel and vacuum line connections, install heat control tube. Install throttle con-

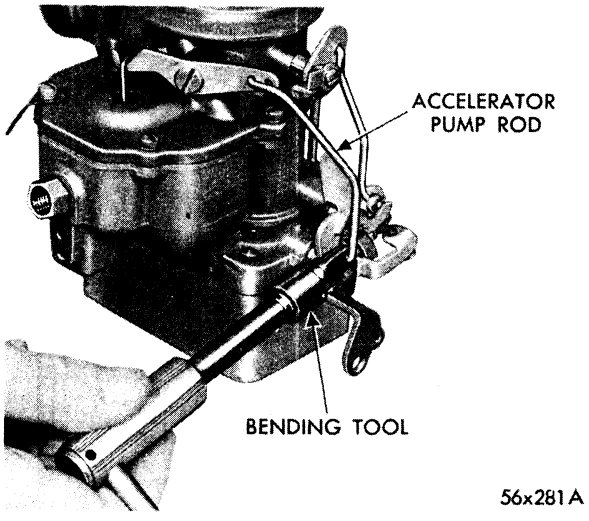


Fig. 31—Bending Pump Rod for Correct Pump Travel

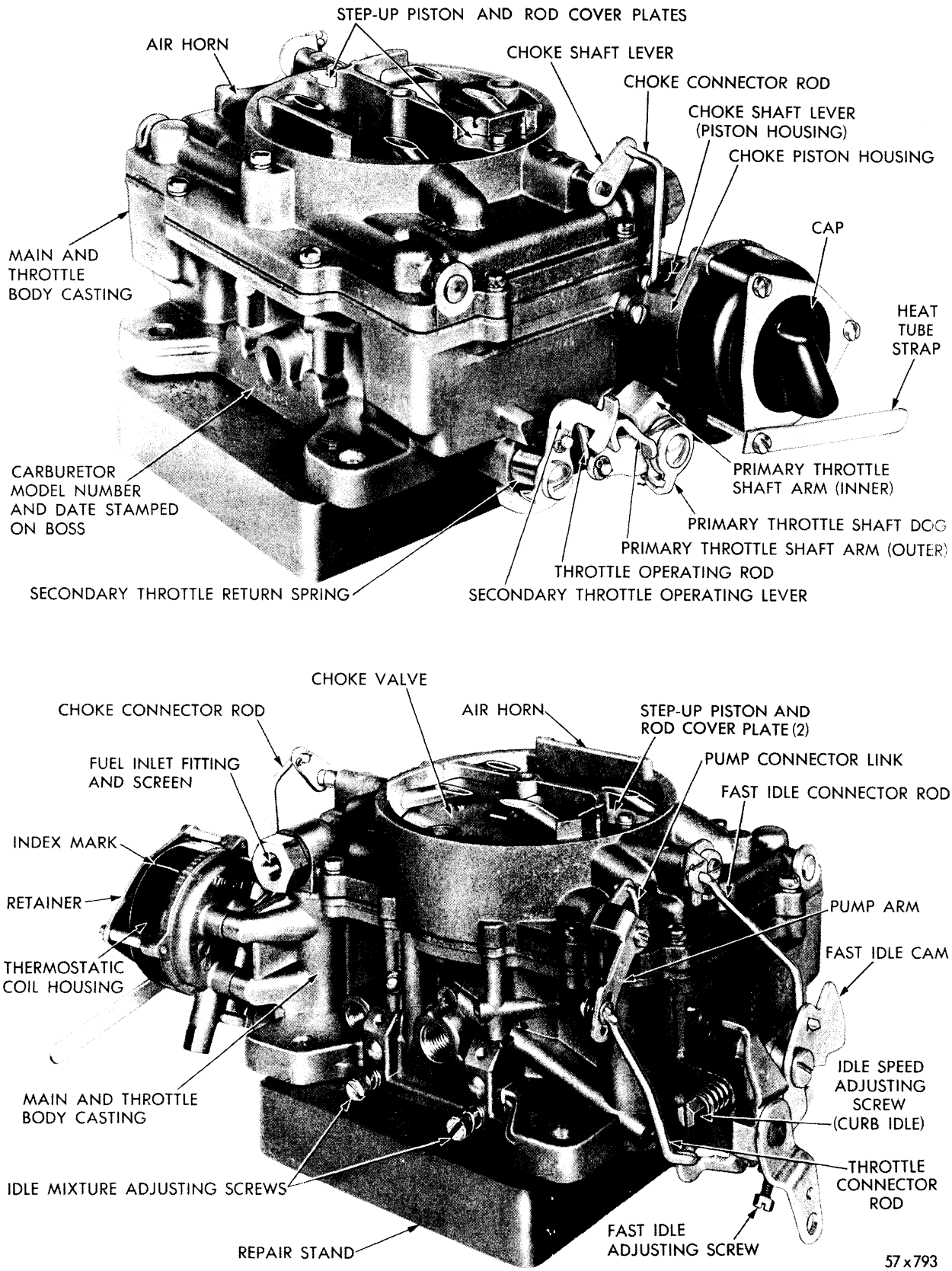


Fig. 32—Carburetor Assembly (Right and Left View)

trol linkage return spring and anchor, the air cleaner and gasket. Set engine idle speed as follows.

Idle Mixture Adjustment—No amount of carburetor adjustment will give a smooth engine idle, unless following items are known to be in good condition and/or adjusted correctly. Spark plugs, distributor points, good high tension terminal connections (no leaks in leads), engine ignition timing and manifold heat control valve operating properly.

If it was not made during assembly of carburetor, make preliminary setting of idle mixture adjusting needles, by turning them clockwise until seated. Back out one full turn. To prevent damage to the needles and seats, use finger pressure **ONLY** to make this adjustment.

Try and turn each adjusting needle the same amount. There is very little inter-connection between two branches of intake manifold. The cylinders on each branch will react to changes in idle mixture as much as if there were two four cylinder engines. It is assumed that approximately the same idle mixture is required by each set of four cylinders. It is further assumed that idle mixture delivered by each barrel of carburetor will be approximately the same if each idle adjusting needle is opened the same amount. The final fine setting may vary slightly from this, but it is best to start with needles in same physical location.

With engine warmed-up, idle speed set at 500 r.p.m. and both idle adjusting needles set at one full turn open, observe the roughness of engine and absence or presence of fluffs at tail pipe and/or pipes. Turn both idle mixture adjusting needles clockwise (leaner) 1/8 turn. If r.p.m. increases slightly, the engine runs smoother, and there are fewer fluffs in exhaust, the leaner adjustment is in right direction. Try turning needles clockwise another 1/8 turn, or a total of 1/4 turn from initial setting. This may further improve idle or make it worse. If, with this setting, the idle was improved, reset idle speed to 500 r.p.m. and then try individual adjustments of each needle 1/8 turn clockwise (leaner) and counter-clockwise (richer) to find best adjustment for each needle.

If the 1/8 turn (leaner) clockwise adjustment of both needles produced a drop in engine r.p.m., rougher operation, and more fluffs at tail pipes, try adjusting both needles 1/8 turn counter-clockwise (richer) from initial setting. Repeat procedure described above.

The best idle operation will normally be found with idle mixture needles set somewhere between 3/4 and 1 1/4 turns open. The final setting should result in both needles being open same number of turns, plus or minus 1/8 turn.

After final adjustment of idle mixture adjusting needles, recheck (and set if necessary) the idle speed.

CARBURETORS Models AFB-2650S-2651S Models (LC-2, LC-3, LY-1)

The new AFB 2650S and 2651S (aluminum four barrel) carburetors (Fig. 32) contain many new features, some of which are, a new location for the step-up rods and pistons. The stepup rods, pistons and springs are accessible for service without removing the air horn, or the carburetor from the engine. The venturi assemblies (primary and secondary) are replaceable and contain many of the calibration points for both the high and low speed systems.

All the major castings of the carburetor are aluminum, with the throttle body cast integral with the main body. This allows an over-all height reduction in the carburetor. The section containing the accelerator pump and the integral choke is termed the primary side of the carburetor. The other side is the secondary. The five conventional systems used in previous four barrel carburetors are also used in this unit. The five conventional systems are, two

float systems, two low speed systems, (primary side only) two high speed systems, one accelerator pump system and one automatic choke control system.

21. SERVICING THE CARBURETOR

Dirt, dust, water and gummy deposits are some of the main causes for poor carburetor operation. However, proper cleaning and the installation of new parts, where required, will return the carburetor to its originally designed performance.

When overhauling the AFB Carburetor, several items of importance should be observed to assure a good job.

The carburetor should be carefully disassembled.

All parts cleaned in a suitable solvent, then inspected for wear or damage.

Air pressure only should be used to clean the various orifices and channels.

Questionable parts should be replaced with new ones. When inspecting parts removed from the carburetor it is at times rather difficult to determine if they are satisfactory for further service. It is recommended therefore that in such cases that new parts be installed.

22. DISASSEMBLING THE AFB CARBURETOR

To disassemble the carburetor for cleaning or overhaul, refer to Figure 32, and proceed as follows:

Place the carburetor assembly on repair stand Tool C-3400 or T-109-287S elevating legs. These tools are used to protect the throttle valves from damage and to provide a suitable base for working.

Remove the hairpin clip that attaches the fast idle connector rod to the choke lever. Disengage rod from lever, then swing rod at an arc until it can be disengaged from the fast idle cam.

Remove the retainer and spring that holds the throttle connector rod in the center hole of the accelerator pump arm. Remove the hairpin clip that attaches the lower end of rod in the primary throttle shaft lever. Disengage rod from arm and lever, then remove from carburetor.

Remove the hairpin clips that attach the choke connector rod to the choke shaft lever and the lever at the choke piston housing. Disengage rod and remove from carburetor.

Remove the screws attaching the step-up piston and rod cover plates. **Hold cover down with a finger to prevent the piston and rods from flying out.** Lift off the plates and slide the step-up pistons and rods out of the air horn. Remove the step-up piston springs.

Remove the ten screws that attach the air horn to the main body. (1 screw in hole in air horn). Lift the air horn straight up and away from the main body. **When removing air horn, use care so as not to bend or damage the floats.** Remove the accelerator pump plunger lower spring from the pump cylinder.

a. Disassembling the Air Horn

Place the air horn in an inverted position on the bench (to protect the floats) then proceed to disassemble as follows:

Using a suitable Tool, remove the float fulcrum pins, (left and right) then lift the floats up and out of bosses on air horn. **It is suggested that the float on the pump side be marked so that the floats can be re-installed in their respective positions.**

Remove the two needle valves from their respective seats, after marking the one on the pump side for identification. Using a wide blade screw driver, remove the needle valve seats. Be sure each needle valve is returned to its original seat at reassembly.

Remove the hairpin clip that holds the accelerator pump connector link in the pump arm and plunger shaft. Disengage link from pump arm and shaft. Slide the accelerator pump plunger and spring out of the air horn. Remove the air horn to main body gasket and discard.

Place the accelerator pump plunger in a jar of clean gasoline or kerosene, to prevent the leather from drying out.

Remove the fuel inlet fitting and filter screen from the air horn.

b. Main Body Disassembly

Using a Phillips screw driver, remove the screws that attach the accelerator pump jet housing to the main body. Lift out the jet hous-

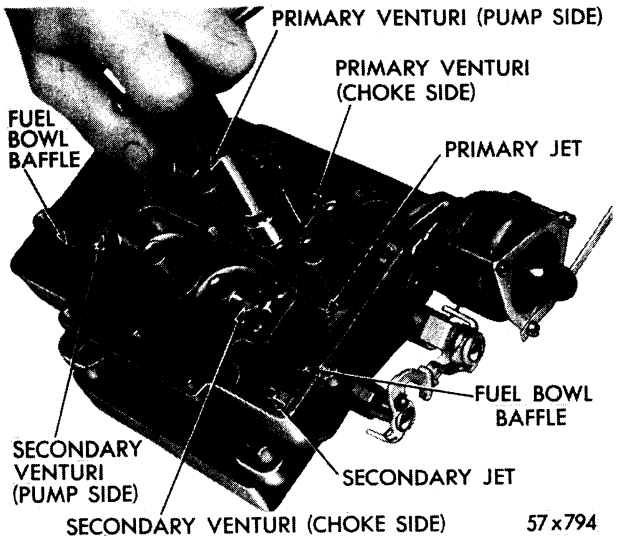


Fig. 33—Removing or Installing Main Metering Jets (Primary)

ing and gasket. Discard the gasket. Now, invert the main body and drop out the discharge check needle, from the discharge passage.

Using Tool T109-58, remove the main metering jets (primary side), as shown in Figure 33. **The primary and secondary main metering jets are not interchangeable. It is very important that these jets be installed in their respective locations in the main body at reassembly.** Again using Tool T109-58, remove the main metering jets (secondary side), as shown in Figure 34.

Remove the screws that attach the primary venturi (choke and pump side) to the main body. Lift the venturi straight up and away from the main body, as shown in Figure 35. Discard the gaskets.

The venturi assemblies are not interchangeable, side for side and must be re-installed in their original location at reassembly.

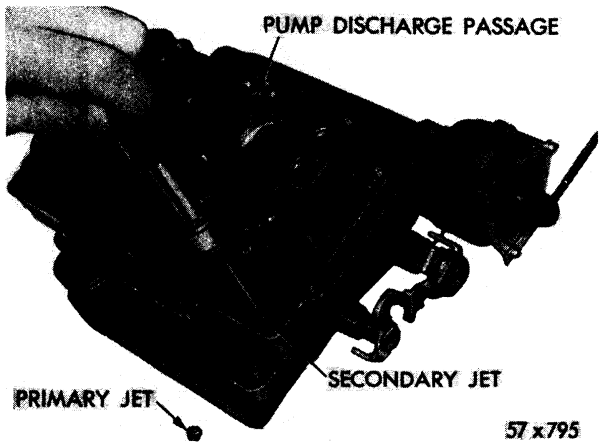


Fig. 34—Removing or Installing Metering Jets (Secondary)

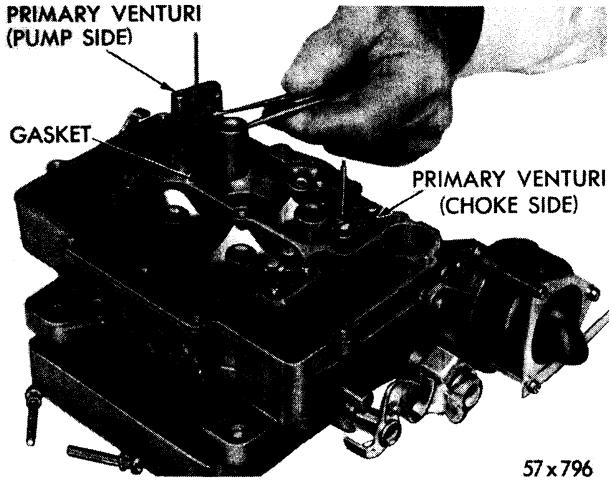


Fig. 35—Removing or Installing Primary Venturi (Choke Side and Pump Side)

Remove the screws that attach the secondary venturi (choke and pump side) to the main body. Lift the secondary venturi assemblies straight up and away from the body as shown in Figure 36.

Invert the main and throttle body casting, then remove the accelerator pump intake check ball plug. Using Tool T109-59, screw driver bit, remove the check ball seat, as shown in Figure 37. Again invert the body casting and drop out the intake check ball.

Remove the two idle mixture adjusting screws and springs from the throttle body portion of the main casting.

Remove the screws that attach the thermostatic coil spring housing retainer to the choke piston housing. Remove the retainer, cap, gasket, housing, gasket and baffle plate from the choke housing.

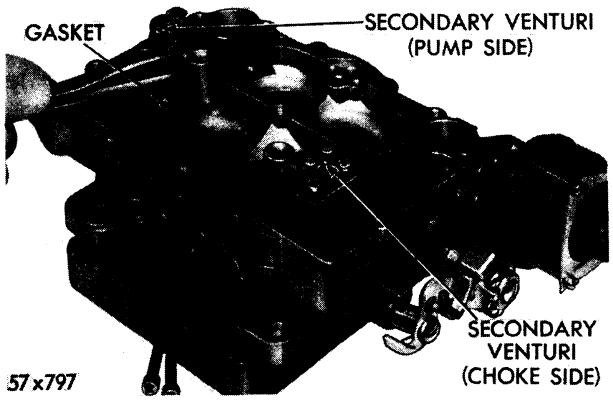


Fig. 36—Removing or Installing Secondary Venturi (Choke Side and Pump Side)

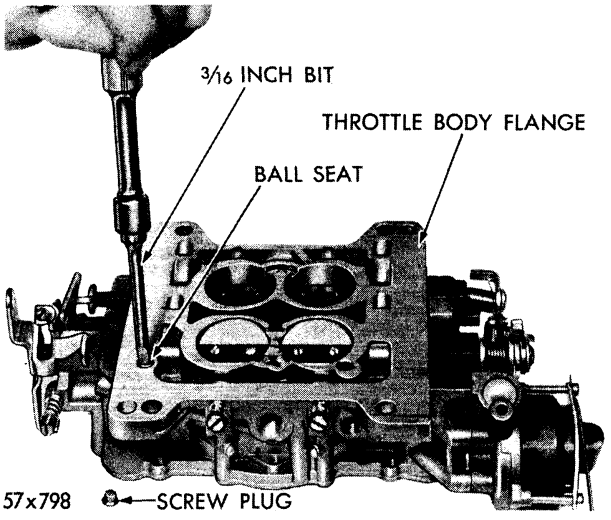


Fig. 37—Removing Intake Check Ball Seat

Remove the screws that attach the choke piston housing to the main body casting. Remove choke piston housing and discard the vacuum passage gasket.

Remove the choke piston arm attaching screw and washer, then slide the choke piston out of its cylinder.

The carburetor now has been disassembled into two units, namely the air horn and the main and throttle body casting. The component parts of each, have been disassembled as far as necessary for cleaning and inspection.

It is usually not advisable to remove the throttle shafts or valves, unless wear or damage necessitates the installation of new parts. During the manufacture of the carburetor, the location of the idle transfer ports and the idle discharge ports to the valve is carefully established for one particular assembly, as shown in Figure 38. The valves are milled to give the proper port relation.

If new throttle shafts should be installed in an old, worn body, it would be very unlikely that the original relationship of these ports to the valves would be obtained. A very slight change in the port relationship to the valves would adversely affect normal carburetor operation, between the speeds of 15 and 30 miles per hour.

It is recommended that if the throttle shafts are excessively worn, that a new carburetor be installed. However, if the throttle valves have become nicked, burred or damaged, new valves may be installed, providing the following instructions are carefully followed.

The screws that attach the throttle valves are staked on the opposite side and care should be used in removal so as not to break the screws in the throttle shaft. Remove the staked portion of the screws with a file.

Remove the screws that attach the primary throttle valves to the throttle shaft and slide valve (or valves) out of the bores.

Remove the screws that attach the secondary throttle valves to the throttle shaft and slide valve (or valves) out of bores.

The primary valves and secondary valves are not interchangeable and should be kept separate in order that each may be returned to its respective bore. (See Fig. 39).

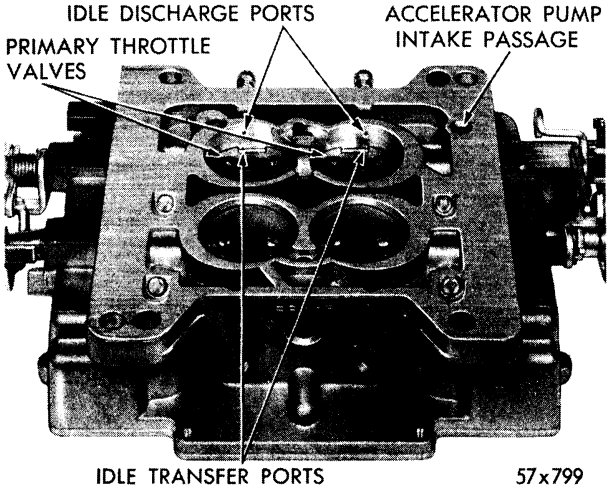


Fig. 38—Ports in Relation to Throttle Valves

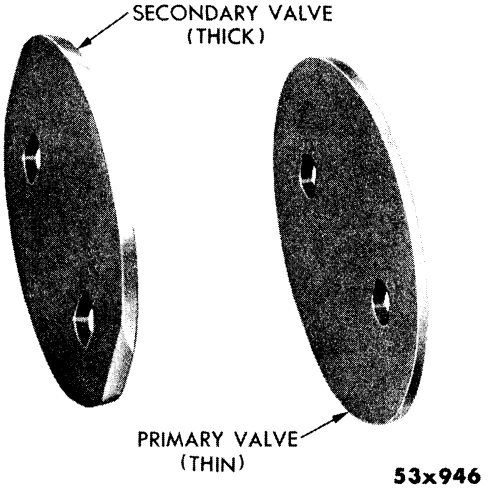


Fig. 39—Throttle Valve Identification

23. CLEANING CARBURETOR PARTS

The recommended solvent for gum deposits is denatured alcohol, which is easily obtainable. However, there are other commercial solvents which may be used with satisfactory results.

IMPORTANT

If the commercial solvent or cleaner recommends the use of a water rinse, it should be "HOT". After rinsing, all trace of water must be blown from the passages with air pressure. It is further advisable to rinse all parts in clean kerosene or gasoline to be certain no trace of moisture remains. Never clean jets with a wire, drill, or other mechanical means, because the orifices may become enlarged, making the mixture too rich for proper performance.

It is important that all parts of the automatic choke be clean and move freely, in order to function properly. It is possible, under an extremely dusty condition, fine particles of dirt may be deposited on the various choke parts.

Examine all choke parts for wear or damage. Worn or damaged parts must be replaced with new, to insure proper operation of the choke. Other than an occasional cleaning, the automatic choke control requires no servicing. However, it is very important that the choke control unit works freely at the thermostatic coil spring housing and at the choke shaft.

To remove the thermostatic coil spring and heat retainer plate from the housing for cleaning, hit the housing sharply against the palm of the hand (coil side down). Clean dust, dirt or other foreign material that may be present, from the retainer plate and out of the choke housing. When reassembling, match the lug in the housing with the notch on the heat retainer plate. Install the plate and press down until seated. **Be sure the retaining spring in the plate is clear of notch.**

The thermostatic coil spring, heat retainer plate and coil housing are serviced as an assembly only. If the housing is cracked or broken, install a complete new assembly. The index mark out in the rim of the housing is correct for the one coil originally installed. **Do not attempt to separate the thermostatic coil from the heat retainer plate.**

24. CARBURETOR ASSEMBLY

a. Main and Throttle Body Casting

Slide the primary throttle valve (or valves) into their respective bores, install new screws, but do not tighten. **Be sure the idle speed adjusting screw is backed out.** Hold the valves in place with the fingers. (Fingers pressing on the high side of valves).

Tap the valves lightly with a screw driver to seat in the bores. Holding the valves in this position, tighten the screws securely. Stake screws by squeezing with pliers.

Install the two idle mixture adjusting screws and springs in the throttle body portion of the casting. The tapered portion must be straight and smooth. If the tapered portion is grooved or ridged, a new idle mixture adjusting screw should be installed to insure having correct idle mixture control. **DO NOT USE A SCREW DRIVER.** The adjustment should be made with the fingers. Turn the idle mixture adjusting screws lightly against their seats, then back off one full turn for an approximate adjustment.

Position the choke shaft lever (piston housing) so that it is pointing toward the piston cylinder, as shown in Figure 40. (One o'clock when viewed from the rear).

Slide the choke piston into the cylinder, and at the same time position the piston arm over the flats on the shaft. Install retaining washer and screw. Snug down and carefully tighten.

Slide a new vacuum passage gasket into position, then install the piston housing on the body casting. Install screws and tighten securely.

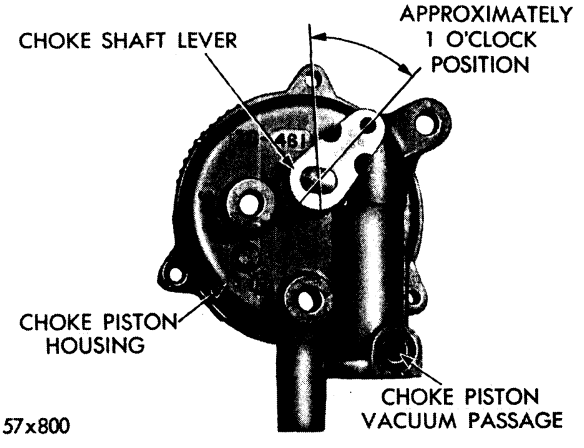


Fig. 40—Positioning Choke Shaft Lever

Place new secondary venturi gaskets in position, then install the secondary venturi (pump and choke side) by lowering straight down on gaskets. Install attaching screws and tighten securely. **Be sure all the metering holes and vent tubes are clean, in both the primary and secondary venturi.**

Place new primary venturi gaskets in position, then install the primary venturi (pump and choke side) by lowering straight down on the gaskets. (Refer to Figure 35). Install attaching screws and tighten securely.

Install the primary and secondary main metering jets, using Tool T109-58. (Refer to Figures 33 and 34). Tighten jets securely.

Invert the carburetor and install the accelerator pump intake check ball. Install seat and tighten securely, using Tool T109-59. (Refer to Figure 37). Install screw plug and tighten securely.

b. Accelerator Pump Test

Pour clean gasoline into the carburetor bowl (approximately ½ inch deep). Remove the accelerator pump plunger from the jar of gasoline. Flex the leather several times, then slide into the pump cylinder.

Install the accelerator pump discharge check needle in the discharge passage. Raise the pump plunger and press lightly on the plunger shaft to expel air from the pump passages. Using a small clean brass rod, hold the discharge check needle firmly on its seat. Again raise the plunger and press downward. No fuel should be emitted from either the intake or discharge passage.

If fuel does emit from the intake passage, disassemble the intake check ball and reclean the passage. Fuel leakage at the discharge check needle indicates the presence of dirt or a damaged check needle. Clean again and then install a new check needle. Retest for leakage.

If either the intake check ball or discharge check needle leaks after above test and service fix, attempt to reseat as follows:

c. Intake Check Ball

Remove the screw plug, gasket, ball seat and ball from the bottom of the throttle body flange. Install a new ball and ball seat. Install screw plug and new gasket, then retest as described previously.

d. Discharge Check Needle

With the discharge check needle installed, insert a piece of drill rod down on the needle. Lightly tap the drill rod with a hammer to form a new seat. Remove and discard old needle and install a new one. Retest as described previously. If the service fix does not correct the condition, a new carburetor will have to be installed.

Install the accelerator pump jet housing gasket. Install housing and attaching screws. Tighten screws securely.

Press down on the accelerator pump plunger shaft, and as the plunger is being depressed, a clear straight stream should emit from each jet. If the streams are identical, (if either one is diverted or restricted) a new accelerator pump jet housing should be installed. After test, pour the gasoline from the carburetor bowl and remove pump plunger.

e. Assembling the Air Horn

Slide the fuel inlet screen into the fuel line fitting, then install fitting in air horn. Tighten securely.

Check to see if the leather on the accelerator pump plunger is hard, cracked or worn. If any sign of wear or deterioration is evident, install a new plunger assembly.

Slide the accelerator plunger into air horn, then install the accelerator pump link. Install the retaining hairpin clip to secure.

Place a new air horn to main body gasket in position on the air horn, then install the float needle valve seats. (Be sure each needle seat and needle is reinstalled in its original position).

Slide the right and left floats into position in the air horn, then install the float fulcrum pins. **(Be sure the marked float is installed on the pump side of the air horn).**

After the floats have been installed, check the float alignment, level and drop settings as follows:

f. Float Alignment Setting

Sight down the side of each float shell to de-

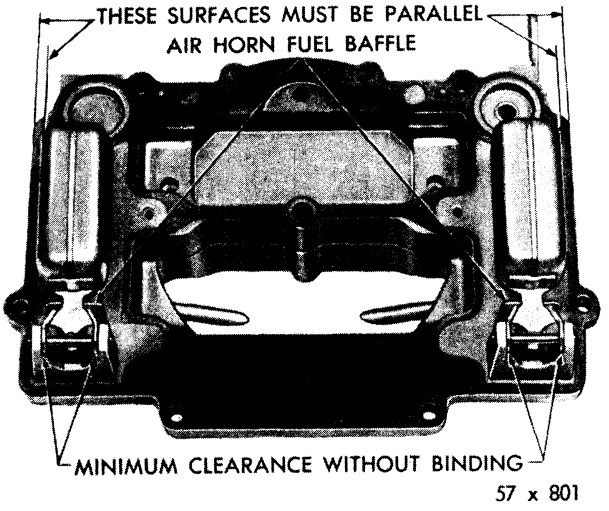


Fig. 41—Checking Float Alignment

termine if the side of the float is parallel to the outer edge of the air horn casting, as shown in Figure 41.

If the sides of the float are not in alignment with the edge of casting, bend the float lever by applying pressure to the end of the float shell with the fingers while supporting the float lever with the thumb. **To avoid damage to the float, apply only enough pressure to bend the float lever.**

After aligning the floats, remove as much clearance as possible between the arms of the float lever and the lugs on the air horn. To do this, bend the float lever. The arms of the float lever should be as parallel as possible to the inner surfaces of the lugs on the casting.

g. Float Level Setting

With the air horn inverted, the air horn gasket in place and the float needle seated, slide float gauge T109-107 (5/16") between the top of the float (at outer end) and the air horn gasket, as shown in Figure 42. Float should just touch gauge.

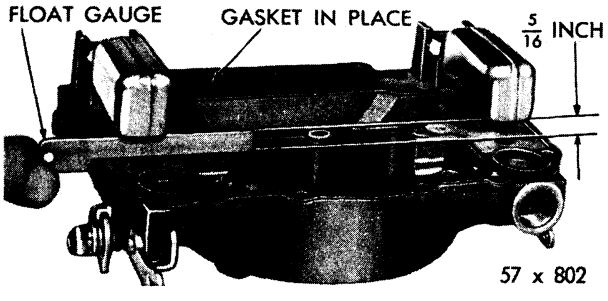


Fig. 42—Checking Float Height with Gauge

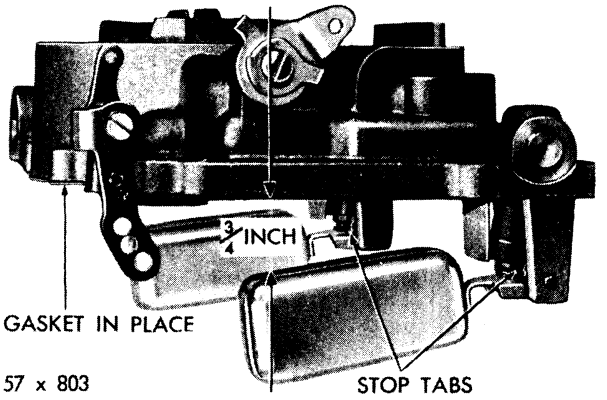


Fig. 43—Checking Float Drop

Check the outer float in the same manner. If an adjustment is necessary, bend the float arm using Tool T109-22, until correct clearance has been obtained. After bending arm, recheck the float alignment.

h. Float Drop Setting

Holding the air horn in an upright position, measure the distance from the top of the floats (outer end) to the air horn gasket as shown in Figure 43. This measurement should be 3/4 inch. If an adjustment is necessary, bend the stop tabs on the float levers until the correct drop setting has been obtained. Bend the tab towards the needle seat to lessen the drop, or away from the seat to increase the drop.

After the floats have been checked and adjusted, continue to assemble the carburetor as follows:

Place the accelerator pump plunger lower spring in the pump cylinder, then lower the air horn carefully down on the main body.

CAUTION

Be sure the fuel baffles on the air horn, slide down in front. (bowl side) of the float chamber baffles, or the air horn will not index correctly with the main body and can cause the floats to hang up.

Be sure the leather on the plunger does not curl or wrinkle. Accelerator pump operation will be affected if this precaution is not observed.

Install the 10 air horn attaching screws and tighten securely. (the two long screws should be installed in the holes that are located at the air cleaner mounting surface. The 1 inch screw at the front and the 1½ inch at the rear).

Slide the step-up piston springs into the piston cylinders, followed by the step-up pistons and step-up rods. Install the cover plates and attaching screws while holding the step-up pistons down in position. Tighten screws securely.

Engage the choke connector rod with the choke shaft lever and the lever at the choke piston housing. Install hairpin clips to secure.

Engage the throttle connector rod with the primary throttle shaft lever, then install hairpin clip. Slide the flatwasher over other end of rod and engage with the accelerator pump arm. Install retainer spring and retainer secure.

Engage the lower end of the fast idle connector rod with the fast idle cam, then swing in an arc to lock in cam. Slide other end of rod into the choke shaft lever and secure with hairpin clip.

The carburetor now has been completely assembled with the exception of the automatic choke housing and heat tube cap. This was done in order to make the choke piston lever adjustment.

25. CARBURETOR ADJUSTMENTS

The following adjustments should be made with the carburetor on the bench for ease of working, and, should be made in the following order:

a. Fast Idle Adjustment

With the choke valve held tightly closed, tighten the fast idle adjusting screw (on the high step of the fast idle cam), until wire gauge Tool T109-200 (.012 inch) can be inserted between the primary throttle valve and the bore (side opposite idle port), as shown in Figure 44. The index mark on the fast idle cam should be in direct line with the fast idle screw shank.

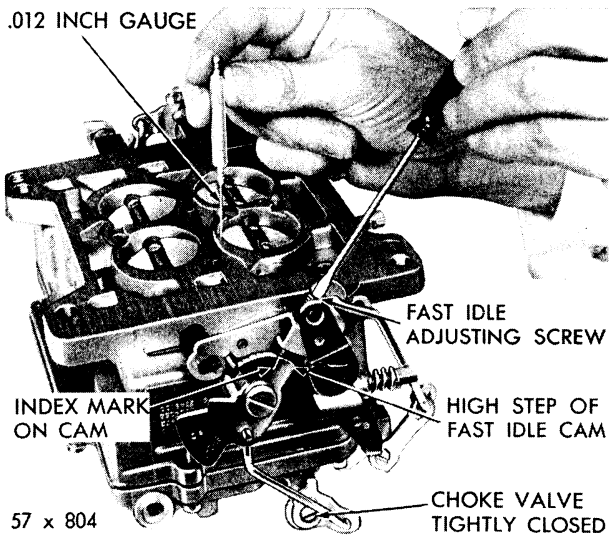


Fig. 44—Checking Fast Idle Adjustment

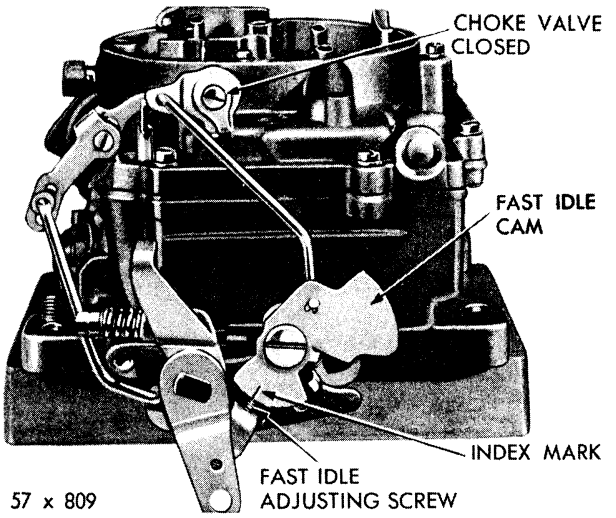


Fig. 45—Checking Fast Idle Indexing

b. Choke Shaft Lever Adjustment

Invert the carburetor and open the throttle valves to wide open position. Close the choke valve tightly and then close the throttle valves. Release the choke valve. This will position the fast idle cam to fast idle. The index mark on the cam should split the center of the fast idle adjusting screw, as shown in Figure 45. If an adjustment is necessary, bend the fast idle connector rod at the angle, using Tool T109-213, until the index mark on the cam indexes the fast idle adjusting screw.

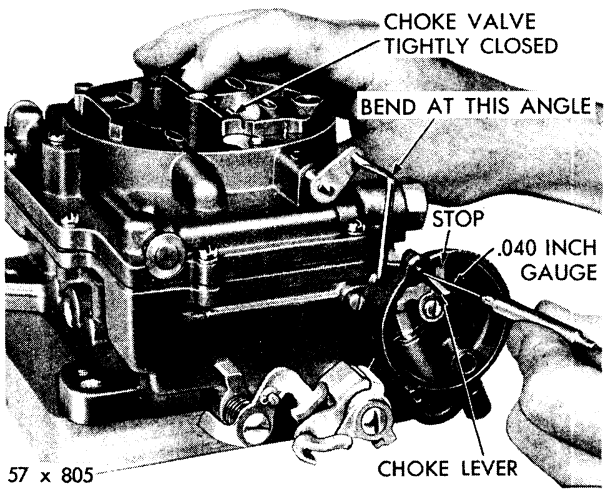


Fig. 46—Checking Piston Lever Adjustment

c. Choke Piston Lever Adjustment

Move the choke valve to the fully closed position. It should then be possible to insert a .040 inch shank or wire gauge, Tool T109-193, between the choke lever and the stop lug in the piston housing, as shown in Figure 46.

If an adjustment is necessary, bend the choke connector rod at the upper angle, using Tool T109-213, until correct clearance has been obtaned. Reinstall baffle plate and gasket. Place the choke thermostatic coil housing against baffle plate and gasket with the index mark pointing straight down. Turn housing clockwise until the index mark on the housing is in line with the first notch rich beyond the center mark on the piston housing. Hold in this position and install heat tube cap and gasket. Be sure the heat tube opening in cap is pointing horizontally toward the rear. Install retaining ring, strap and attaching screws. Tighten securely.

d. Choke Unloader Adjustment

With the throttle valves in the wide open position, it should be possible to insert Tool T109-31 (¼ inch) gauge between the upper edge of the choke valve and the inner wall of the air horn, as shown in Figure 47.

If an adjustment is necessary, bend the unloader lip on the throttle shaft lever, using Tool T109-41 until correct opening has been obtained.

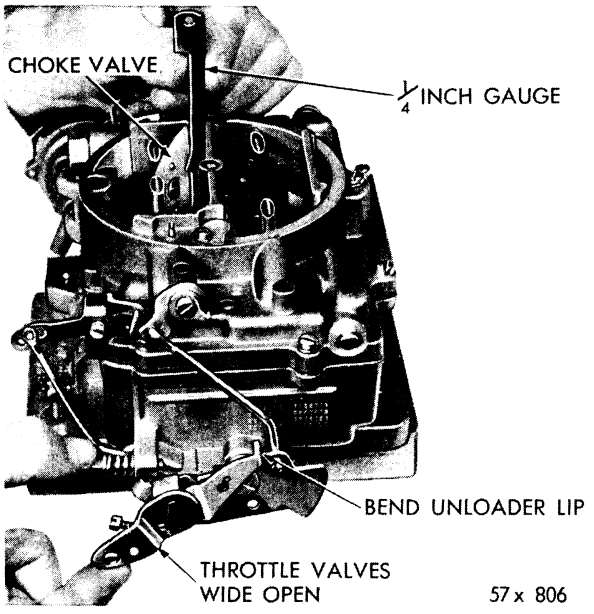


Fig. 47—Checking Choke Unloader Adjustment

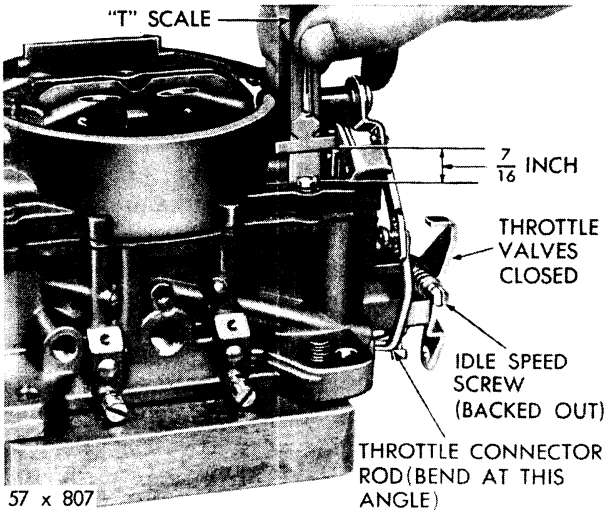


Fig. 48—Checking Accelerator Pump Travel

e. Accelerator Pump Adjustment

Move the choke valve to wide open position, to release the fast idle cam. Back off the idle speed adjusting screw (curb idle) until the throttle valves are seated in the bores.

Measure the distance from the top of the air horn to the top of the plunger shaft, using a "T" scale, as shown in Figure 48. This distance should be 7/16 inch.

If an adjustment is necessary, bend the throttle connector rod at the lower angle, using Tool T109-213, until correct travel has been obtained.

f. Secondary Throttle Lever Adjustment

To check the secondary throttle lever adjust-

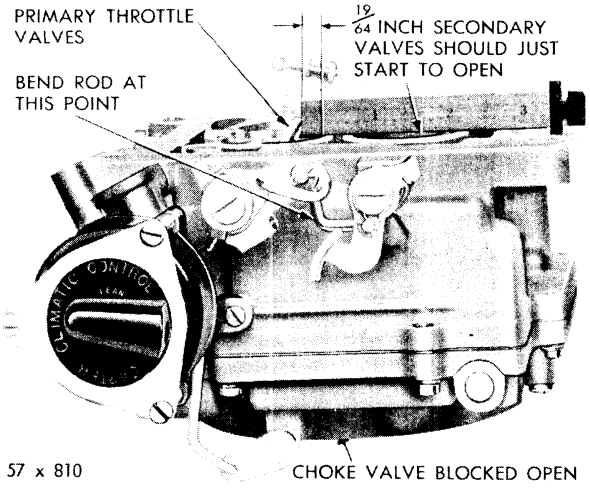


Fig. 49—Checking Secondary Throttle Opening

ment, block the choke valve in the wide open position and invert the carburetor. Slowly open the primary throttle valves until it is possible to measure $^{19}/_{64}$ inch between the lower edge of the primary valve and the bore (opposite idle port), as shown in Figure 49. At this measurement, the secondary valves should just start to open. The stop lugs on both the primary and secondary throttle levers should contact the bosses on the flange at the same time.

If an adjustment is necessry, bend the secondary throttle operating rod at the angle, using Tool T109-213, until correct adjustment has been obtained. At wide open throttle, the primary and secondary throttle valves should reach the full vertical position.

With the primary and secondary throttle valves in the tightly closed position, it should be possible to insert Tool T109-29 (.017 to .022 inch) wire gauge, between the positive closing shoes on the secondary throttle levers, as shown in Figure 50.

If an adjustment is necessary, bend the shoe on the secondary throttle lever, using Tool T109-22, until correct clearance has been obtained.

g. Secondary Throttle Lock-Out Adjustment

Crack the throttle valves, then manually open and close the choke valve. The tang on the secondary throttle lever should freely engage in the notch of the lock-out dog.

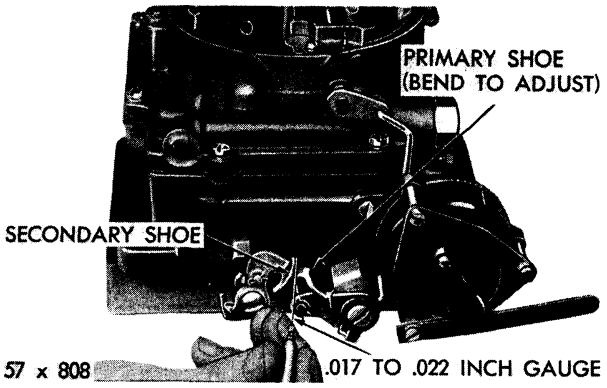


Fig. 50—Checking Clearance between Closing Shoes

If an adjustment is necessary, bend the tang on the secondary throttle lever, until engagement has been made. Use Tool T109-22 for this operation.

After adjustments have been made, reinstall carburetor on engine, using a new gasket.

It is suggested that the carburetor bowl be filled with clean gasoline. This will help prevent dirt that is trapped in the fuel system, from being dislodged by the free flow of fuel, as the carburetor is primed.

SERVICE DIAGNOSIS

26. POOR IDLING

a. Tighten main to throttle body screws.
b. Check and adjust float level.
c. Install new idle mixture needles.
d. Install new throttle shaft or body.
e. Clean idle discharge holes.
f. **Clean carburetor and idle bleed.**

27. POOR ACCELERATION

a. Clean accelerator pump by-pass jet.
b. Install new accelerator pump.
c. Clean accelerator pump discharge cluster.
d. Clean vacuum piston and cylinder.
e. Install new accelerator pump inlet check valve.
f. Check and reset float level.
g. Install needle valve and seat.
h. Install new throttle linkage.
i. Check and readjust choke.

28. CARBURETOR FLOODS OR LEAKS

a. Install new main body if required.
b. Install new air horn to main body gasket.
c. Check and adjust float level.
d. Install new fuel inlet needle valve and seat.
e. Check fuel pump pressure and install new pump if necessary.

29. POOR PERFORMANCE—(mixture too rich)

a. Replace air cleaner element (paper).

b. Install new floats.

c. Check float level and adjust if necessary.

d. Check fuel pump pressure and install new pump if necessary.

e. Install new main metering jets.

f. Check manifold heat control valve.

EXHAUST SYSTEM

The LC-1 Model (Single rocker shaft engine) exhaust system consists of exhaust and intake manifolds, heat control valve, "Y" exhaust extension pipe muffler, and tail pipe, as shown in Figure 51.

The LC-2 Model (single rocker shaft engine) and the LC-3 (double rocker shaft engine) exhaust system is dual exhaust system which consists of exhaust and intake manifolds, heat control valve, two exhaust pipes, two exhaust mufflers and two tail pipes, as shown in Figure 52.

The exhaust system of the Imperial Models is a dual system with four mufflers, as shown in Figure 53.

The Manifold Heat-Control Valve Housing is now cast integral with the Right Exhaust Manifold on all models.

SERVICE PROCEDURES

30. INTAKE AND EXHAUST MANIFOLDS (All Models)

Figures 54 and 55 show intake manifold and cross-over passages.

a. Removal of the Intake Manifold

Remove air cleaner, drain radiator. Remove

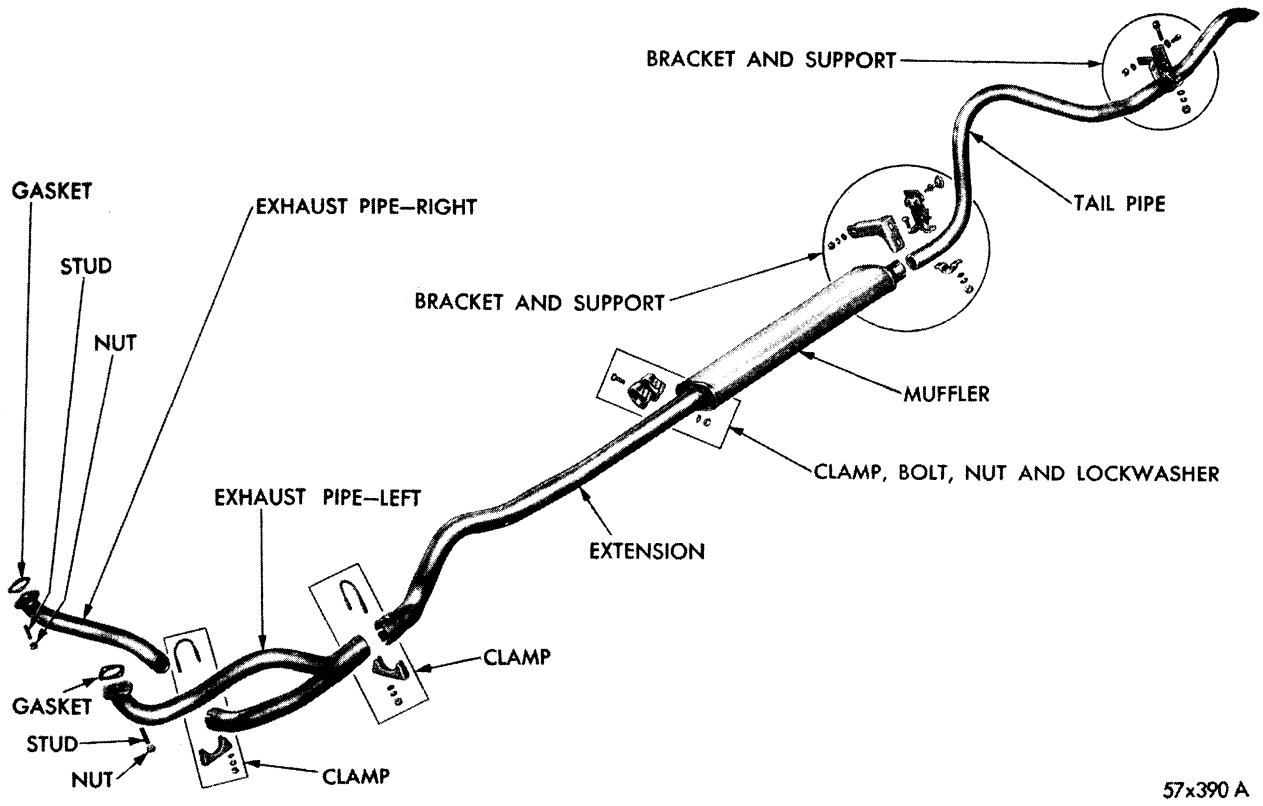


Fig. 51—Exhaust System (Single Rocker Shaft Engine Model LC-1)

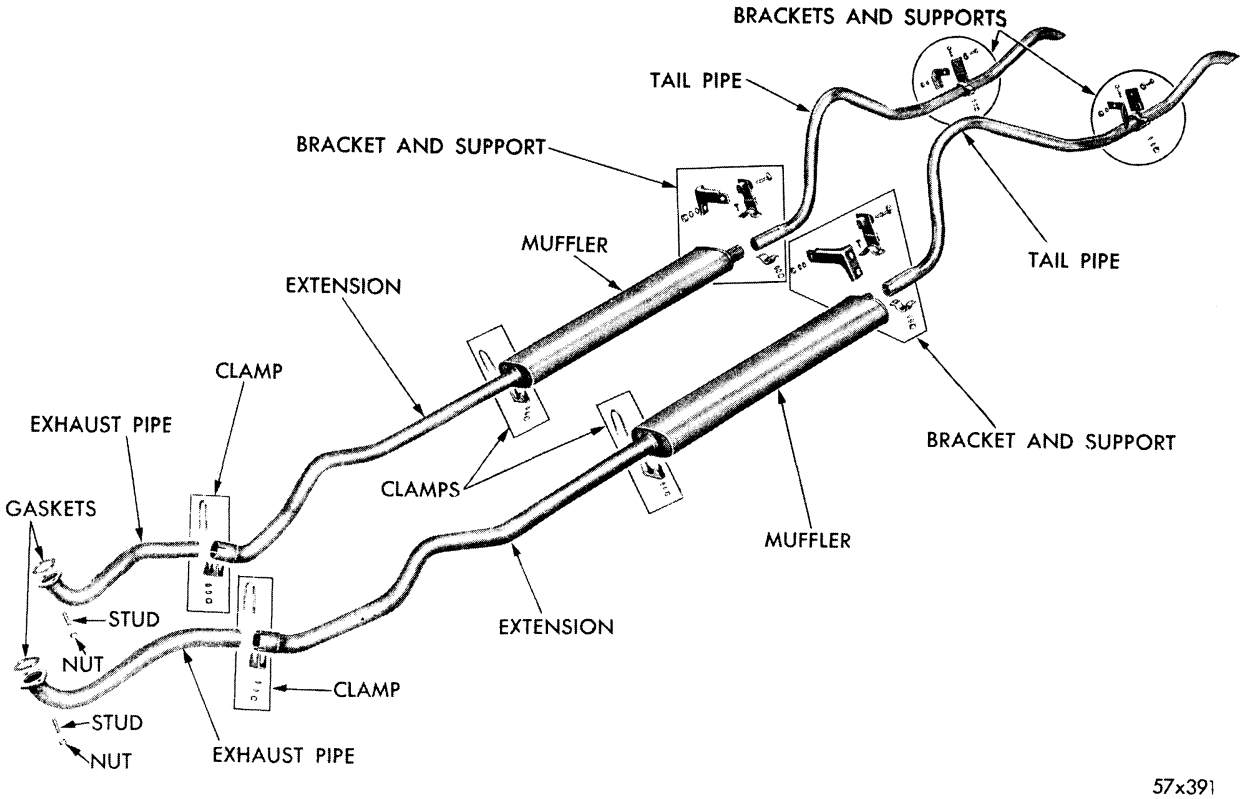


Fig. 52—Dual Exhaust System (Models LC2, LC3)

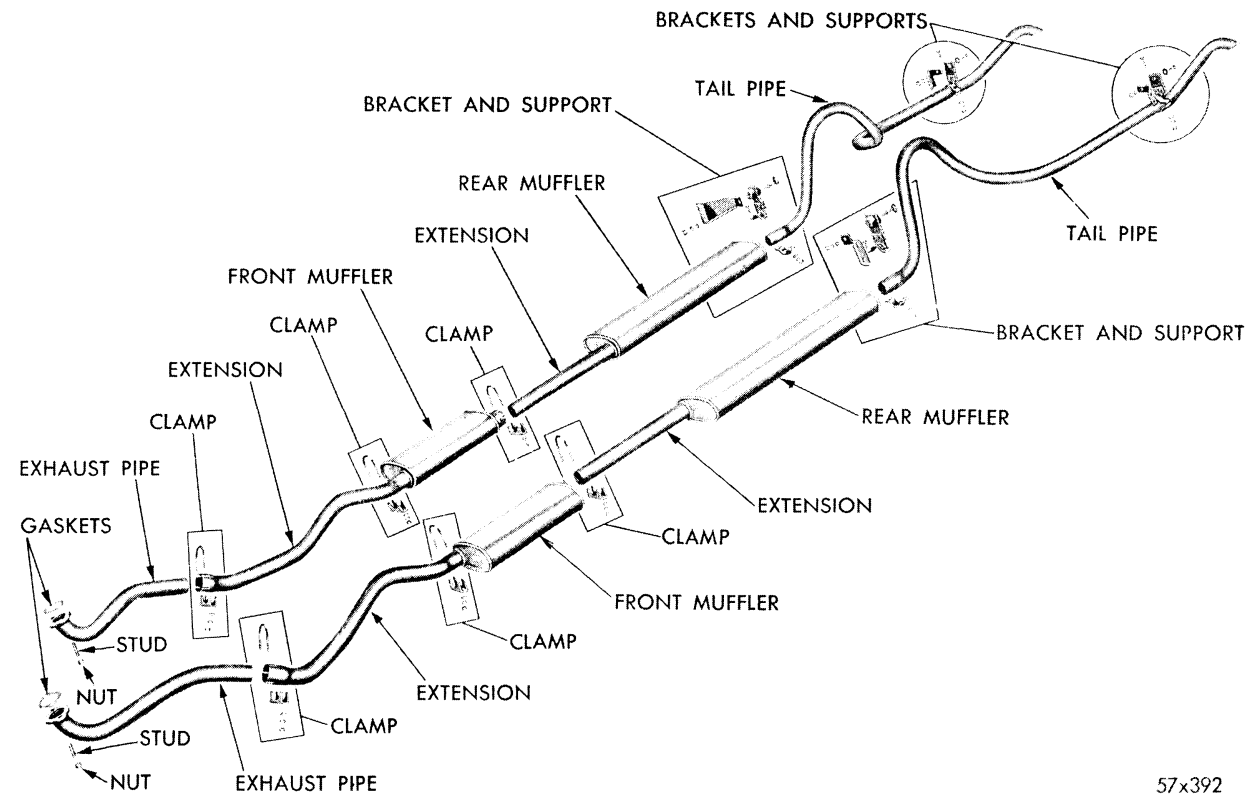


Fig. 53—Dual Exhaust System (Model LY1)

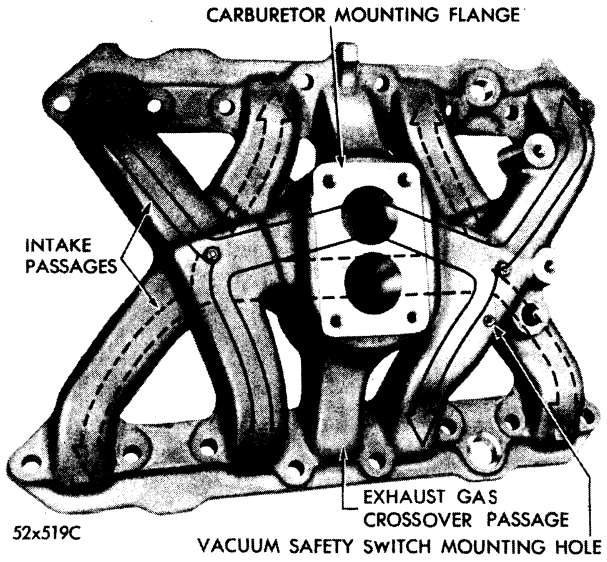


Fig. 54—Intake Manifold (LC1 Engine Only)

generator and disconnect carburetor linkage. Disconnect power brake vacuum line at manifold (if so equipped). Disconnect distributor vacuum advance line and fuel line at carburetor. Disconnect automatic choke heat tube at carburetor. Disconnect wires at coil. Remove bolts holding intake manifold to cylinder head. Remove intake manifold.

NOTE: If car is equipped with air conditioning, remove bracket from intake manifold to compressor.

b. Removal of Left Side Exhaust Manifold

Remove nuts and bolts that hold exhaust pipe to manifold flange. Remove and discard gasket.

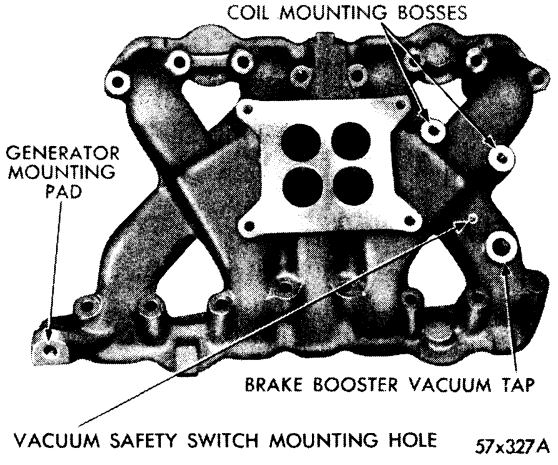


Fig. 55—Intake Manifold (LC2, LC3, LY1)

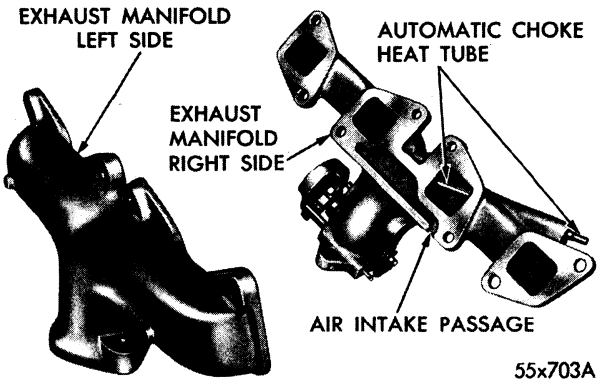


Fig. 56—Exhaust Manifold (All Models)

Remove exhaust manifold retaining nuts, slide manifold off studs out and away from cylinder head.

Use care when removing manifold attaching nuts and bolts, because constant heating and cooling of manifolds may have caused them to freeze. Lubricate with a good grade of penetrating oil and allow to stand for several minutes before attempting removal.

c. Removal of Right Side Exhaust Manifold

Remove automatic integral choke heat tube from exhaust manifold. (Be careful not to bend tube when removing.) Remove bolts and nuts that hold exhaust pipe to exhaust manifold flange. Discard gasket. Remove oil filter cover and element. Remove bolt and clamp that hold ground cable and heat tube to cylinder head. Remove nuts that hold exhaust manifold to cylinder head, loosen front engine mount nuts and jack up engine to slide manifold off studs and away from cylinder head.

NOTE: On all cars, exhaust pipe to transmission clamp and brackets have been eliminated so be sure exhaust pipe is sufficiently supported before removing exhaust pipe from exhaust manifold.

31. INSPECTION OF INTAKE AND EXHAUST MANIFOLDS (All Models)

Clean intake and exhaust manifolds in solvent; blow dry with compressed air. Inspect manifolds for cracks, distortion, or any other condition which would make them unfit for further service.

Particular attention should be given to "Hot

spot" chamber in intake manifold. If chamber is coated with hard black carbon, it must be scraped or sand blasted to remove deposit. The layers of carbon act as an insulator and retard heating action of exhaust gases on "hot spot" chamber which, in turn, affects vaporization rate of fuel passing through intake manifold.

When inspecting exhaust manifolds, be sure to check choke heat tube cavity inlet passage. The passage and cavity must be clean and free from any obstructions. (See Fig. 56). New gaskets should be used when installing exhaust and intake manifolds and all mating surfaces must be clean and smooth.

32. EXHAUST PIPES, MUFFLERS AND TAIL PIPES

The exhaust system normally requires little service. The system should be checked periodically for leaking gaskets, broken supports or insulators and burned or blown out muffler or pipes. The exhaust pipe, muffler, and tail pipe are mounted by hangers which are insulated to isolate vibration. A support, with a special clamp and hanger supports tail pipe at rear of muffler, while another clamp and support mounted on rear of frame supports rear of tail pipe. The front support is adjustable.

33. EXHAUST SYSTEM (All Models)

When servicing exhaust system, it is rather difficult to remove clamps and disconnect pipes because of rust, dirt, or other foreign matter which has adhered to these parts. Lubricate nuts and bolts, which are to be removed, with a good grade of penetrating oil and wait several minutes before attempting removal. Hit connecting clamp several sharp bows with a soft hammer if clamps are rusted to pipes.

34. REMOVAL

a. Cross-Over Exhaust Pipe

Refer to Fig. 51 and proceed as follows:

Remove clamp bolt from clamp at "Y" pipe and cross-over pipe connection. Remove bolts from left-hand exhaust manifold flange. Discard gasket. Remove cross-over pipe.

b. "Y" Exhaust Pipe

Remove clamp bolt from clamp connecting "Y" pipe and exhaust pipe. Remove bolts from right-hand exhaust manifold flanges, discard gasket. **On all cars be sure the exhaust system is sufficiently supported.** Remove "Y" pipe.

c. Muffler

Loosen or remove clamp bolts at exhaust pipe to exhaust extension pipe and muffler assembly. Remove muffler and extension pipe assembly.

d. Tail Pipe

Remove clamp bolt from front tail pipe bracket. Remove clamp bolt from rear tail pipe bracket. Jack up frame to relieve body weight from rear springs, remove tail pipe.

NOTE: In most instances where clamps are used, they will have to be spread before pipes can be removed.

35. INSTALLATION

When installing components of exhaust system start at exhaust manifolds and work toward rear until muffler is to be installed. Position tail pipe, install muffler. If entire exhaust system, or any component of it is being replaced, clamps and brackets should be tightened only to extent necessary to hold exhaust system in position. The final tightening is done after system has been properly aligned.

36. DUAL EXHAUST SYSTEM

The dual exhaust system is standard equipment on the LC2-LC3 models.

The service procedure for dual exhaust system (removal, installation and alignment) will be comparable to exhaust system for the LC-1 with following exceptions.

In dual exhaust system, cross-over and "Y" exhaust pipes are not used; there is an individual exhaust pipe, muffler and exhaust extension pipe and tail pipe for each cylinder bank. (Refer to Fig. 52).

37. ALIGNMENT OF EXHAUST SYSTEMS

Figs. 51, 52, and 53 illustrate various types of supports, insulators and clamps with procedures as follows:

Tighten exhaust manifold flange studs and nuts evenly, 40 foot-pounds torque. Install muffler and tail pipes and leave clamp bolts loose in order to align entire system. Check muffler

and tail pipes so that clearance of ½ inch is maintained between frame, floor pan, bumper, shock absorber and fuel tank. Tighten all clamp bolts and brackets to 20 foot-pounds torque.

MANIFOLD HEAT CONTROL VALVE

The manifold heat control valve, as shown in Fig. 57, is controlled by a thermostatic coil counterweight, and velocity of exhaust gas through exhaust manifold. The thermostatic coil is installed in a manner which will maintain sufficient tension on valve shaft to keep valve in closed position when engine is cold.

In closed position, hot gases circulate up and around "hot spot" chamber in intake manifold. This, in turn, preheats vaporized fuel passing down through manifold, resulting in smooth engine performance.

NOTE: Should heat control valve become stuck in either open or closed position car performance would be affected.

38. TESTING MANIFOLD HEAT CONTROL VALVE

Inspect operation of heat control valve periodically. With engine idling (car standing) accelerate to wide open throttle and release quickly. The counterweight should respond by moving clockwise approximately ½ inch and returning to its normal position. If no movement is observed, the valve shaft may be frozen or the coil is weak or broken. In either case, heat control valve should be disassembled and replaced with new parts.

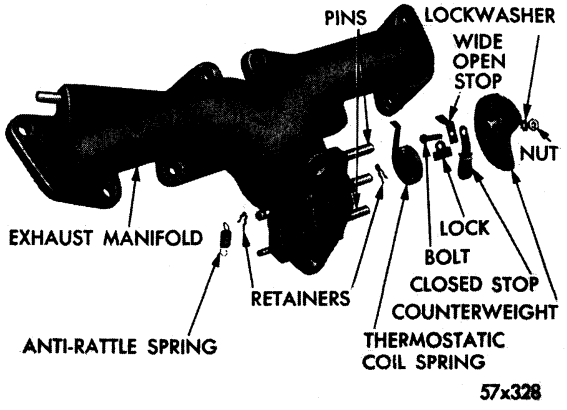
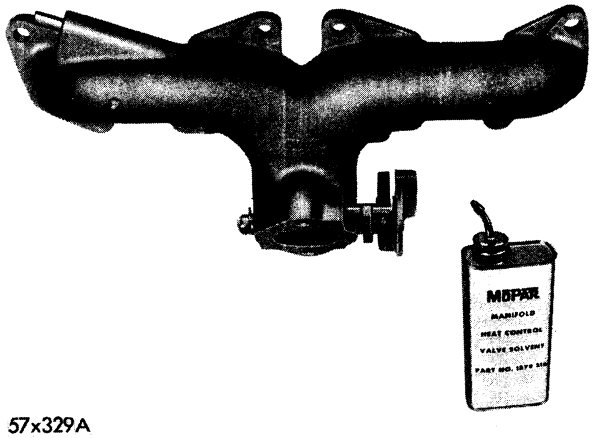


Fig. 57—Manifold Heat Control Valve



57x329A

Fig. 58—Servicing the Valve Shaft

a. Disassembly (Fig. 57)

Loosen retaining nut and remove counterweight, lock and stop from end of shaft, exposing the thermostatic coil. Unhook coil from pin and remove by prying out of valve shaft slot. If valve shaft is frozen in manifold, apply Mopar Manifold Heat Control Valve Solvent Part No. 1879318 to both ends of shaft as shown in Figure 58, and allow to stand several minutes. Loosen by turning shaft clockwise or counter-clockwise (depending on frozen position) until shaft is free. Work shaft from closed to open position several times until shaft can be turned very easily with fingers.

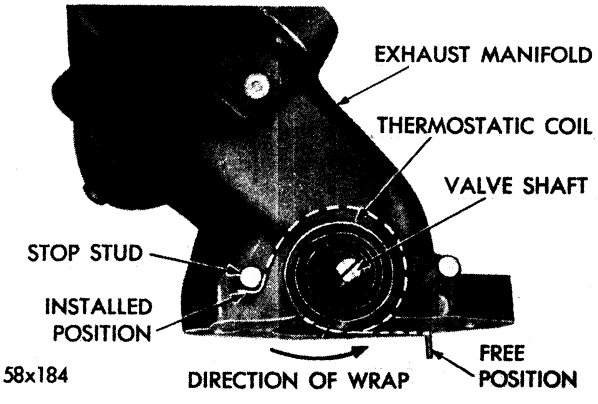


Fig. 59—Positioning the Thermostatic Coil

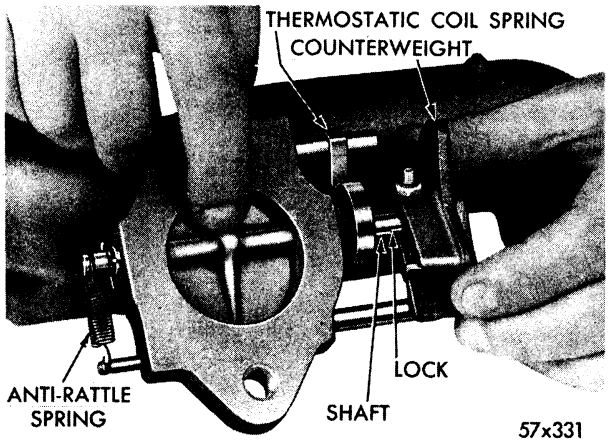


Fig. 60—Installing the Heat Control Valve Counterweight

b. Assembly

Position valve shaft in extreme counter-clockwise position. Place the new coil in position over shaft slot, with outer end tongue of coil in lower right-hand position, as shown in Figure 60. Press inner end of coil into slot of shaft and seat firmly.

Move outer end tonque around and hook under pin, as shown in Fig. 59. Place counterweight over shaft (with weight in upward position) and insert lock in shaft slot, as shown in Fig. 60. Center counterweight on shaft and turn assembly clockwise until stop passes the pin. Press counterweight on shaft until seated, install stop, and tighten nut securely with Tool T-109-173. Test valve for proper operation.

c. Servicing

The manifold heat control valve should be checked for proper operation at all lubrications and engine tune-up. See Lubrication, Section XV.

SERVICE DIAGNOSIS

39. EXCESSIVE EXHAUST NOISE

a. Check for leaks.

b. Check system for bind. Loosen all hangers and test car by driving.

c. Check complete exhaust system for sign of failure, repair as required.

d. Install new gaskets as required after checking exhaust manifold for distortion. Be sure manifold registers evenly with cylinder head. Tighten nuts to 25 foot-pounds torque.

e. Install new gasket after checking flange for cracks or foreign material that will not allow gasket to seat properly. Tighten bolts evenly.

f. Remove exhaust manifold and check mating surfaces. Place manifold on smooth surface and check mating flanges for alignment. If manifold shows sign of distortion (more than .010 inch), install new manifold and gaskets.

g. Tighten clamps or replace as necessary.

40. LEAKING EXHAUST GASES

a. Locate leak and correct.

b. Install new manifold and gaskets, if necessary.

c. Check complete system for alignment and adjust as required. A leaking connection will be indicated by black streaks along pipes.

d. Install new muffler and tail pipes if needed. Check alignment of exhaust pipes, muffler and tail pipe. Align as necessary.

e. Remove manifold and install new gaskets if necessary, after carefully inspecting both cylinder head and manifold mating surfaces. Tighten manifold nuts and bolts evenly, working from center to outer ends of manifold.

f. Check for bent or pinched exhaust or tail pipes. Such conditions will retard the flow of exhaust gases. Install new parts as required. If excessive amount of carbon is present or if car is sluggish, install new muffler.

g. Tighten clamp at rear muffler connection.

41. ENGINE HARD TO WARM UP

Check operation of heat control valve and make necessary repairs.

42. MANIFOLD HEAT CONTROL VALVE RATTLE

a. Check for broken thermostatic spring and make necessary correction.

b. Check for weak or broken anti-rattle spring and make necessary repairs or replacement.

c. Check shaft for looseness in body and correct condition as necessary.