Section VIII
FUEL AND EXHAUST SYSTEMS
CONTENTS

DATA AND SPECIFICATIONS

Item	C-71	C-71, C-72, C-73, C-70
FUEL PUMP		
Make	Carter	Carter
Model		
Up to Cars	M 961 S	M 961 S
After Cars	M 2413 S	M 2413 S
Type	Mechanical Diaphragm	Mechanical Diaphragm
Driven By	Camshaft	Camshaft
Pump Pressure (pounds)	6 to 7	6 to 7
CARBURETOR		
Make	Ball and Ball	Carter
Type	Dual Thrust Downdraft	4 Barrel Downdraft

Item	C-71	C-71, C-72, C-73, C-70
Model		
Standard Transmission	BBD—2312S	———
PowerFlite	BBD—2313S	WCFB 2314SA or WCFB 2367SA
Nominal Size	———	1⅛" 4 Bore 4 Bolt
ADJUSTMENTS		
Idle Mixtures (both screws)	One Full Turn Open	One Full Turn Open
Idle Speed	500 r.p.m.	500 r.p.m.
Accelerator Pump	31/32—1/64 inch	Long Stroke
Float Setting (Casting to top of floats)		
Primary	¼ inch	⅛ inch
Secondary	———	3/16 inch
Float travel	———	½" ± 1/16 inch
Unloader	3/16 inch	3/16 inch
Fast Idle	.020 inch	.018 inch
CHOKE ROD ADJUSTMENT	———	.020 inch
CHOKE		
Control	Integral Automatic	Integral Automatic
Setting	Index Mark	(Std. Setting) 1 notch rich

SPECIAL TOOLS
FUEL PUMP

C-483	Gauge
T-109-43	Rivet Extractor

SPECIAL TOOLS
CARBURETOR

C-3225	Stand, Carburetor Repair
C-3400	Stand, Carburetor Repair
T-109-22	Bending Tool, Fast Idle Cam Adjustment
T-109-31	Gauge, Unloader (¼ inch)
T-109-41	Bending Tool
T-109-44	Wire Gauge, Fast Idle (.015 inch)

SPECIAL TOOLS (Cont'd)

T-109-58	Bit, Screwdriver
T-109-193	Gauge, Wire (.040 and .054 inch)
T-109-197	Gauge, Bowl Vent Cap
T-109-200	Gauge, Wire (.010 and .012 inch)
T-109-214	Bending Tool
T-109-282	Gauge, Float Setting
T-109-283	Gauge, Float Level (7/32")
T-109-236	Gauge Float Level (5/32")
T-109-237	Thickness (.005 inch)

Section VIII
FUEL AND EXHAUST SYSTEM
FUEL PUMP

Two different Carter fuel pumps are used on the Chrysler 1956 Models. Carter fuel pump number M 961 S is used on all models from start of production "up to" cars. A Carter fuel pump number M 2413 S is used on all models "after" cars. The service procedures covering these two pumps are identical. These pumps have different housings internally, (the latter having a greater capacity), but may be identified internally by the difference in shape of rocker arm, as shown in Figures 1 and 2.

The fuel pumps are driven by an eccentric on the camshaft, which actuates the rocker arm. This action lifts the pull rod and diaphragm assembly upwards against main spring, thus creating a vacuum in the valve housing, which opens the inlet valve and fuel is drawn into valve housing chamber from the 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 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 the carburetor requires more fuel.

As the engine consumes fuel the float level in the carburetor bowl drops and needle valve

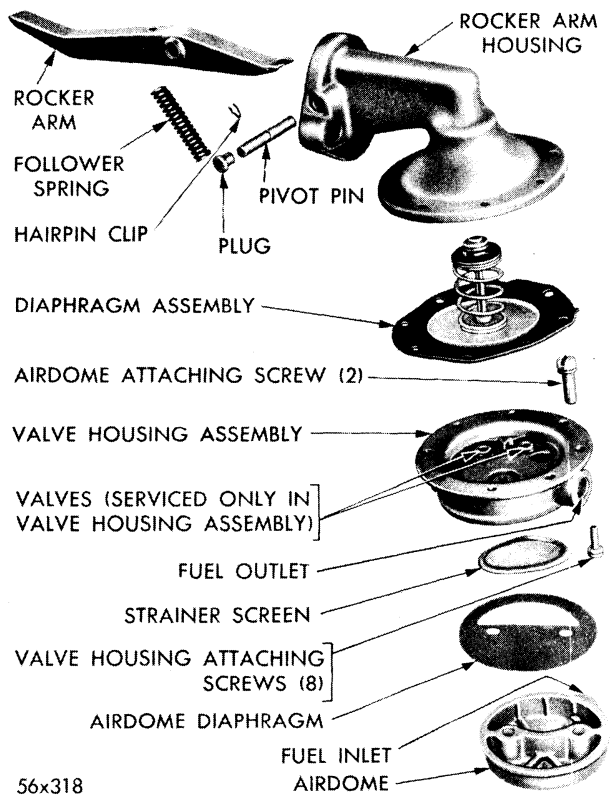


Fig. 1—Fuel Pump (Exploded View Model M 961 S)

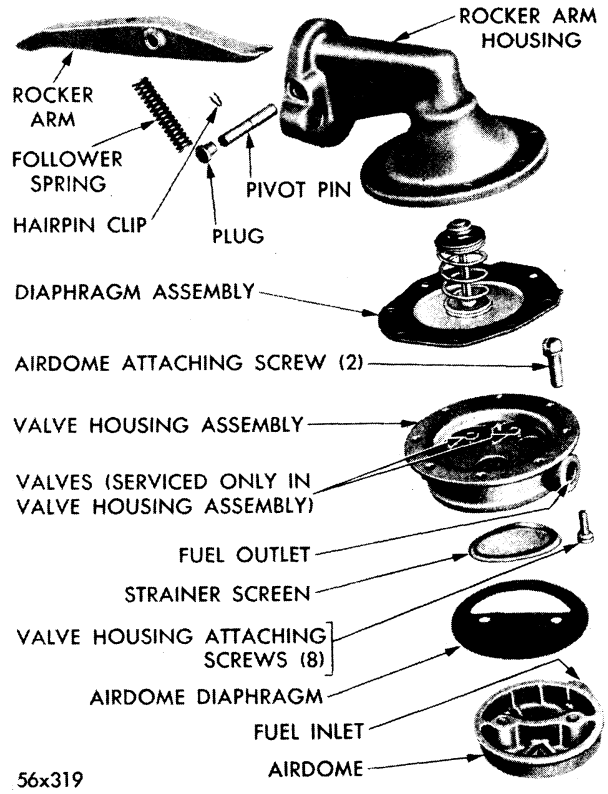


Fig. 2—Fuel Pump (Exploded View Model M 2413S)

opens to admit fuel into float chamber, this 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 deteriorated or damaged oil seal on the diaphragm pull rod. In either case, the diaphragm assembly should be replaced.

c. Fuel Pump Pressure

If leakage is not apparent at fuel pump breather hole, test fuel pump pressure by inserting "T" fitting into fuel line at carburetor. Connect pressure gauge, Tool C-483, to "T" fitting and check fuel pump pressure while rotating the engine.

Fuel pump pressure should be from 6 to 7 pounds. This pressure should remain constant, or return to zero very, very slowly when engine is stopped. An instant drop to zero on the testing gauge indicates that outlet valve is leaking. Inlet and outlet valves are not serviceable. If necessary, replace the complete valve housing assembly.

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

2. INLET VALVES

To test the inlet valves for proper functioning, disconnect fuel line to fuel pump and start engine, or turn engine with starting motor. Place finger over inlet fitting of fuel pump while engine is turning. There should be a noticeable suction—not alternated by blow-back—at this point. If blow-back is present, one or both inlet valves are not seating properly. The inlet and outlet valves are not serviceable. If necessary, replace the complete valve housing assembly.

Additional Checks

Check for leakage at fuel pump diaphragm which might be caused by loose mounting screws. 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. Service as outlined in Paragraph 4.

SERVICE PROCEDURES

3. SERVICING THE FUEL PUMP

Should it become necessary to disassemble the fuel pump for installation of new parts, refer to Figures 1 and 2, and proceed as follows:

Before disassembling the fuel pump, mark housings and air dome in such a manner that they may be reassembled with inlet and outlet fitting holes in correct location.

Remove rocker arm follower spring by prying up and over dimple in housing. Remove pivot pin plug, using plug removing Tool T-109-43. Remove hairpin clip from groove in pivot pin. Remove pin and slide rocker arm out of rocker arm housing.

Remove screws that hold valve housing to rocker arm housing. Separate housings and remove diaphragm assembly. Remove screws that attach air dome to valve housing. Separate dome from housing.

4. CLEANING AND INSPECTION

Clean all parts (except diaphragms) in solvent, then blow dry with compressed air. Examine diaphragm for cracks, torn screw holes or ruptures. Check condition of rubber oil seal on pull rod. If deteriorated, install new diaphragm and pull rod assembly. Check strainer screen in bottom of valve housing. If corroded or clogged, install new screen. Check rocker arm for wear or scoring on portion that contacts eccentric on camshaft. If arm is scored or worn, install new rocker arm.

The component parts of inlet and outlet valves are not available for service. If new valves are required, install new valve housing assembly.

5. ASSEMBLING THE FUEL PUMP

To reassemble fuel pump, refer to Figures 1 and 2, proceed as follows:

NOTE

When reassembling the fuel pump do not use shellac or other adhesive on either of the two diaphragms.

Install strainer screen in position in valve body. Place rubber diaphragm over air dome with the cut-out portion over strainer. (Be sure the inlet fitting hole is in correct position under cut-out in diaphragm). Install screws and tighten securely.

Place diaphragm assembly over valve body, then align screw holes. Lower rocker arm housing down on diaphragm. Align screw holes. Check for positioning marks. Compress slightly and tighten screws alternately. Install rocker arm with slot directly under pull rod washer and gasket. Slide pivot pin through housing and lever until centered. Install hairpin clip and plug. Place end of follower spring over tang in lever, compress slightly and slide over dimple in housing.

SERVICE DIAGNOSIS

6. FUEL PUMP LEAKS—FUEL

a. Tighten loose housing screws.

b. Install new diaphragm.

c. Tighten loose inlet or outlet fuel fittings.

7. FUEL PUMP LEAKS—OIL

a. Install new diaphragm.

b. Tighten fuel pump mounting bolts.

c. Install new pump to block gasket.

8. 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.

9. FUEL PUMP NOISE

a. Tighten fuel pump mounting bolts.

b. Install new rocker arm.

c. Install new rocker arm follower spring.

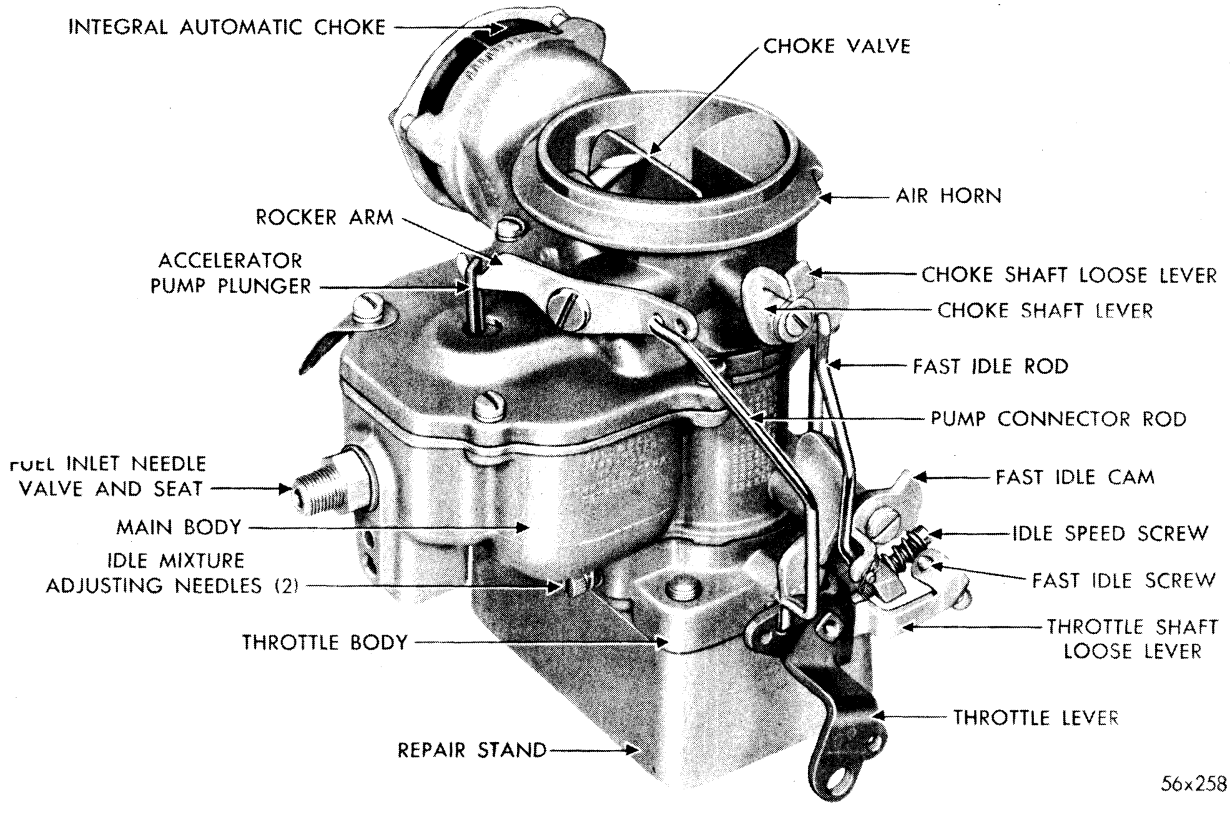


Fig. 3—Carburetor Assembly (BBD-2312 S)

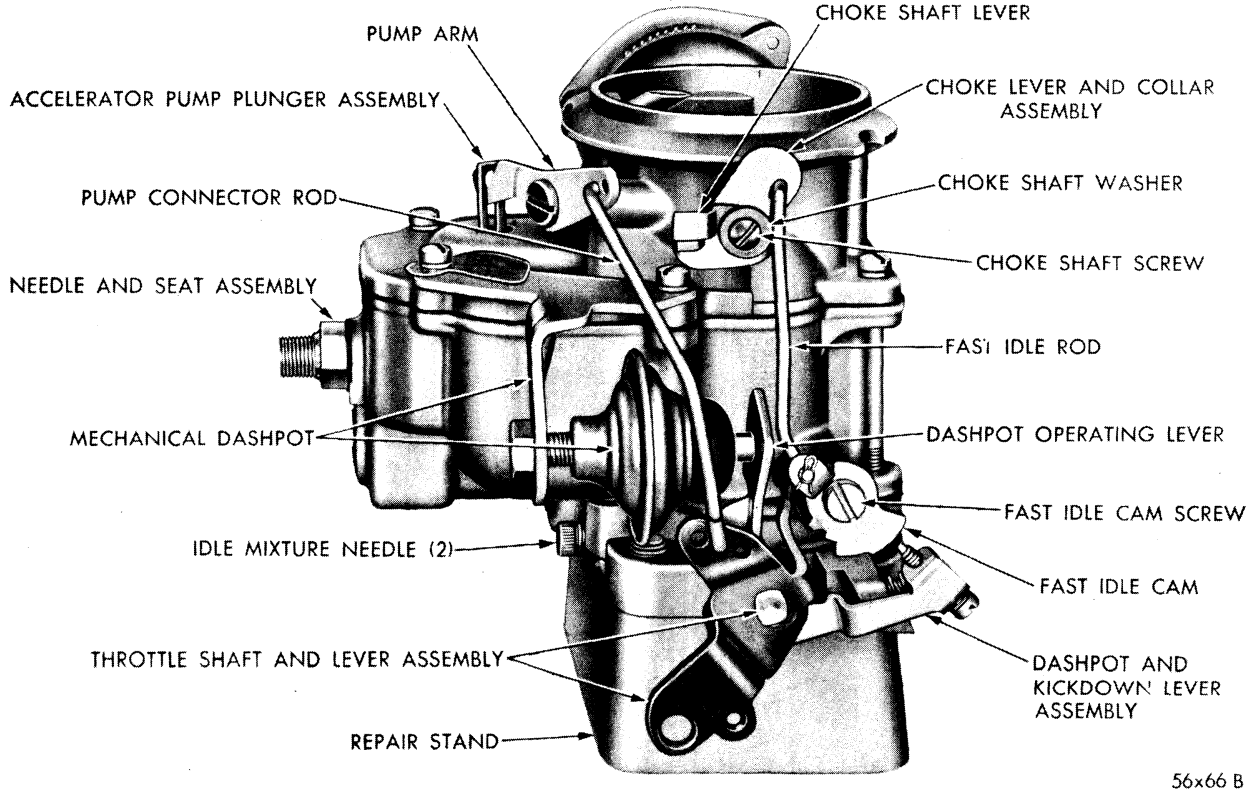


Fig. 4—Carburetor Assembly (BBD-2313S)

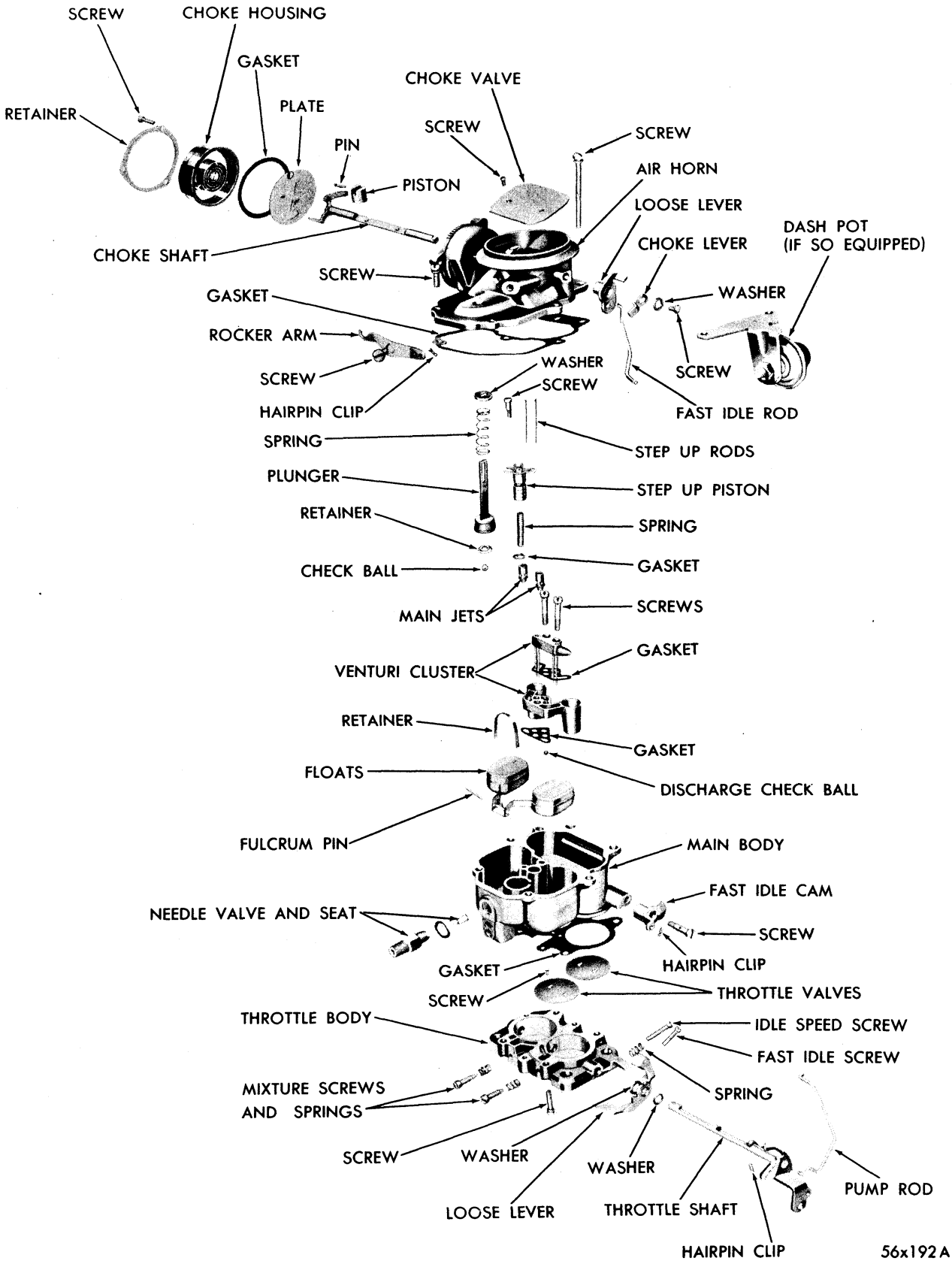


Fig. 5—Carburetor Assembly (Disassembled View) (BBD-2312 & 2313 S)

CARBURETORS
MODELS BBD-2312S AND BBD-2313S

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

Incorporated in carburetor is the automatic integral choke, of hot air type; cast with air horn and connected to choke and throttle shafts through series of rods, levers and fast idle mechanism.

10. 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 overhaul carburetor, refer to model number and secure a repair kit for number indicated on tag.

There are two models of Ball and Ball (BBD) series carburetor used on the V-8 engine, depending on type of transmission with which car is equipped. The same basic design applies to these two carburetors regardless of adaption. (Refer to Specifications for detailed information.)

Model BBD-2312S, is used when car is equipped with Standard Three Speed Transmission only (See Fig. 3).

Model BBD-2313S, is used when car is equipped with PowerFlite Transmission. (This carburetor is equipped with the mechanical dashpot). (See Fig. 4).

The service procedures for disassembly, overhaul, cleaning and assembly of these carburetors are the same, with exception of the dashpot.

SERVICE PROCEDURES

11. REMOVAL OF CABURETOR 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 dashpot can be serviced without removing carburetor from engine.

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

When overhauling carburetor, several items of importance should be observed to assure a good job. The carburetor must be disassembled, all parts carefully cleaned in suitable solvent, such as, "Metalclene" or equivalent. Inspect all parts for damage or wear. Replace questionable parts with **New** ones. When checking parts removed from carburetor, it is at times, rather difficult to be sure they are satisfactory for further service. It is therefore recommended, that in such case, **New** parts be installed.

12. CARBURETOR DISASSEMBLY

To disassemble carburetor for cleaning or overhaul, refer to Figures 3, 4, and 5 (depending

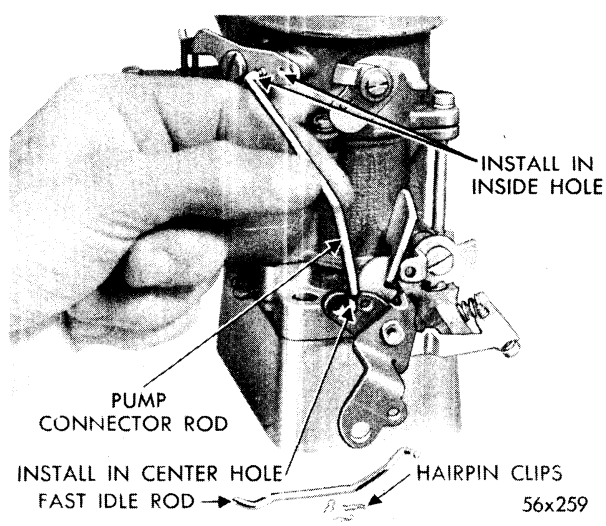


Fig. 6—Removing or Installing Fast Idle and Pump Connector

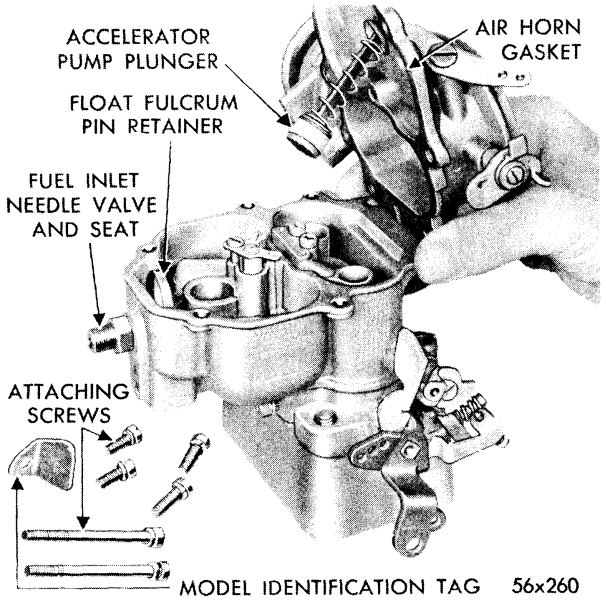


Fig. 7—Removing or Installing Air Horn

upon the model of carburetor), and proceed as follows:

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 dashpot (if so equipped). Remove hair pin clips that retain fast idle and pump connector rods, then disengage from the choke and throttle levers, as shown in Figure 6.

Remove air horn and integral automatic choke, as shown in Figure 7. Discard gasket. Remove fuel inlet needle valve, seat, gasket and float fulcrum pin retainer. Lift out floats, as shown in Figure 8.

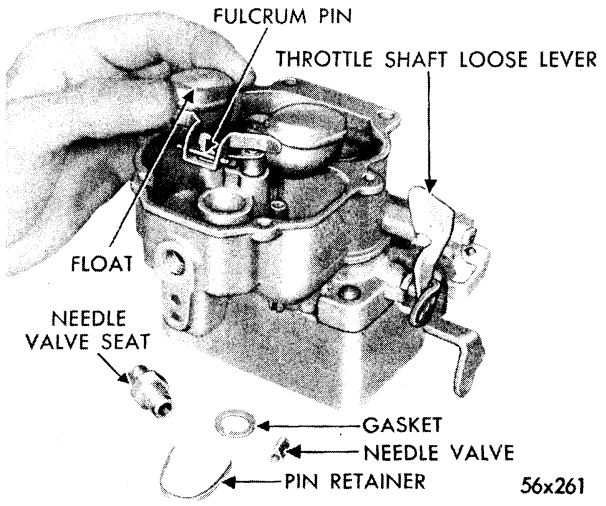


Fig. 8—Removing or Installing Float

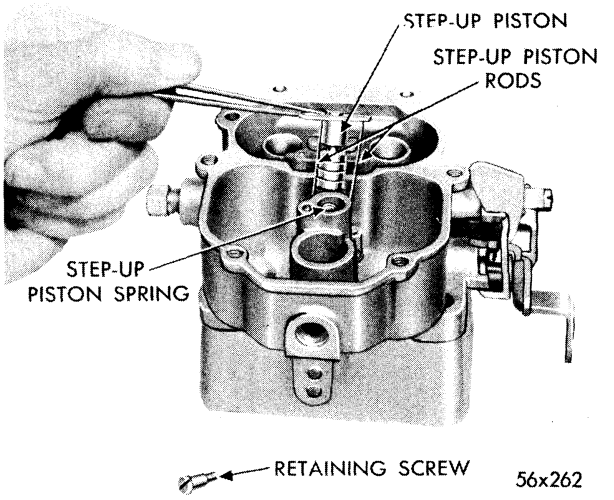


Fig. 9—Removing or Installing Step Up Piston and Rods

Remove step-up piston plate screw, lift step-up piston and rods up out of carburetor bowl, as shown in Figure 9. Remove step-up piston spring and gasket from piston cylinder.

Remove main metering jets and gaskets, as shown in Figure 10. Remove vented screws that attach venturi cluster to main body. Lift cluster up and away from carburetor, as shown in Figure 11. 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 be cleaned in solvent and dried with compressed air. The discharge cluster is serviced **only** as

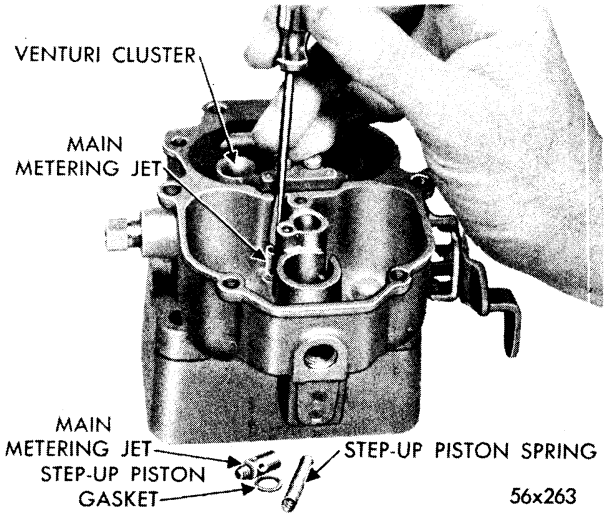


Fig. 10—Removing or Installing Main Metering Jets

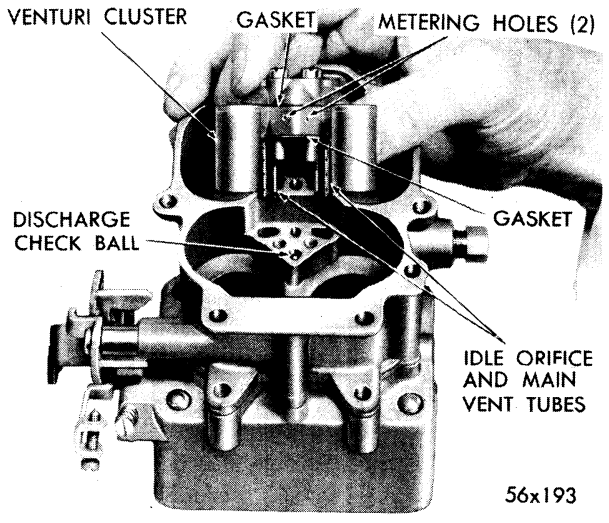


Fig. 11—Removing or Installing Venturi Cluster

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 12. If pump plunger leather is worn, hard or cracked, a new pump plunger should be installed at reassembly. Place plunger in a jar of clean gasoline or kerosene to prevent leather from drying out.

Remove screws that attach the thermostatic coil spring housing to air horn. Remove coil spring housing, spring, gasket and baffle plate, as shown in Figure 13. Using a file or other suitable tool, remove staking portion of screws

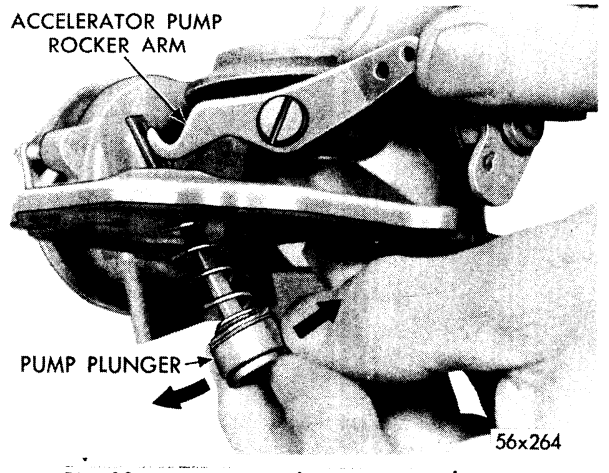


Fig. 12—Removing or Installing Accelerator Pump Plunger

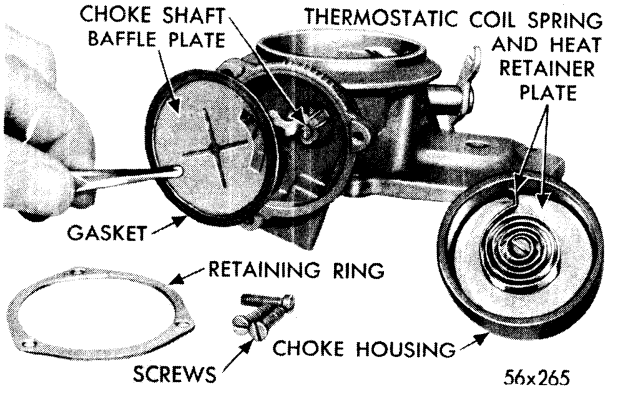


Fig. 13—Removing or Installing Choke Baffle Plate and Gasket

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

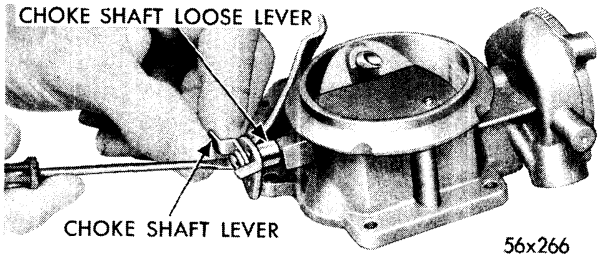


Fig. 14—Removing or Installing the Choke Shaft Lever

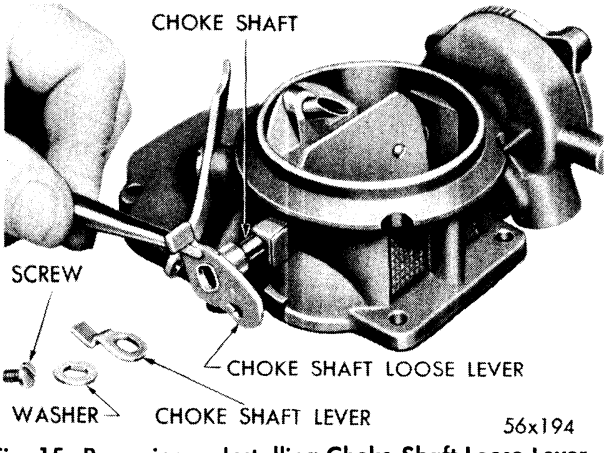


Fig. 15—Removing or Installing Choke Shaft Loose Lever

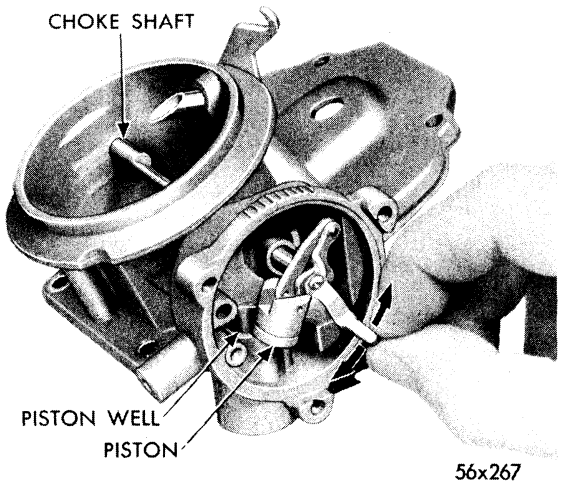


Fig. 16—Removing or Installing Choke Shaft and Piston

Figure 16.

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, unless wear or damage necessitates installation of new parts. To install new valves or throttle shaft, refer to Inspection and Reassembly Paragraph 14.

13. CLEANING CARBURETOR PARTS

The recommended solvent for gum deposits is denatured alcohol. However, there are other commercial solvents or cleaners, 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. 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 wire, drill or other mechanical means as the orifices may become enlarged, making fuel mixture too rich for proper performance.

14. INSPECTION AND REASSEMBLY

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

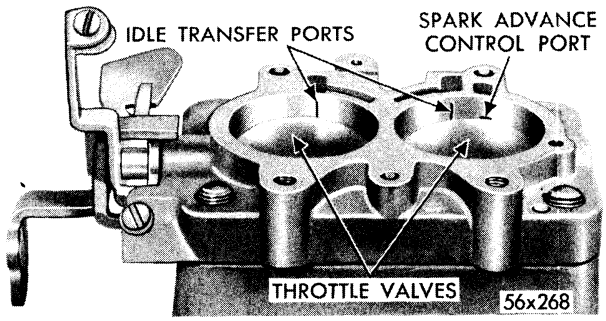


Fig. 17—Ports in Relation to Throttle Valves

During manufacture, location of idle transfer port and spark advance control ports to valves is carefully established for one particular assembly. (See Fig. 17). 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

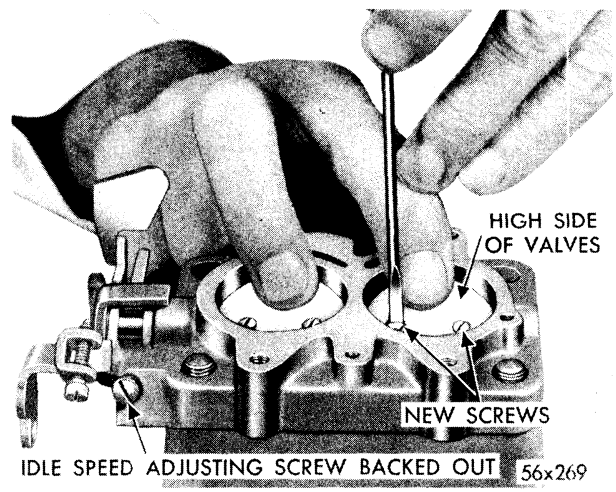


Fig. 18—Removing or Installing Throttle Valves

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 installation 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 18 (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).

a. Idle Mixture Needle Adjustment

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

b. 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 dusty 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. Check tube and install a new one if necessary.

Before assembling automatic choke parts, be sure they are all clean and free from grit and dirt. Examine for wear or damage. Worn or damaged parts must be replaced in order to insure proper choke operation.

The thermostatic coil spring, heat retainer plate and spring 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 spring originally installed. Do not attempt to separate coil spring from heat retainer plate.

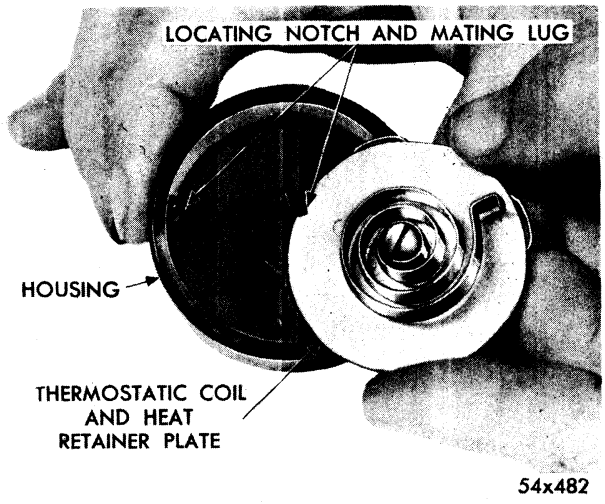


Fig. 19—Installing Heat Retainer Plate

To remove coil spring 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 19. Install plate and press down until it is seated in housing. Be sure retaining spring in plate is clear of notch.

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. 16). 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 screwdriver 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, with index mark in down position, install coil housing. Turn the housing clockwise until index mark on rim is in line with center index mark on air horn, as shown in Figure 20. Install screws and tighten securely. To secure desired performance from choke during starting and warm-up, the index mark on coil housing must always be in line with center index mark

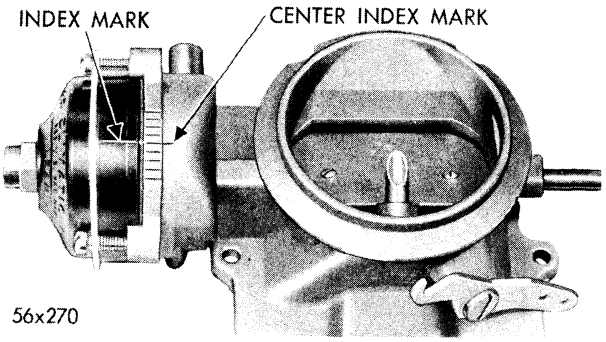


Fig. 20—Alignment of Index Marks of Choke

on the air horn, for BBD 2312S and one notch rich for BBD 2313S (PowerFlite). Slide choke shaft loose lever and sleeve over choke shaft, followed by choke shaft lever, washer and screw (Refer to Figure 15). 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. 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 21.

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.

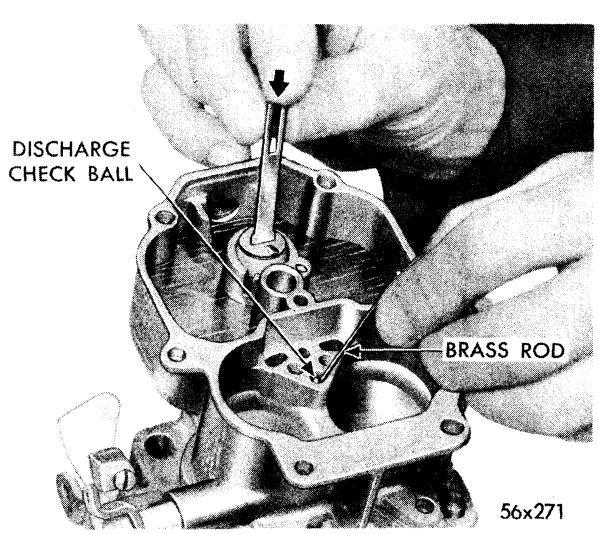


Fig. 21—Accelerator Pump Test

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.

Reinstall the venturi cluster, gaskets and idle bleed screws. Tighten screws securely. (Refer to Fig. 11). Install main metering jets and gaskets, step-up piston gasket, spring, piston and rods. (Refer to Fig. 10). 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 22. 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. 8). 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.

c. Checking Float Height

When checking float height, be sure and remove air horn gasket. Place float gauge T-100-282 in position over floats, as shown in Figure 23. Both floats should just touch gauge when float lip is held firmly against inlet needle. To adjust,

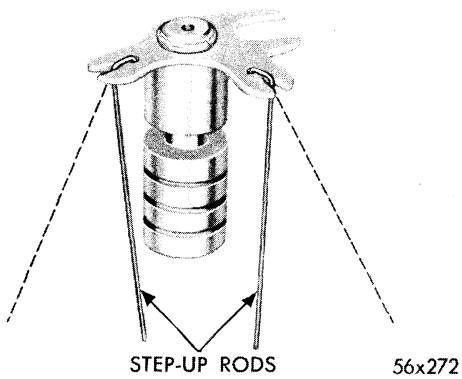


Fig. 22—Positioning Step-up Rods

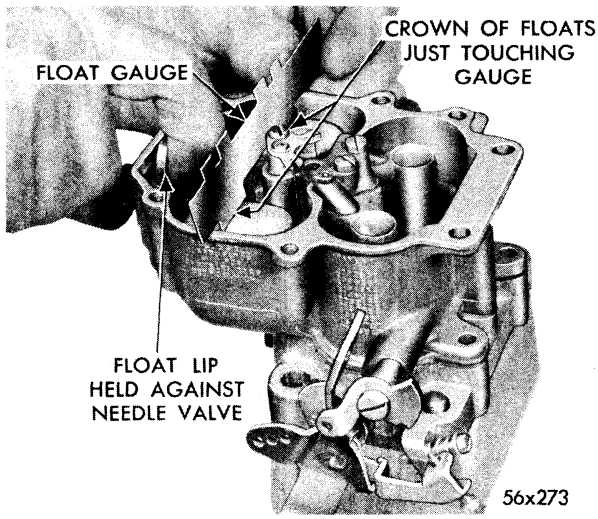


Fig. 23—Checking Float Height

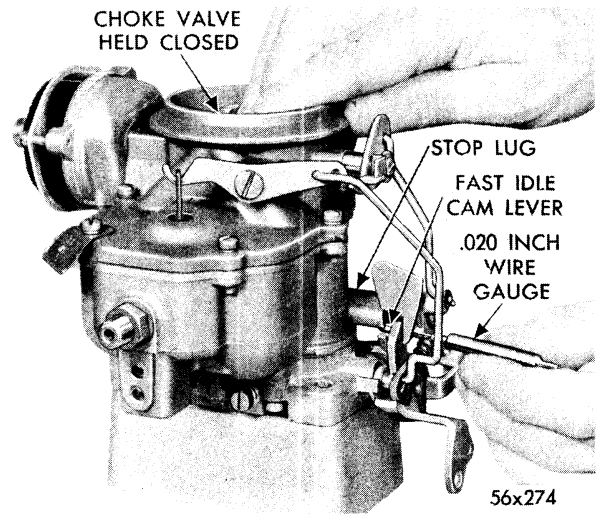


Fig. 24—Checking Fast Idle Cam Adjustment

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 ¼ 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. Do not install dashpot at this time. The installation of dashpot will interfere with final adjustments.

15. CARBURETOR ADJUSTMENTS

It is very important that following adjustments be made on reconditioned carburetor and in sequence listed, namely; Fast idle cam adjustment, fast idle adjustment, unloader adjustment and accelerator pump adjustment. If carburetor is equipped with dashpot, make dashpot adjustment last.

a. Fast Idle Cam Adjustment

To make fast idle cam adjustment, hold choke valve tightly closed, then, it should be possible to insert a .020 inch wire gauge (Tool T-109-29) between body stop lug and fast idle cam lever, as shown in Figure 24. Adjust if necessary, by bending choke lever, using Tool T-109-22, as shown in Figure 25. Bend lever tang up or down until correct clearance has been obtained.

b. Fast Idle Adjustment

To make fast idle adjustment, back out the idle speed adjustment screw, then close choke valve. In this position, fast idle cam screw should rest on high step of fast idle cam, as shown in Figure 26. Insert wire gauge Tool T-109-44 (.015 inch) between throttle valve and side of bore opposite ports, as shown in Figure 27. Adjust fast idle screw to give a slight drag on gauge as it is being withdrawn.

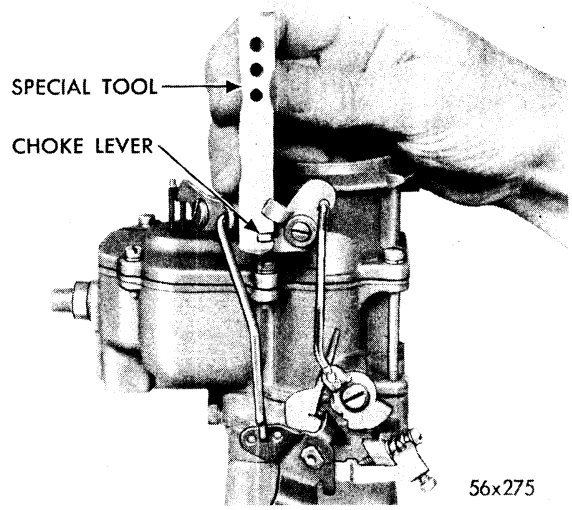


Fig. 25—Bending Choke Lever for Correct Fast Idle Cam Setting

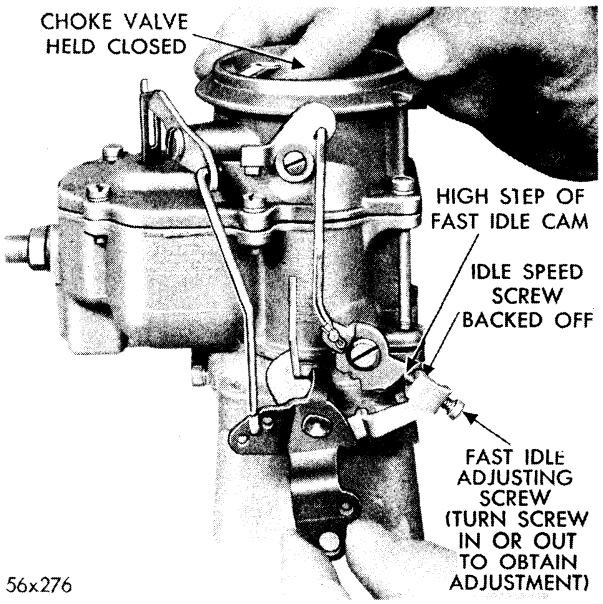


Fig. 26—Checking Fast Idle Setting

c. Choke Unloader Adjustment

To make unloader adjustment, lightly hold choke valve closed, then open throttle valves to wide open position. The choke valve should open sufficiently to allow unloader gauge T-109-28 ($\frac{3}{16}$ 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

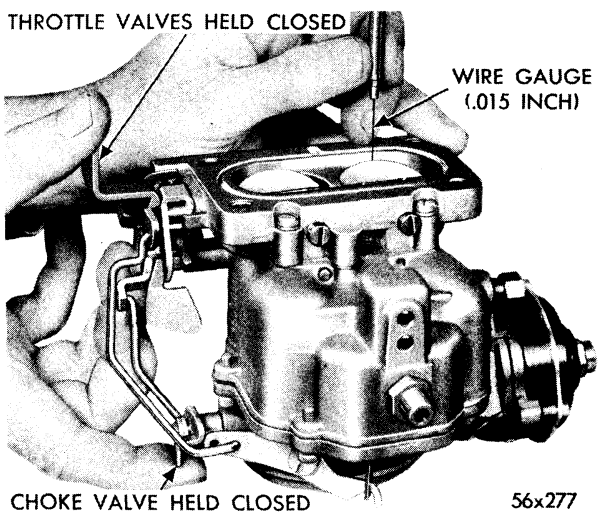


Fig. 27—Correct Throttle Opening for Fast Idle

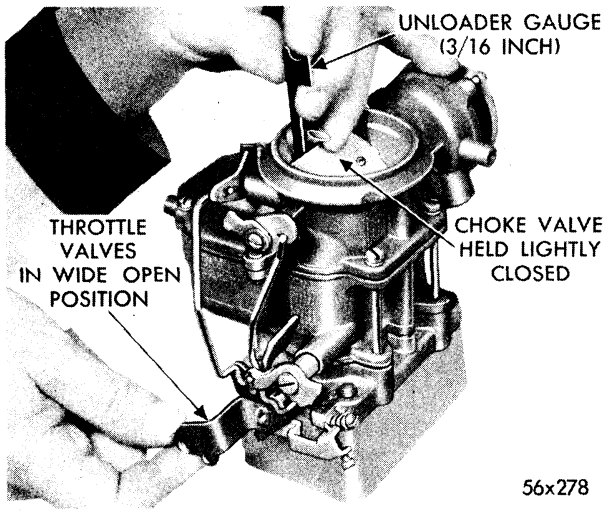


Fig. 28—Checking Choke Unloader Adjustment

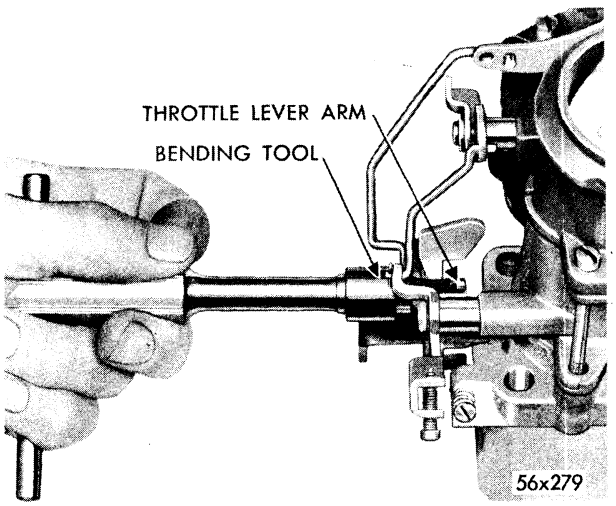


Fig. 29—Bending Throttle Lever Arm for Unloader Adjustment

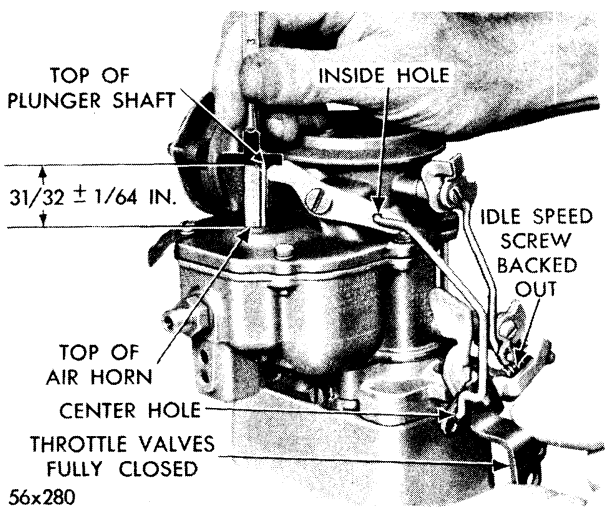


Fig. 30—Checking Accelerator Pump Travel

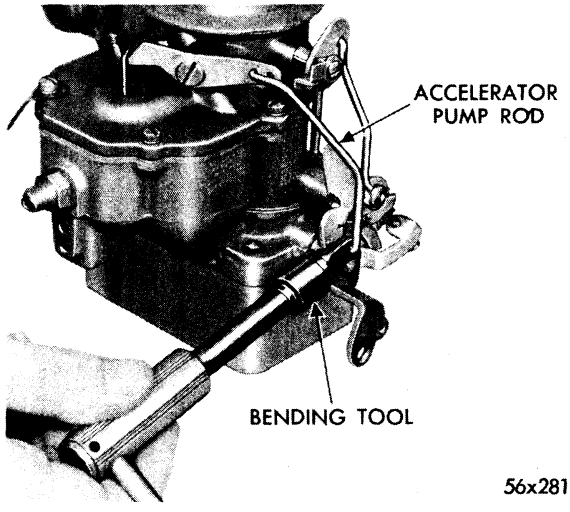


Fig. 31—Bending Pump Rod for Correct Pump Travel

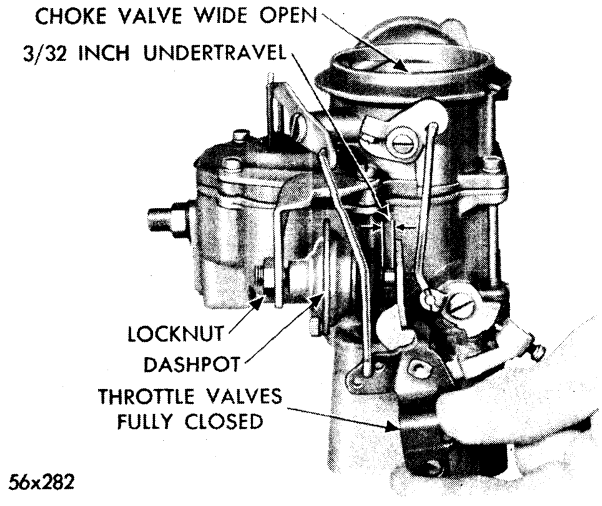


Fig. 32—Dashpot Adjustment

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, distance from top of plunger shaft to top of air horn bowl cover, should be $^{31}/_{32}$—$^{1}/_{64}$ 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.

e. Dashpot Adjustment

To make dashpot adjustment, install dashpot on carburetor, and proceed as follows: The maximum retarding action is obtained by adjusting dashpot mounting stud. To assure full dashpot plunger travel, loosen locknut on adjustment stud and turn dashpot in or out until plunger can be depressed $^{3}/_{32}$ inch (undertravel) after throttle valves are in fully closed position. After adjustment has been made, tighten stud locknut securely. (See Fig. 32).

16. 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. This will prevent the possibility of stripping threads on these connections. Complete tightening of attaching nuts, fuel and vacuum line connections, then install heat control tube. Install throttle control linkage and return spring, 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

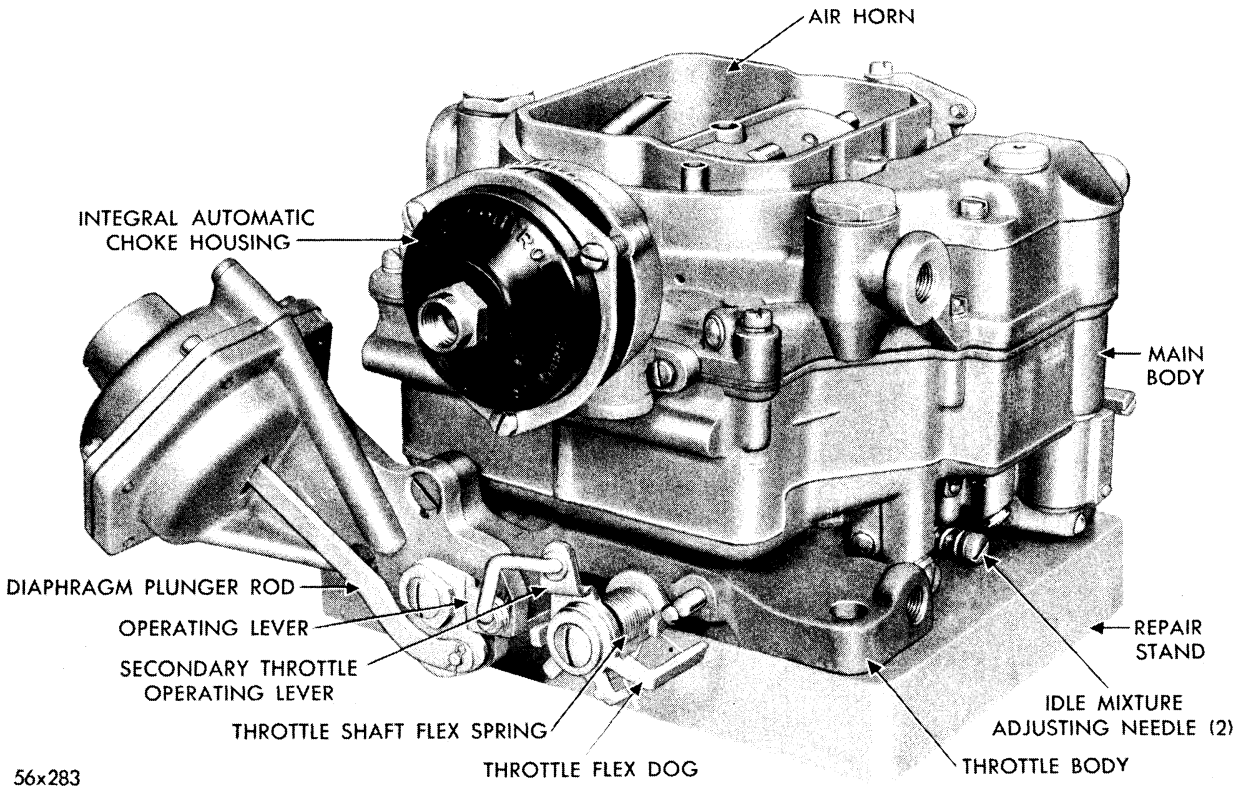


Fig. 33—Carburetor Assembly (WCFB 2314 or 2367 SA)

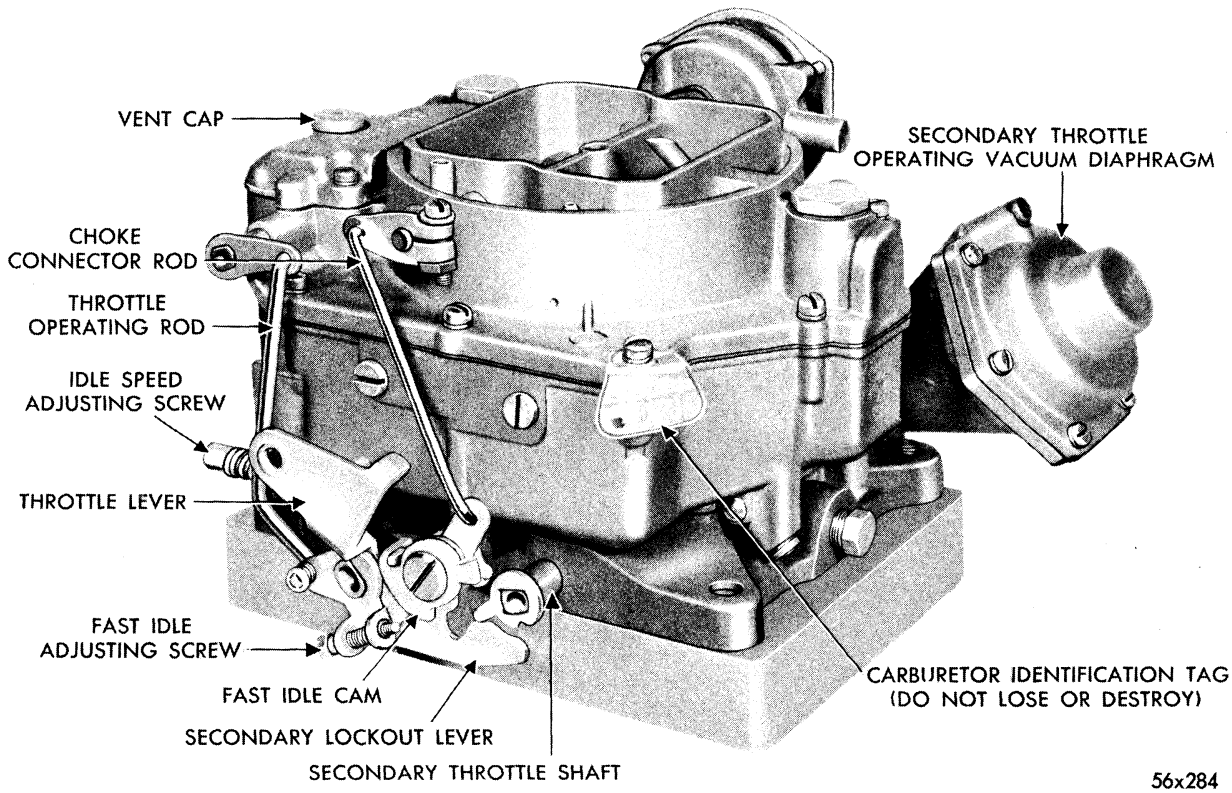


Fig. 34—Carburetor Assembly (WCFB 2314 or 2367 SA)

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 1/4 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—WCFB-2314SA OR WCFB-2367SA

SERVICE PROCEDURES

17. REMOVAL OF CARBURETOR FROM ENGINE

Remove air cleaner and gasket. Disconnect fuel line, choke heat tube and vacuum spark advance tube. Disconnect throttle linkage, remove carburetor from intake manifold. Discard mounting flange gasket. **The dashpot can be serviced without removing carburetor from engine, since it is located in throttle linkage and not on carburetor.**

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

When overhauling carburetor, several items of importance should be observed to assure a good job. The carburetor must be disassembled and all parts carefully cleaned in solvent, such as Metalclene (or equivalent). Inspect all parts removed from carburetor, as it is at times, rather difficult to be sure they are satisfactory for further service. It is therefore recommended, that in such cases, **NEW** parts be installed.

18. CARBURETOR DISASSEMBLY

To disassemble carburetor for cleaning or overhaul, refer to Figure 33, 34, 35, and 36 (depending upon model of carburetor), and proceed as follows:

Place carburetor assembly on repair stand Tool C-3400, (if available). This tool is used to protect throttle valves from damage and to provide a suitable base for working.

Remove hairpin clips, disengage choke connector and throttle operating rods, as shown in Figure 37. (When removing throttle operating rod, remove hairpin clip that holds rod to pump shaft lever, for ease in removal).

Remove metering rod dust cover and gasket, then carefully unhook metering rods from vac-

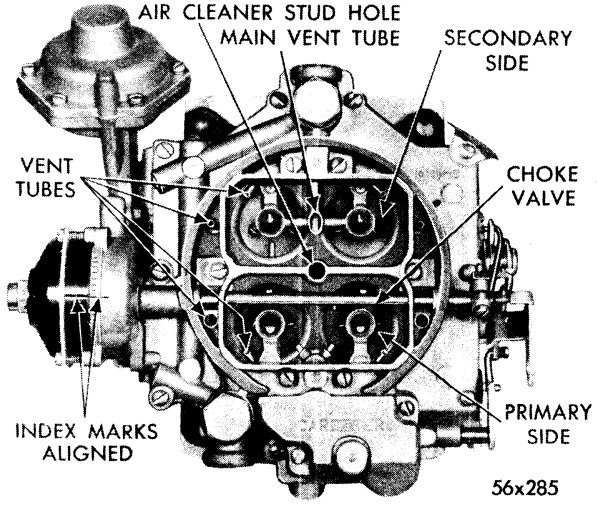


Fig. 35—Carburetor Assembly (WCFB 2314 or 2367 SA)

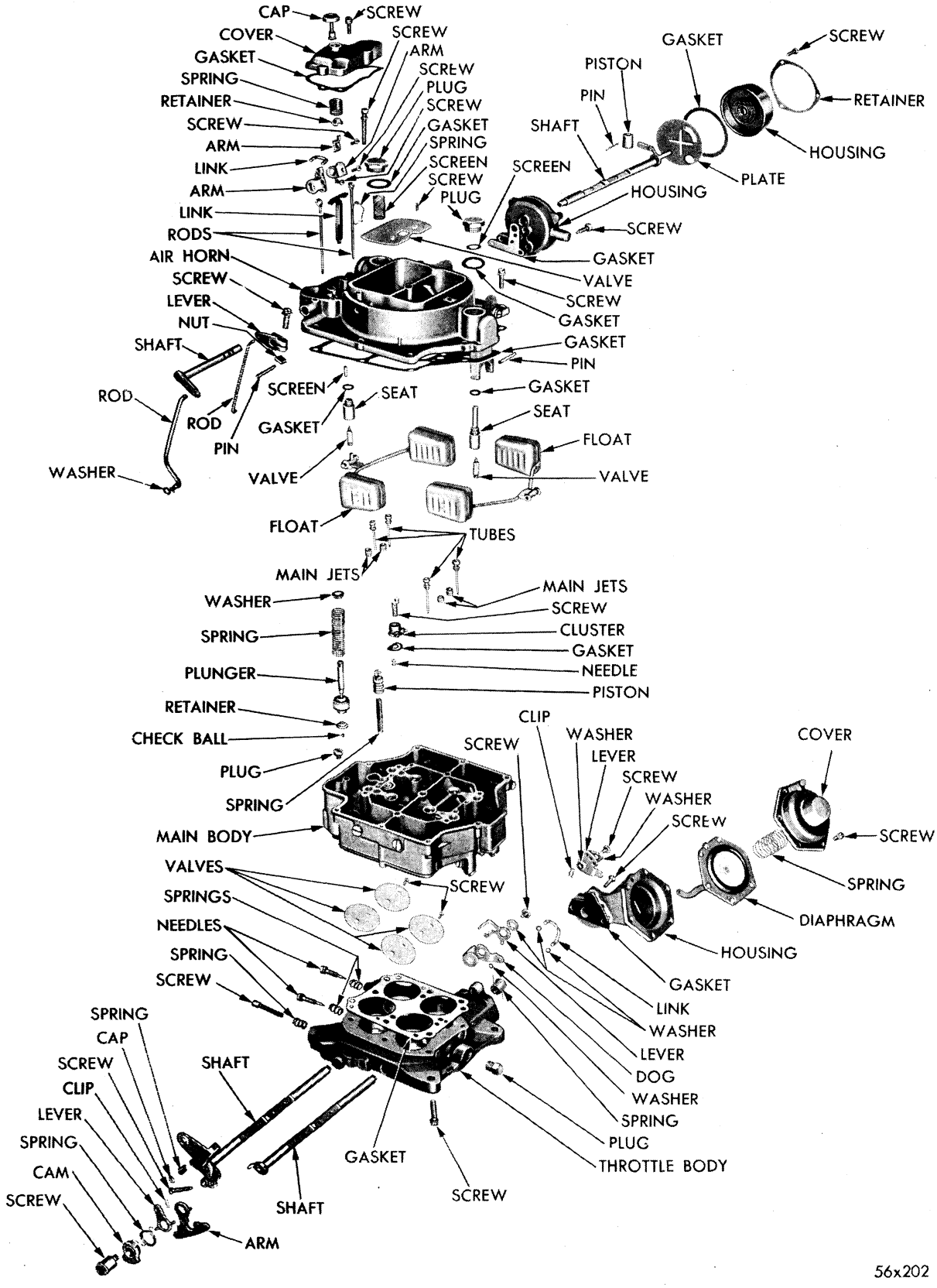


Fig. 36—Carburetor Assembly (WCFB 2314 or 2367 SA)

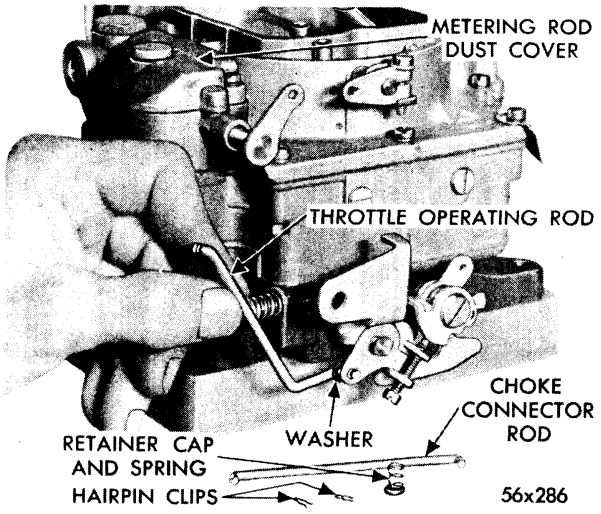


Fig. 37—Removing or Installing Operating and Connector Rods

uumeter link, as shown in Figure 38.

Sixteen screws are used to attach air horn to main body. Six of these are found around inside of air cleaner enclosure, (see Fig. 35) nine around flange of air horn and one within metering rod and pump shaft enclosure. Remove screws. Using finger pressure only, lift air horn straight up and away from main body, as shown in Figure 39. This will prevent damage to floats, accelerator pump plunger or vacuumeter piston.

a. Air Horn Disassembly

Lay air horn on bench in an inverted position. Using suitable tool, remove float fulcrum pins, then lift primary and secondary floats up and away from air horn, as shown in Figure

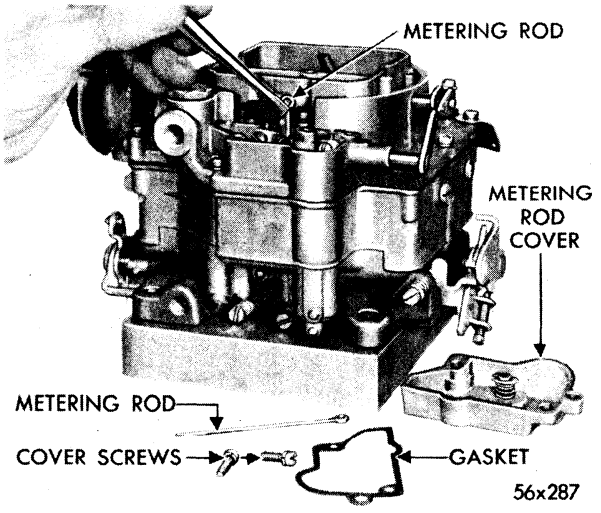


Fig. 38—Removing or Installing Metering Rods

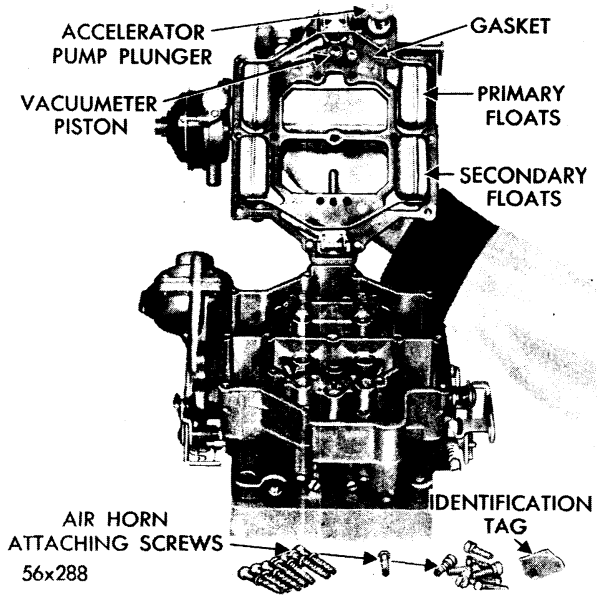


Fig. 39—Removing or Installing Air Horn

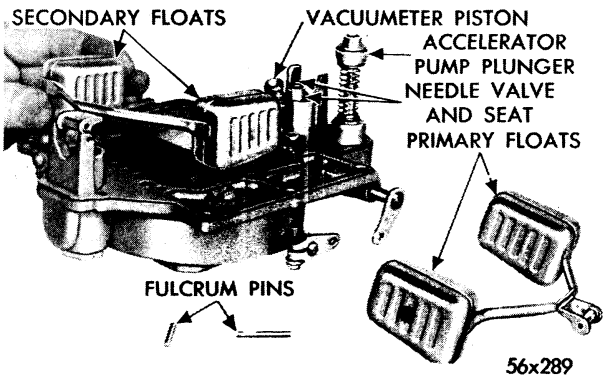


Fig. 40—Removing or Installing Floats

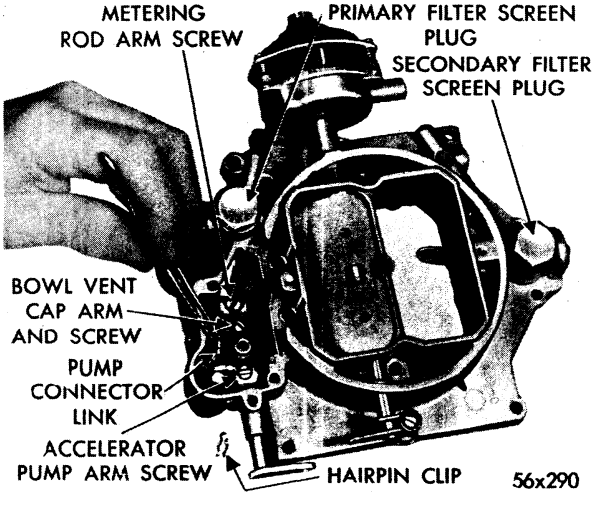


Fig. 41—Removing Accelerator Pump Connector Link

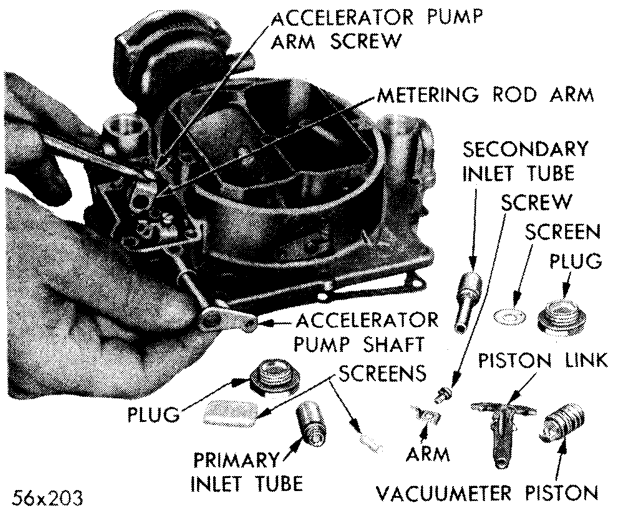


Fig. 42—Removing or Installing Accelerator Pump Shaft

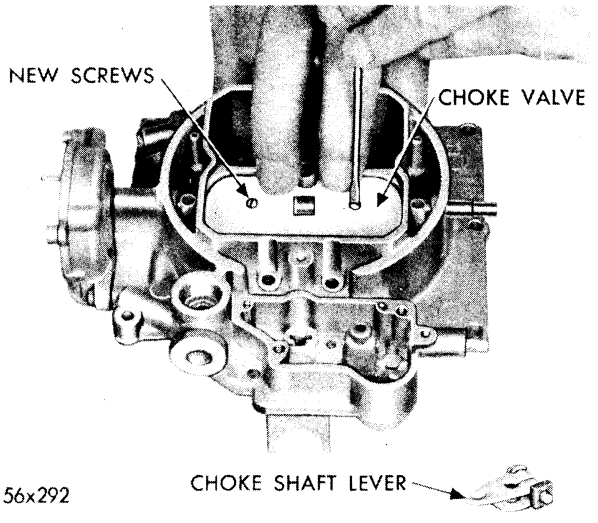


Fig. 44—Removing or Installing Choke Valve

40. **It is advisable to keep parts from primary side of carburetor separated from those of secondary side.** Remove primary and secondary float needle valve and seats. Rotate vacuumeter piston 90° to either side and remove from vacuumeter link. Remove hairpin clip and disengage accelerator pump connector link from plunger shaft and arm, as shown in Figure 41. Slide pump plunger, spring and spring guide washer out of air horn. Check leather on plunger for wear, cracking or stiffness. **The leather must be soft and pliable.** Install new pump plunger if any of these conditions are apparent. Place accelerator pump plunger in jar of clean gasoline to prevent leather from drying out. Remove air horn gasket.

Remove primary and secondary fuel inlet plugs, gaskets and screens. Loosen metering rod arm and accelerator pump arm screws. Remove bowl vent arm attaching screw. Lift out arm. Slide accelerator pump shaft out of air horn, and at same time, remove each arm as it is released, as shown in Figure 42. Slide vacuumeter piston link out of air horn.

b. Integral Automatic Choke Disassembly

Remove screws and retainer ring that attach thermostatic coil housing to air horn. Lift off coil spring housing, spring, and gasket, as shown in Figure 43. Remove baffle plate to expose choke piston.

Loosen choke shaft lever clamp screw, then

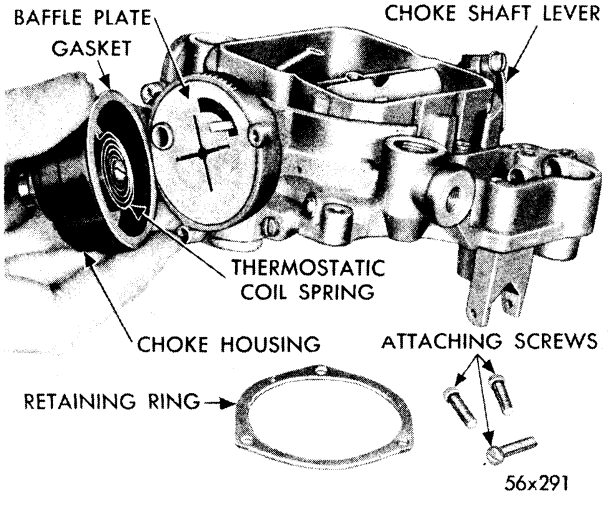


Fig. 43—Removing or Installing Choke Housing

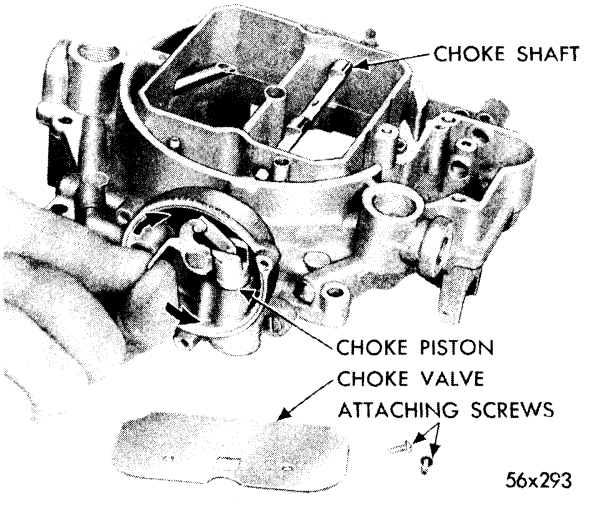


Fig. 45—Removing or Installing Choke Shaft and Piston

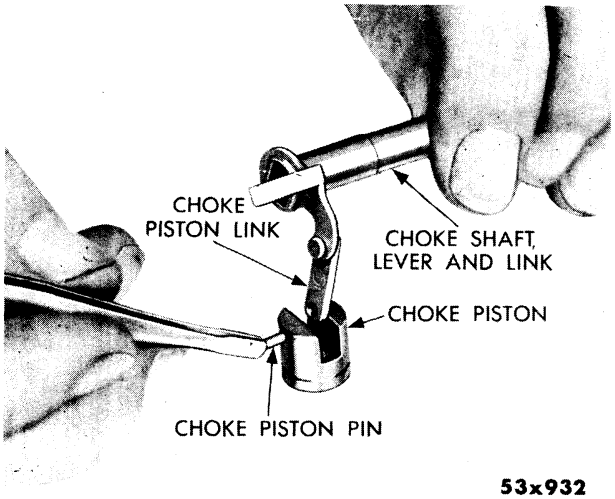


Fig. 46—Rmoving or Installing Choke Piston Pin

slide lever from end of shaft. Using file, remove staking that holds choke valve retaining screws. Remove screws and lift out choke valve, as shown in Figure 44. **These screws are staked to prevent loosening and care should be used to avoid breaking off in choke shaft.** Rotate choke shaft counter-clockwise far enough to withdraw choke piston out of its cylinder, as shown in Figure 45. As choke piston clears cylinder, withdraw choke shaft and piston out of air horn.

Using suitable tool, push out piston pin and separate piston front link. (See Fig. 46). Remove screws that hold choke housing to air horn. Remove housing, as shown in Figure 47. Discard gasket.

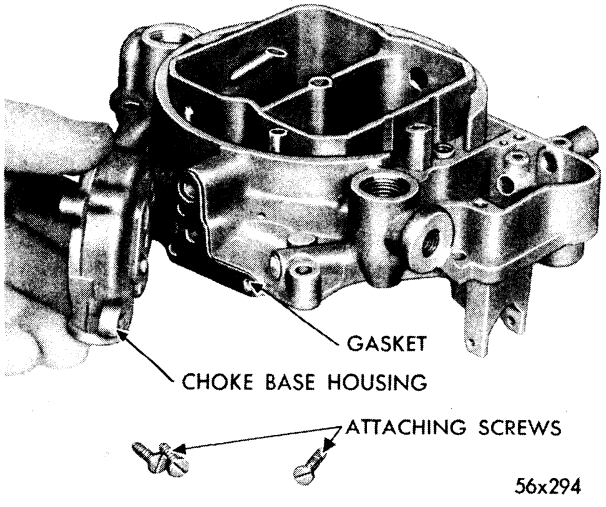


Fig. 47—Removing or Installing Choke Base Housing

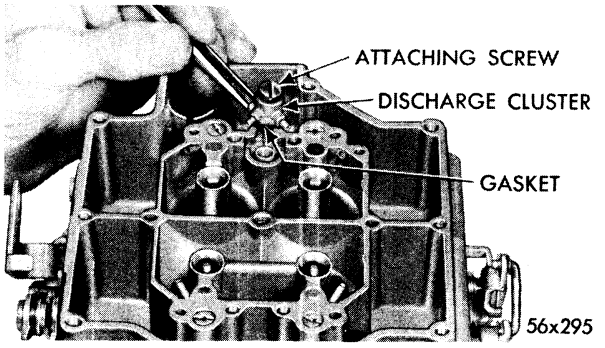


Fig. 48—Removing or Installing Discharge Cluster

c. Main Body Disassembly

Remove vacuumeter piston spring, accelerator

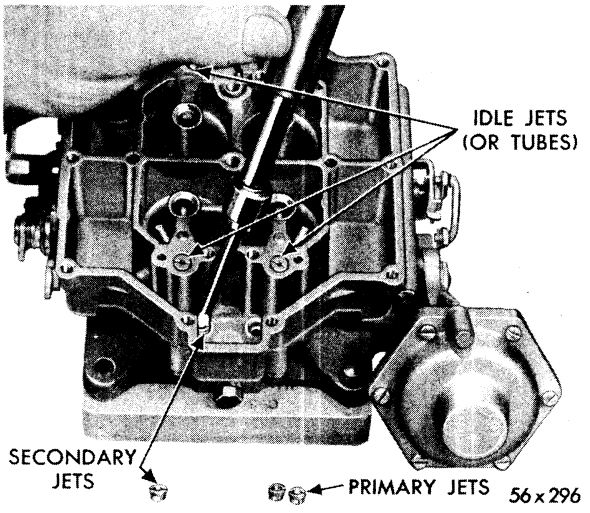


Fig. 49—Removing or Installing Main Metering Jets

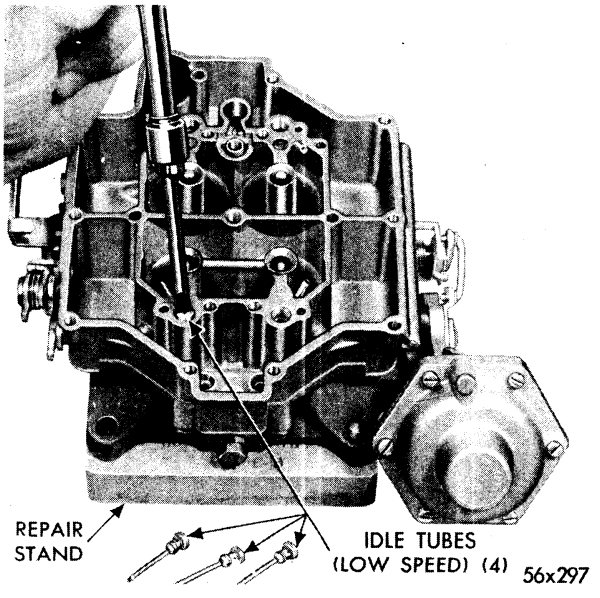


Fig. 50—Removing or Installing Idle Tubes

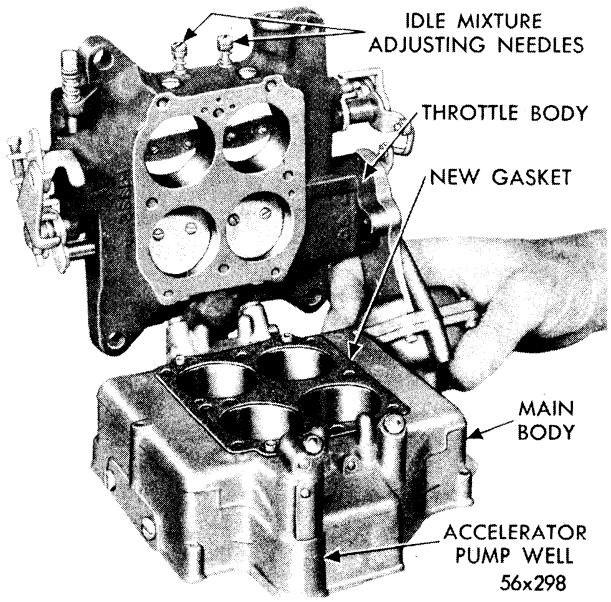


Fig. 51—Removing or Installing Throttle Body

pump discharge cluster and gasket, as shown in Figure 48. Invert carburetor and drop out discharge check needle.

Using Tool T-109-58, remove main metering jets (primary and secondary), as shown in Figure 49. (Be sure and keep primary and secondary jets separate, as they are different and **Are Not Interchangeable**). Again using Tool T-109-58, remove primary and secondary idle jets, as shown in Figure 50. (These jets are interchangeable). Invert main and throttle bodies and remove throttle body attaching screws, (short screw on primary side-center). Remove throttle body, as shown in Figure 51. Discard gasket.

d. Throttle Body Disassembly

Remove hairpin clips that hold throttle operating link to primary and secondary operating levers. Slide link out away from levers, as shown in Figure 52. (Don't lose washers). Disengage throttle flex spring from tang on throttle flex dog, and slide flex dog off primary shaft, as shown in Figure 53. Remove operating lever and flex spring, as shown in Figure 54.

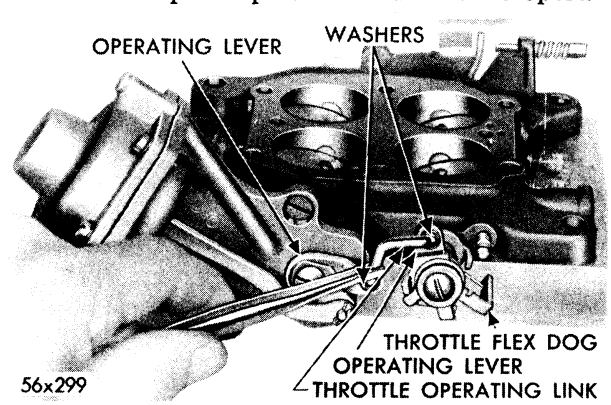


Fig. 52—Removing or Installing Throttle Operating Link

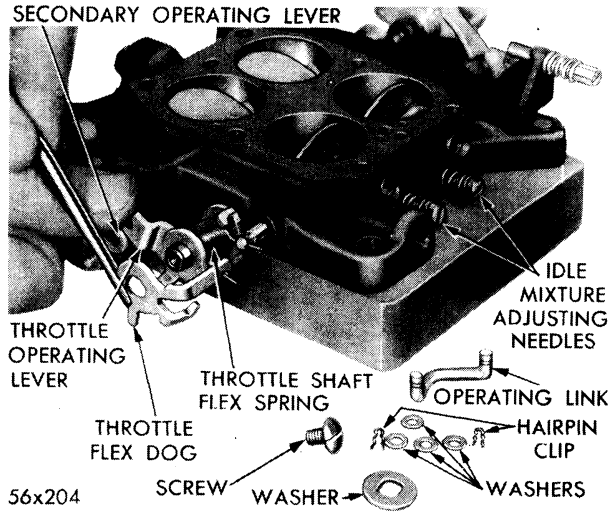


Fig. 53—Removing or Installing Throttle Flex Dog

Disconnect vacuum diaphragm plunger from secondary operating lever by removing hairpin clip. Remove operating lever retaining screw and washer, then slide lever off secondary throttle shaft, as shown in Figure 55. Remove screws that attach vacuum diaphragm to throttle body. Remove vacuum diaphragm, as shown in Figure 56. Discard gasket.

Loosen screw that attaches fast idle cam as-

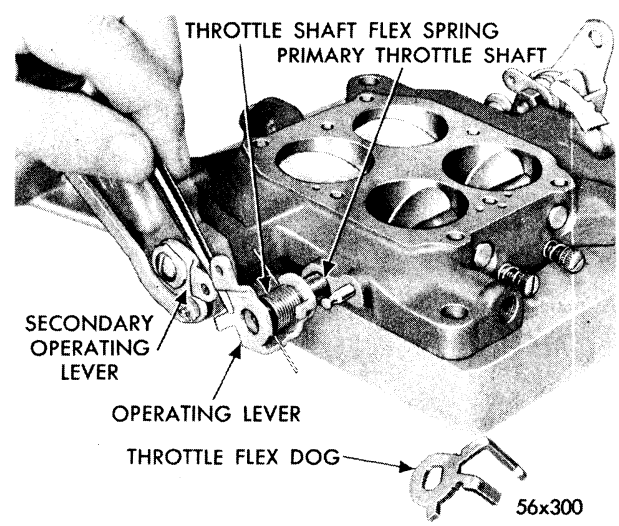


Fig. 54—Removing or Installing Operating Lever

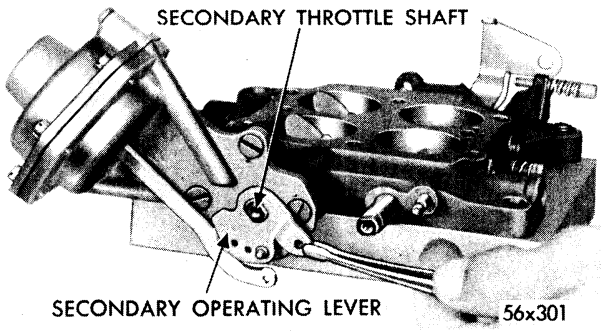


Fig. 55—Removing or Installing Secondary Operating Lever

sembly to throttle body boss, then lift off fast idle cam assembly, cam trip lever, locknut arm and screws, as shown in Figure 57. **When removing fast idle cam and trip lever, be sure and note position of fast idle cam spring and tangs on trip lever.**

It is usually not advisable to remove throttle shafts or valves, unless wear or damage necessitates installation of new parts.

During manufacture, location of idle transfer port and spark advance control port to valves is carefully established for one particular assembly, (see Fig. 58). If new shaft should be installed in an old worn throttle body, it would be very unlikely that original relationship of these ports to valves would be obtained. Changing port relationship would adversely affect normal carburetor operation between speeds of 15 and 30 miles per hour. If it has been determined, however, that new shafts are to be installed, adhere closely to following instructions:

It is suggested that throttle valves be marked

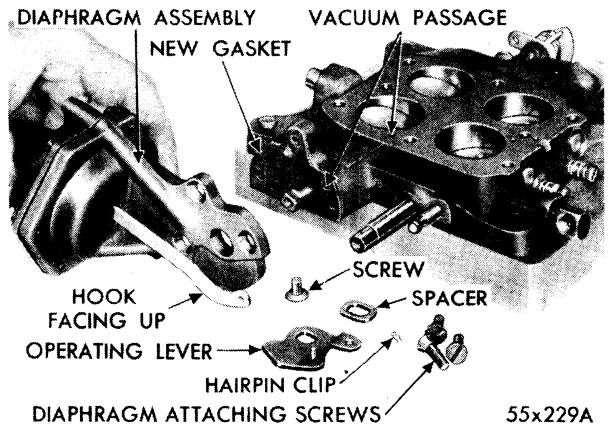


Fig. 56—Removing or Installing Vacuum Diaphragm

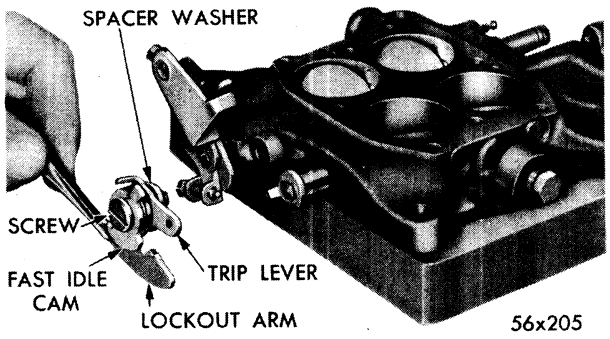


Fig. 57—Removing or Installing Fast Idle Cam

in order that each may be returned to same bore from which it was removed. The screws that attach the throttle valves are staked on opposite side and care should be used in re-

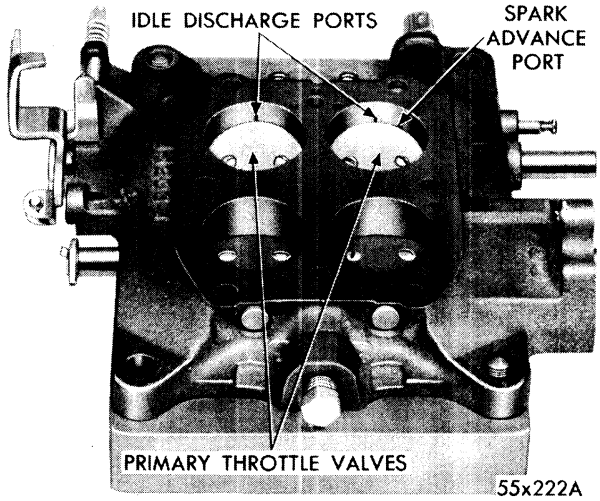


Fig. 58—Ports in Relation to Primary Throttle Valves

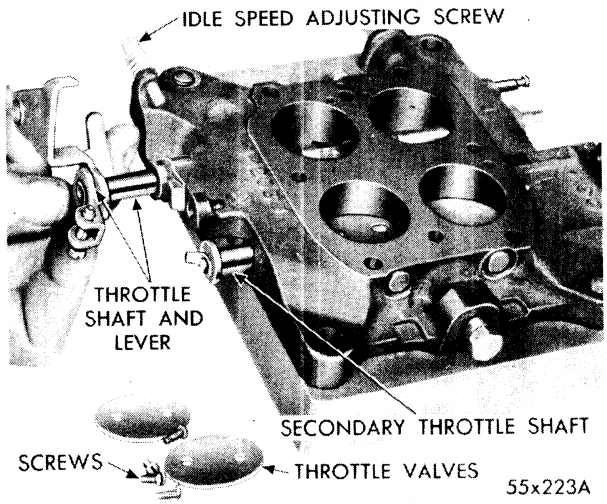


Fig. 59—Removing or Installing Primary Throttle Shaft Lever

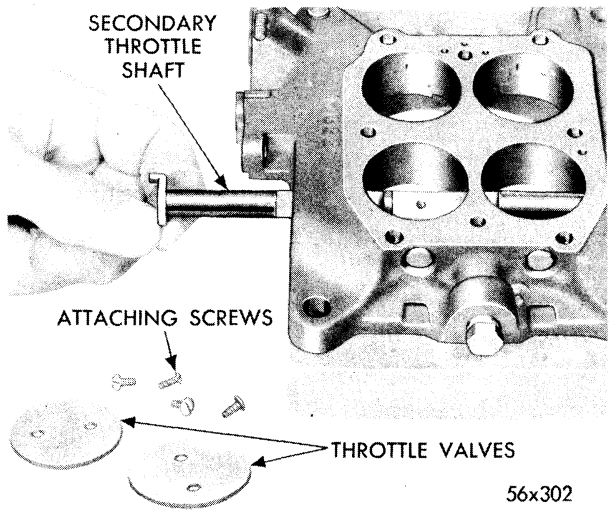


Fig. 60—Removing or Installing Secondary Throttle Shaft

moval so as not to break screws in throttle shafts.

Remove screws that hold primary throttle valves to throttle shaft. Lift out valves, then withdraw throttle shaft, using twisting motion, as shown in Figure 59. Remove screws that hold secondary throttle valves to throttle shaft. Lift out valves, then withdraw throttle shaft, using twisting motion, as shown in Figure 60. **The primary and secondary valves are not interchangeable and should be kept separate in order that they may be replaced in their original bores (See Fig. 61).**

Remove two idle mixture adjusting needles and springs from throttle body, as shown in Figure 62.

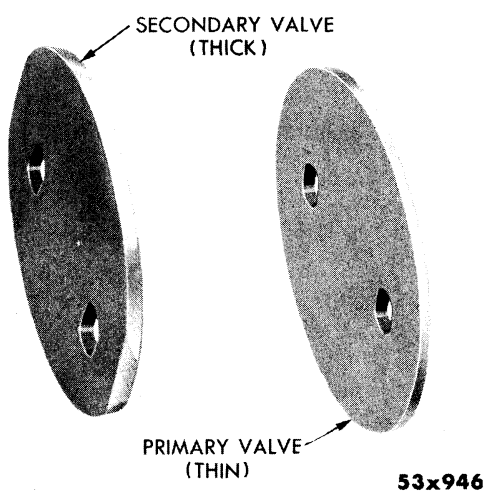


Fig. 61—Throttle Valve Identification

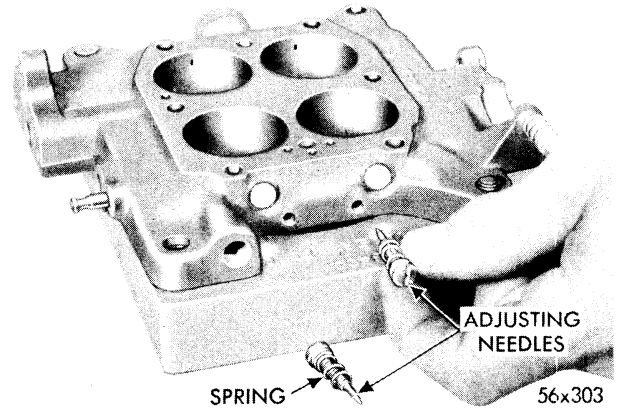


Fig. 62—Removing or Installing Idle Mixture Adjusting

The carburetor now has been disassembled into four units, namely, air horn, main body, throttle body and automatic choke and component parts disassembled as far as necessary for cleaning and inspection.

e. Vacuum Diaphragm Disassembly

Remove screws that attach diaphragm housing cover to housing. Separate cover and housing, and lift out diaphragm, plunger and spring, as shown in Figure 63. Check diaphragm for wear, rupture or tearing. If necessary, install new diaphragm and plunger assembly.

19. CLEANING CARBURETOR PARTS

Refer to Paragraph 13 for Cleaning Instructions.

For automatic choke to function properly, it is important that all parts be clean and move

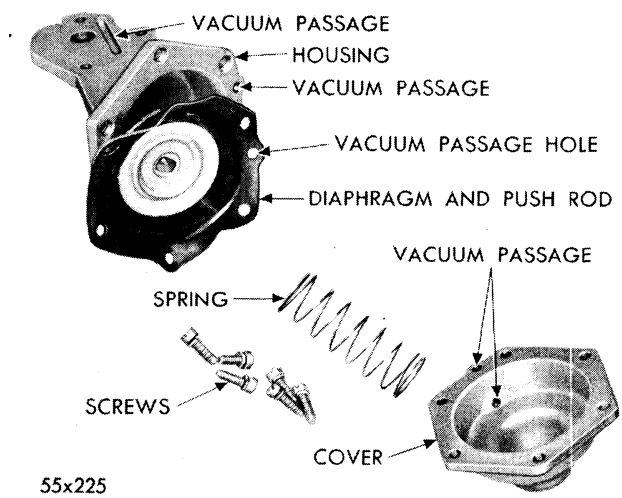


Fig. 63—Vacuum Diaphragm Assembly (Disassembled View)

freely. It is possible, under extremely dusty conditions, that fine particles of dirt may be found deposited on various choke parts. A heavy, black, hard carbon deposit on choke parts indicates possibility of leak in heat tube. Check tube in exhaust manifold and repair as required.

Examine all choke parts for wear or damage. Worn or damaged parts must be replaced with new, to insure proper operation of choke. **Do not attempt to separate thermostatic coil from heat retainer plate.** The thermostatic coil spring, heat retainer plate and moulded bakelite housing are serviced as an assembly only. If housing is cracked or broken, replace with a completely new assembly, as index mark cut on rim of housing is only correct for one thermostatic coil spring originally installed.

To remove thermostatic coil spring and heat retainer plate from housing, hit housing sharply against palm of hand (coil side down).

Clean any dirt, dust or other foreign material that may be present, from retainer plate and out of housing. When assembling, install new gasket, then match notch in plate with lug in housing, as shown in Figure 64. Install plate and press down until seated in housing.

20. INSPECTION AND REASSEMBLY

a. Throttle Body

Check throttle shaft for excessive wear in throttle body. If wear is extreme, it is recommended that throttle body be replaced rather than installing a new throttle shaft in old body. Slide secondary throttle shaft and lever into throttle body with tang on lever pointing toward fast idle cam boss. (Refer to Fig. 60). Slide secondary valves into position, install new screws; do not tighten. Hold valves in place with fingers, as shown in Figure 65. (Fingers pressing on high side of valves). Now tap valves lightly with screwdriver to seat in bores. Holding valves in this position, tighten screws securely and stake by squeezing with pliers.

Slide primary throttle shaft and lever in throttle body. (Refer to Fig. 59). Slide primary valves into position, install new screws; do not tighten. Hold valves in place with fingers, as shown in Figure 66. (Fingers pressing on high side of valves). Tap the valves lightly with

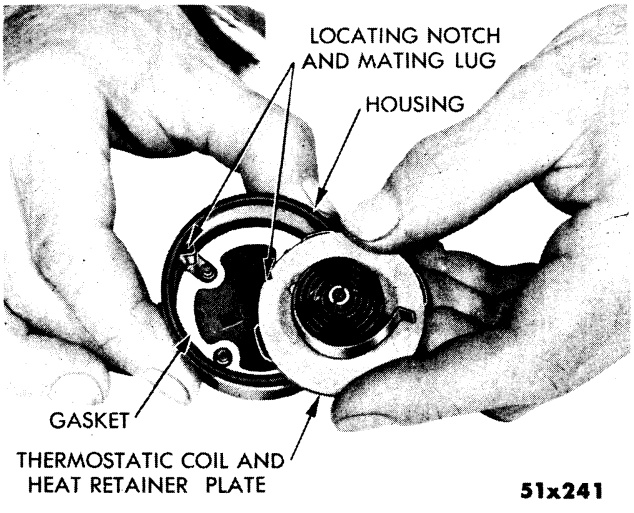


Fig. 64—Installing Coil in Housing

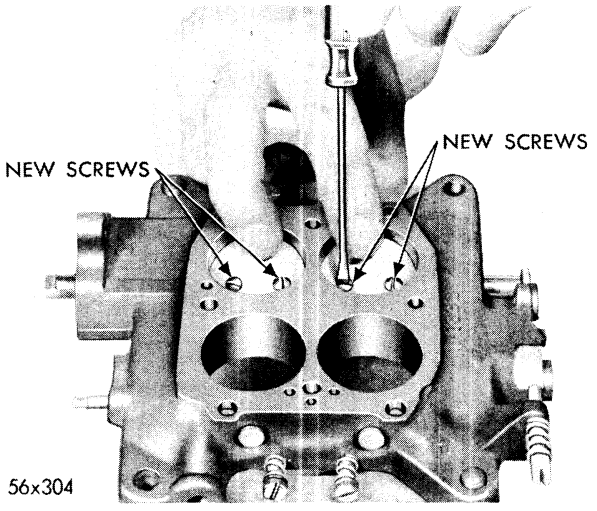


Fig. 65—Installing Secondary Throttle Valves

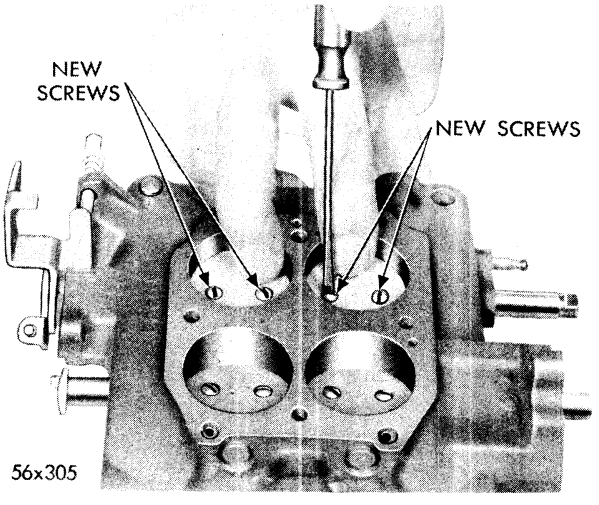


Fig. 66—Installing Primary Throttle Valves

screwdriver to seat in throttle bores. Holding the valves in this position, tighten screws securely and stake by squeezing with pliers.

Install two idle mixture adjusting screws and springs in throttle body. (Refer to Fig. 62). The tapered portion must be straight and smooth. If 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 SCREWDRIVER.** The adjustment should be made with the fingers. Turn needles lightly against their seats, then back off one full turn for approximate adjustment.

Slide fast idle cam retaining screw through fast idle cam (the threaded shank of screw on spring side). Slide fast idle cam trip lever over shoulder on screw, guiding tang between fast idle spring and cam. Slide lockout arm over screw, with lockout detent pointing toward secondary throttle shaft lever tang. Insert pivot screw in position in throttle body and tighten securely. Be sure all parts move freely. (See Fig. 57).

Slide diaphragm plunger rod through slot in diaphragm housing with hook portion facing up, as shown in Figure 56. (Be sure vacuum hole in diaphragm is aligned with vacuum passage). Install spring, cover and screws, tighten securely. Install vacuum unit over secondary throttle shaft and against throttle body, using new gasket. (Refer to Fig. 56). Tighten screws securely. Slide operating lever over end of secondary throttle shaft with arm pointing toward

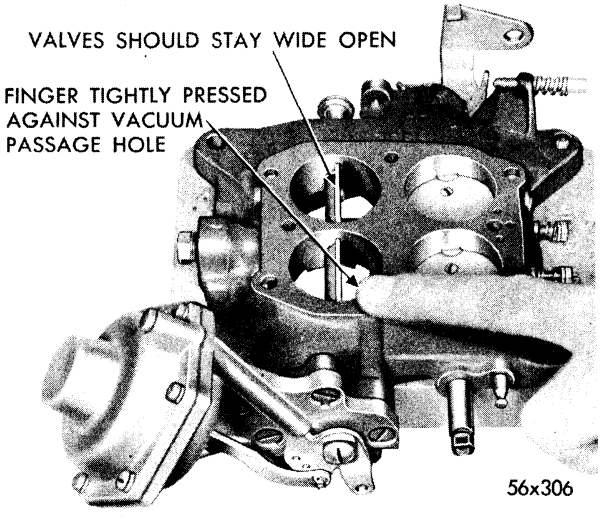


Fig. 67—Checking Vacuum of Diaphragm

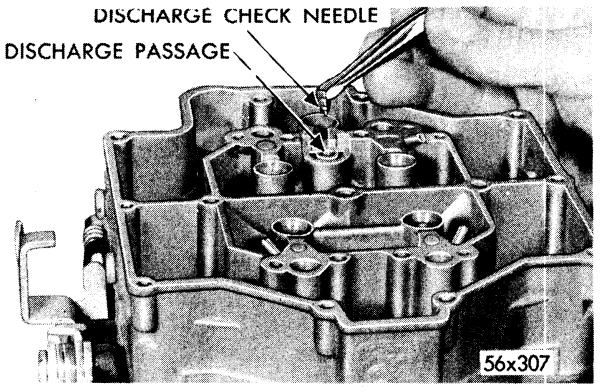


Fig. 68—Installing Accelerator Pump Discharge Check Needle

primary throttle shaft. (Refer to Fig. 55). Insall spacer, washer, and screw, connect diaphragm plunger rod with operating lever and install hairpin clip. To check diaphragm for operation, release secondary lockout arm, open secondary throttle, using operating lever. Place finger over vacuum passage hole in throttle body, as shown in Figure 67. Release operating lever. The throttle valves should hold wide open position or close very, very slowly. If throttle valves snap shut, it is an indication of a leak in diaphragm or housing mounting gasket. Correct as necessary.

Slide flex spring into position in throttle operating lever and slide over end of primary shaft. (Refer to Fig. 54). Slide throttle flex dog over shaft and down against operating lever. Install washer and screw; tighten securely. (Be sure notched tangs are pointing toward throttle body. (See Fig. 53). Engage flex spring ends with notches on each lever, install throttle operating link washers and hairpin clips. (Refer to Fig. 52). Place main body upside down on bench, install new throttle to main body gasket. Lower throttle body down on main body. (Refer to Fig. 51). Install screws and tighten securely. **The accelerator pump well should be on same side as idle mixture adjusting needles. Remember, short attaching screws should be installed on primary side.** Invert carburetor and mount in repair stand, assemble main body as follows:

b. Main Body Assembly

Install accelerator pump discharge check needle in discharge passage, as shown in Figure 68. Install primary and secondary idle jets (Refer to Fig. 50). Tighten securely, using Tool T-109-58.

Remove accelerator pump plunger from jar of gasoline and flex leather several times. Check to see if leather is hard, cracked or worn. If any afore-mentioned conditions exists, install a new accelerator pump plunger. Test operation of accelerator pump as follows:

c. Accelerator Pump Test

Pour clean gasoline into carburetor bowl (approximately ½ inch deep). Insert plunger into its cylinder, press lightly on plunger shaft to expel air from pump passages. Using a small, clean brass rod, hold discharge check needle firmly down on its seat. Raise pump plunger and press downward. No fuel should be emitted from either intake or discharge passage. (See Fig. 69).

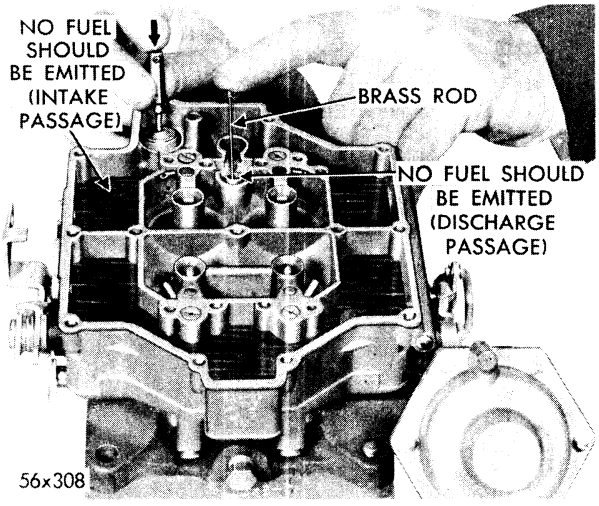


Fig. 69—Accelerator Pump Test

If any fuel does emit from intake ball check, it should be cleaned and thoroughly blown out with compressed air. Fuel leakage at discharge needle indicates presence of dirt or a damaged needle or seat. Clean again and then install a new needle. Recheck for leakage. If either intake check ball or discharge needle leaks after above test, attempt to reseat as follows:

d. Intake Check Ball

Remove check ball retainer from bottom of accelerator pump cylinder. Insert a piece of drill rod down on check ball. Lightly tap with a hammer to form new seat. Install new check ball and retainer, retest as described previously.

e. Discharge Check Needle

Insert small piece of drill rod down on needle. Lightly tap drill rod with hammer to form new seat. Discard old needle and install new one. Retest as described previously. If above instructions do not correct condition, a new carburetor main body assembly will have to be installed.

Install accelerator pump discharge cluster, gasket and screw. (Refer to Fig. 48). Tighten screw securely. Depress accelerator pump plunger. A clear straight stream should emit from each jet. If streams are not identical, (if either one is diverted or restricted) a new accelerator pump discharge cluster should be installed. After test, pour gasoline from carburetor bowl and remove accelerator pump plunger.

f. Air Horn Assembly

Place new gasket over sleeve on rear of choke housing, install housing in position on air horn. Tighten screws securely. Slide choke piston pin through piston and choke piston link (see Fig. 46); slide assembly into air horn. Slide choke shaft into air horn far enough to allow choke piston to be aligned with center of cylinder, turn shaft slightly clockwise and allow piston to enter its cylinder, (see Fig. 45). Slide choke valve down into position (numbered side up) and start **NEW** screws. Holding valve in closed position, tap gently with screwdriver to center and locate valve. Tighten screws securely. (Refer to Fig. 44). With valve in open position, stake screws, using pliers. **Do Not Lubricate any choke operating parts.** Hold air horn in an upright position and close choke valve. The valve should open freely of its own weight.

Install choke baffle plate and gasket. Place coil housing retaining ring over housing and, with index mark in down position, install coil housing. Turn housing counter-clockwise until index mark on rim of housing is in line with center index mark on choke housing. (Refer to Fig. 35). Install screws and tighten securely. **To secure desired performance from choke, during starting and warm up, index mark on coil housing must always be in line with center index on choke housings.**

Invert air horn and install primary and secondary needle seats and gaskets. (The secondary seat has a tube extension, primary a small filter screen on end, (see Fig. 70). Tighten seats securely. Invert air horn and install new secondary filter screen and plug. Make sure screen is firmly seated.

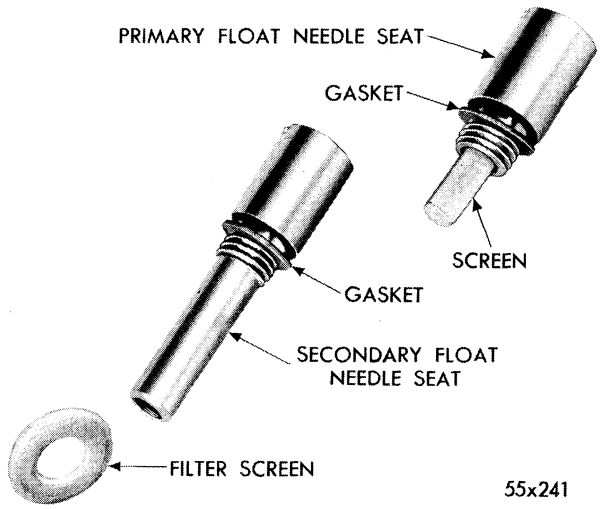


Fig. 70—Primary and Secondary Float Needle Seats and Screws

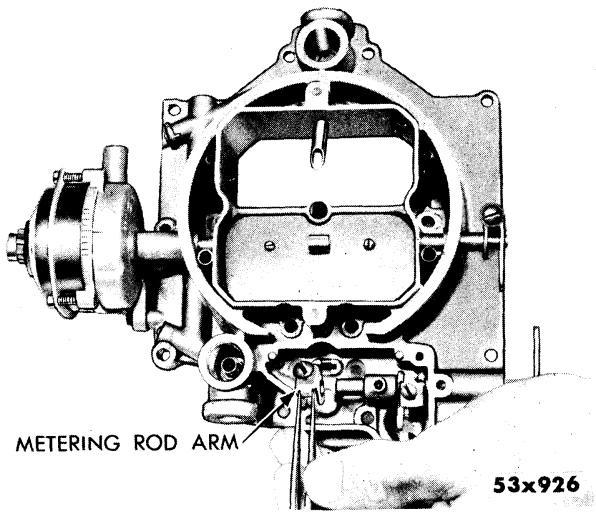


Fig. 72—Installing Metering Rod Arm

Slide accelerator pump shaft and lever into air horn, just far enough to allow installation of accelerator pump arm. (See Fig. 42). Install pump arm with lever portion facing away from pump shaft (See Fig. 71). Continue to slide pump shaft into air horn until shaft protrudes from support boss. Install metering rod arm, (see Fig. 72). The lifter portion must be aligned with vacuumeter piston link slot in air horn casting. Install bowl vent operating arm with lever portion facing away from pump shaft. (Refer to Fig. 41). Install screw and lockwasher, **but do not tighten.**

Install fuel inlet filter screen, plug and gasket. Tighten securely. Slide vacuumeter piston link down into slot in air horn, with lifter lip facing away from pump shaft. Be sure metering rod tension spring is centered in hole at top of link. (As link is being lowered, engage lifter portion of arm in slot in link). Snug down clamp screw. Slide choke lever over end of choke shaft with lever pointing toward accelerator pump shaft. Snug down screw. (To be adjusted and positioned later).

Invert air horn and install primary needle valve in its seat. Slide primary float in position and install fulcrum pin. Check float setting as follows: **Be sure each needle is installed in its original seat.**

g. Float Level Adjustment

When making float level adjustment, be sure

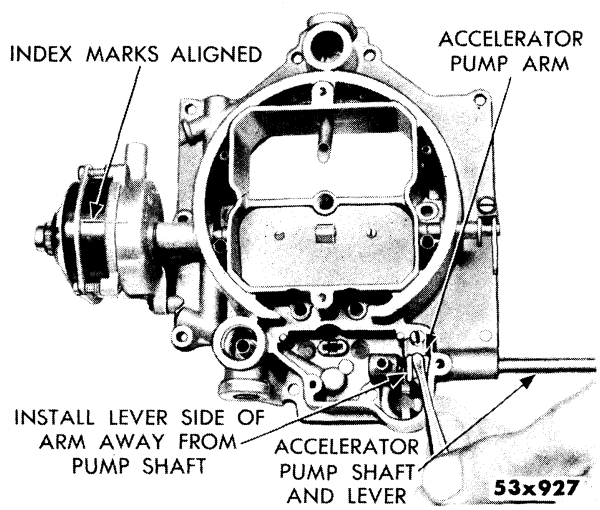


Fig. 71—Installing Accelerator Pump Arm

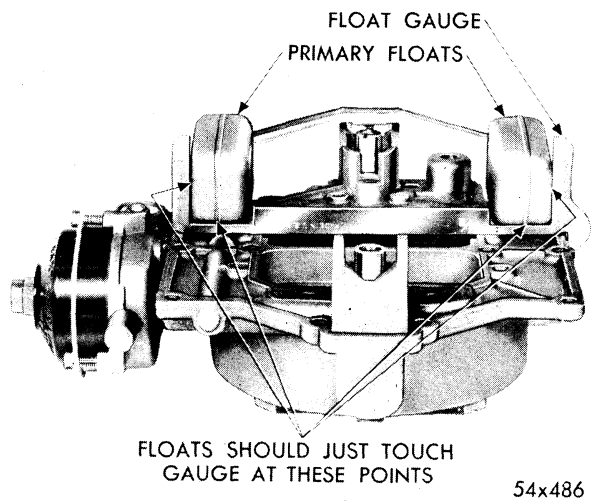


Fig. 73—Checking Primary Float Setting

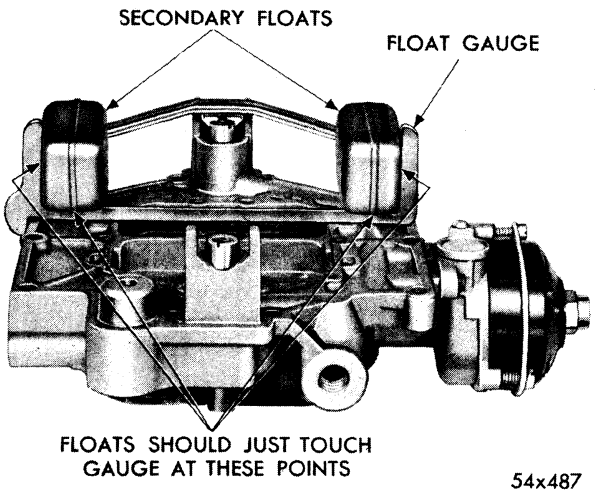


Fig. 74—Checking Secondary Float Setting

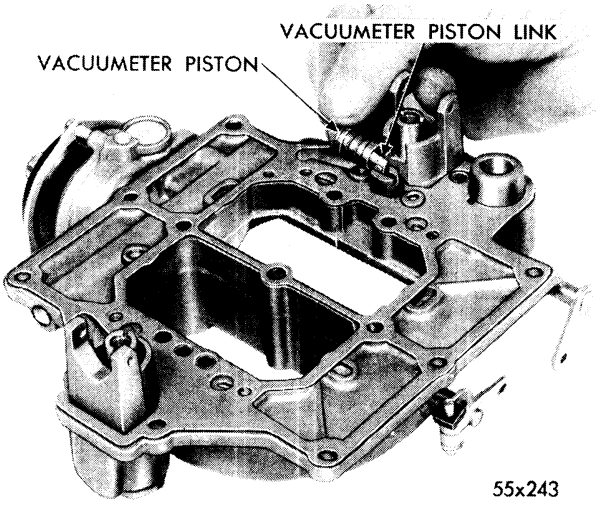


Fig. 76—Installing Vacuumeter Piston

air horn gasket is removed. The primary and secondary floats are set at different heights, using two separate gauges. Place primary float level gauge Tool T-109-236 ($\frac{5}{32}$ inch), in position, as shown in Figure 73. Both floats should just clean horizontal section in gauge. Bend float arm as required to obtain correct setting. With notch end of gauge fitting against side of air horn casting, float arm should be bent for sideways adjustment, until floats barely touch the vertical upright of float gauge. (See Fig. 73). Repeat above instructions for secondary floats, using Tool T-109-283 ($\frac{7}{32}$ inch), as shown in Figure 74. It should be noted that distance between float and casting machined surface is $\frac{5}{32}$ inch for primary and $\frac{7}{32}$ inch for secondary floats.

h. Float Drop Adjustment

After performing float level adjustment, hold air horn assembly in an upright position and note distance in which floats drop, as shown in Figure 75. Both primary and secondary floats should drop ½ inch from gauge setting (plus or minus $\frac{1}{16}$ inch), when measured at center floats, as shown in Figure 75. Adjust as necessary by removing float, and bending small tang which contacts float needle seat. Bend tang towards needle seat to lessen drop, or away from seat to increase drop.

Invert air horn and remove floats. Install new air horn gasket, reinstall primary and secondary floats, and vacuumeter piston. Tilt piston approximately 90 degrees to either side. For correct installation position on vacuumeter piston link. (See Fig. 76). Install vacuumeter piston spring in main body, as shown in Figure 77.

Remove accelerator pump plunger from jar of gasoline and flex leather several times. Check to see if leather is hard, cracked or worn. If any afore-mentioned conditions exist, install

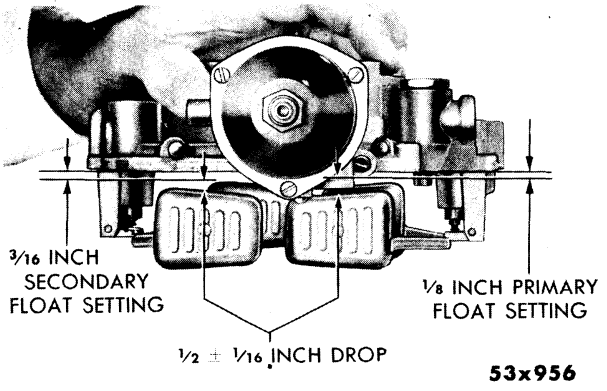


Fig. 75—Checking Float Drop

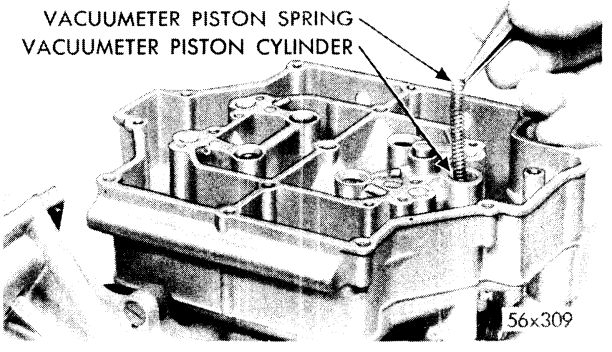


Fig. 77—Installing Vacuumeter Piston Spring

new accelerator pump plunger. Slide accelerator pump plunger spring over plunger shaft followed by spring seat, (shoulder on seat toward spring). With spring compressed, slide shaft end into opening in air horn. With pressure on bottom of plunger, invert air horn and install accelerator pump connector link in top hole in arm and plunger as shown in Figure 78. Install hairpin clip to secure. **Before installing link, be sure hole in plunger shaft is parallel to pump shaft. Install link with hairpin clip groove end, entering hole in the pump arm.** Carefully lower air horn down on main body, guiding accelerator pump plunger into its well.

CAUTION

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

Install air horn attaching screws as follows: Insert six 1¼ inch screws around inside diameter of air horn; tighten securely. Insert remaining 1¼ inch screw in its hole in metering rod chamber. Tighten securely. Insert the one inch screw in thick boss at corner of air horn casting, between automatic choke housing and fuel inlet port. Insert remaining screws (¾ inch) around outside of air horn, tighten securely.

Install metering rods, being careful to engage in loops on metering rod tension spring. (See Fig. 38). Install throttle connector rod and secure with clips. Engage keyed end of

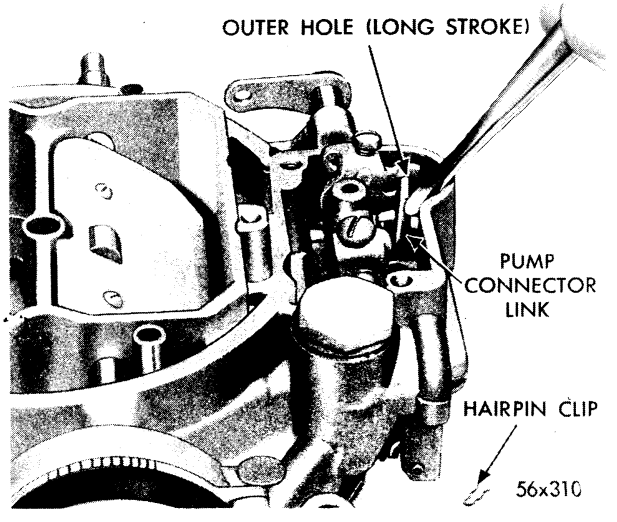


Fig. 78—Installing Accelerator Pump Connector Link

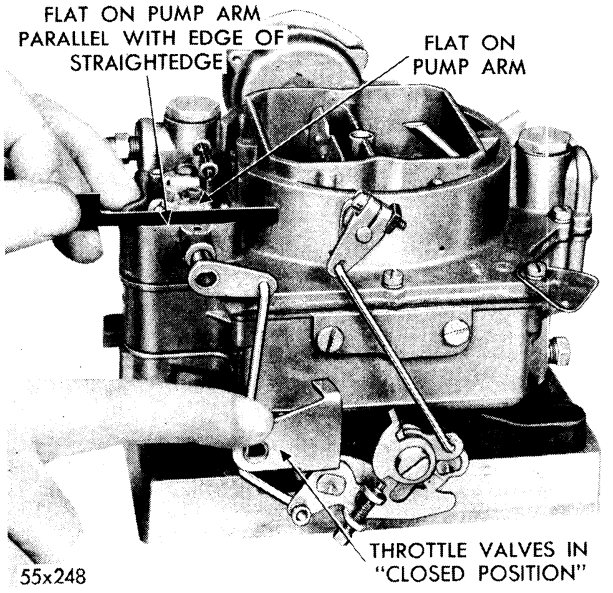


Fig. 79—Accelerator Pump Plunger Travel (Optional Adjustment)

choke connector rod with slot in choke lever, rotate rod and engage in hole in cam trip lever. Install clip to secure. The carburetor now has been completely assembled with exception of metering rod cover, and is now ready to make following adjustments in order as listed:

21. CARBURETOR ADJUSTMENTS

a. Accelerator Pump Adjustment

Before making this adjustment, be sure that pump connector link is installed in outer hole

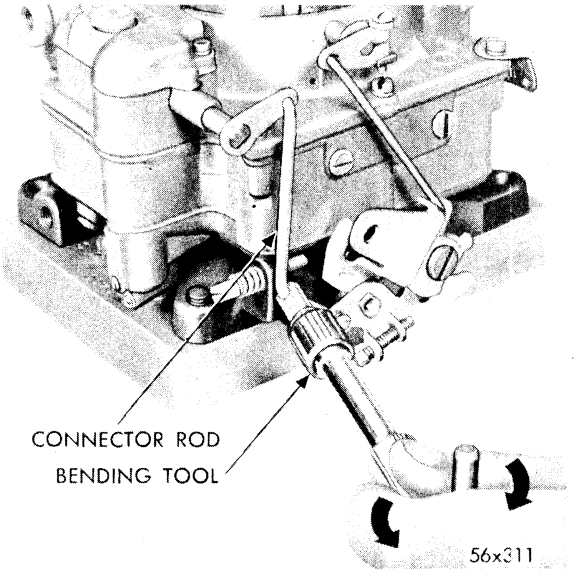


Fig. 80—Bending Connector Rod for Correct Plunger Travel

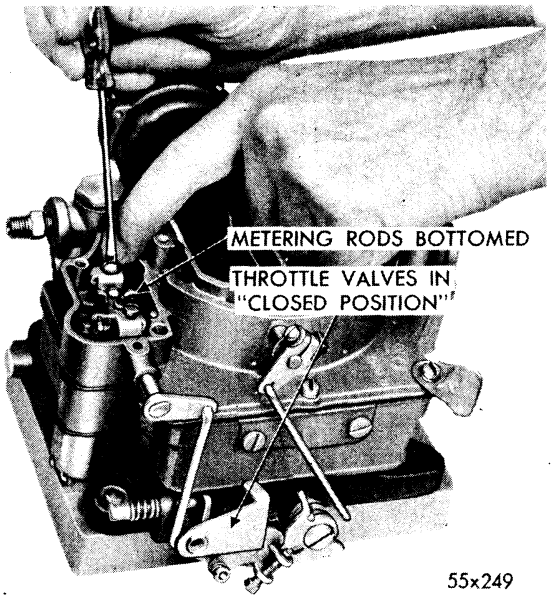


Fig. 81—Positioning Meter Rods

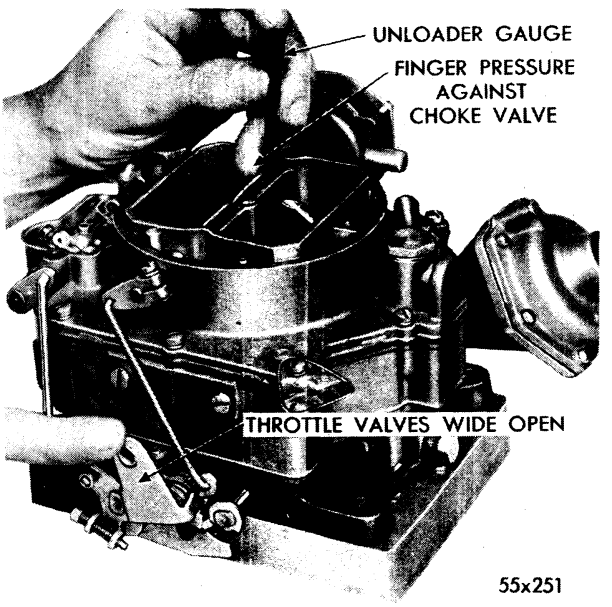


Fig. 83—Choke Unloader Adjustment

(long stroke of pump arm), with ends pointing toward pump shaft arm.

Back off idle speed adjusting screw (if not previously done) until primary throttle valves are fully seated in their bores. (Make sure fast idle adjusting screw is off fast idle cam).

Hold straight edge across top of dust cover boss, as shown in Figure 79, and adjust length of connector as in preceding adjustment until flat on top of pump arm (under set screw) is parallel with upper edge of straightedge. To adjust pump setting, bend throttle connector rod at lower angle, using Tool T-109-213, as shown in Figure 80.

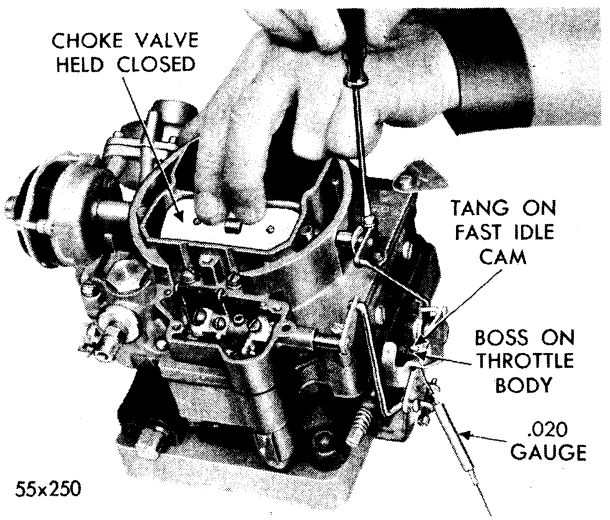


Fig. 82—Choke Rod Adjustment

b. Positioning Metering Rods

Loosen set screw in thermetering rod arm (if previously tightened) enough to obtain a slight bind on pump shaft. Lift arm slightly. With primary throttle valves seated in their bores, depress metering rod link until metering rods bottom, as shown in Figure 81. Keeping arm in contact with metering rod link, tighten set screw securely.

c. Choke Rod Adjustment

Loosen choke shaft lever clamp screw. Insert a .020 inch wire gauge Tool T-109-29, between tang on fast idle cam and boss on throttle body casting. Hold this gauge in place by pressure of screwdriver exerted on choke shaft lever clamp screw, as shown in Figure 82. This will take up all slack in linkage. Hold choke valve tightly closed, and tighten clamp screw securely.

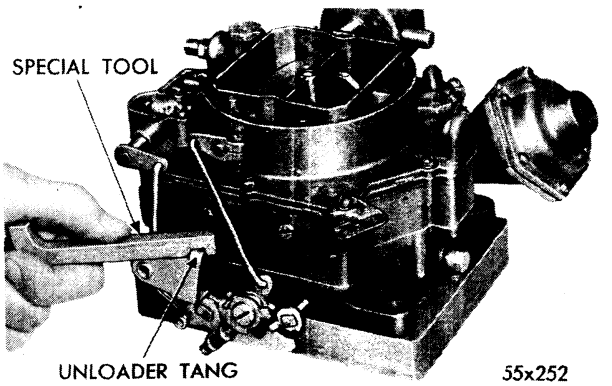


Fig. 84—Bending Unloader Tang

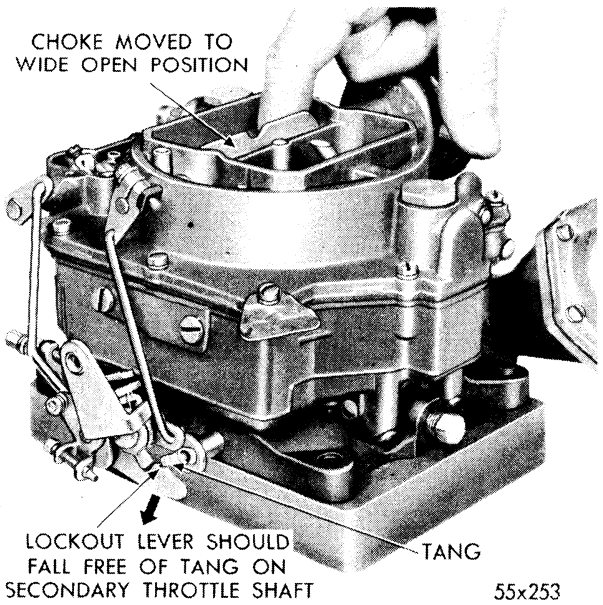


Fig. 85—Checking Secondary Throttle Lockout Release

d. Choke Unloader Adjustment

With primary throttle valves held in wide open position, insert a $\frac{3}{16}$ inch drill or unloader gauge T-109-28, between upper edge of choke valve and inner dividing wall of air horn, as shown in Figure 83. With finger pressing lightly against upper part of choke valve, a slight drag should be felt on gauge as it is being withdrawn. If no drag is felt, or if too much drag is apparent, bend unloader tang on throttle lever, as shown in Figure 84, until correct clearance has been obtained. Use Tool T-109-41 to bend tang.

e. Secondary Throttle Lockout Adjustment

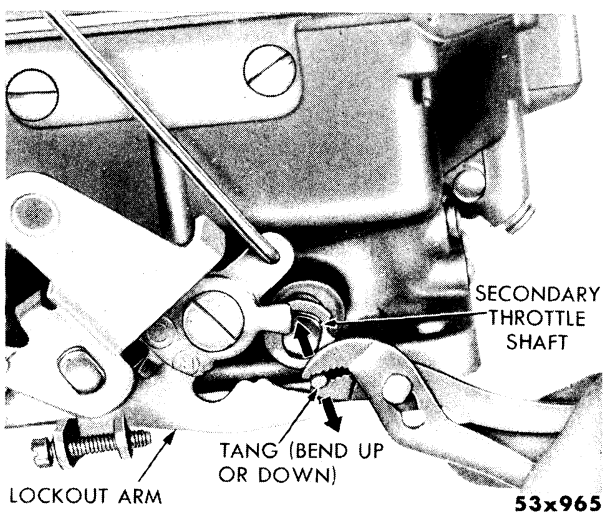


Fig. 86—Bending Throttle Shaft Tang to Obtain Clearance

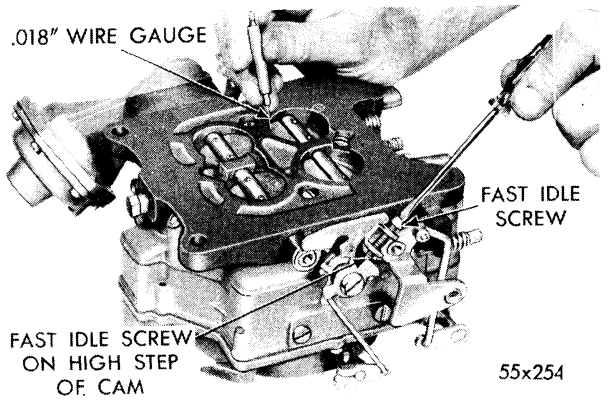


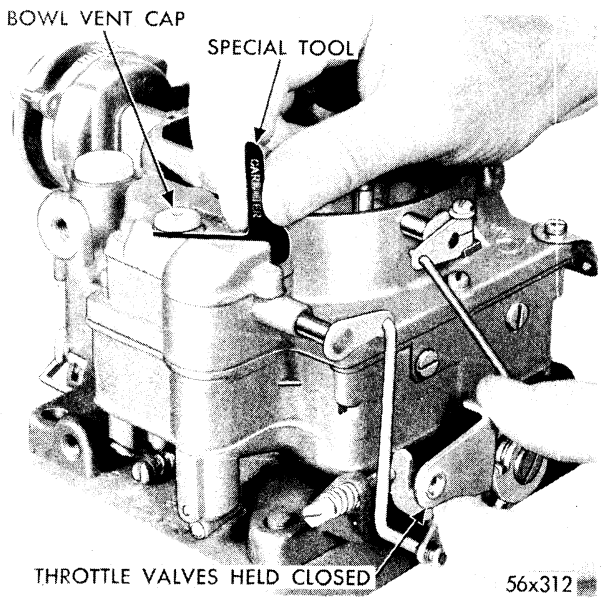
Fig. 87—Fast Idle Adjustment

Move choke valve to wide open position, lockout lever should fall free of tang on secondary throttle shaft, as shown in Figure 85. Bend tang on secondary throttle lever until clearance has been obtaind, as shown in Figure 86.

f. Fast Idle Adjustment

Insert .012 inch wire gauge, Tool T-109-200 between primary throttle valves and side of bore, opposite idle adjusting screws. Move choke valve to fully closed position, and adjust fast idle screw to give a slight drag on wire gauge when screw is resting on high step of fast idle cam, as shown in Figure 87.

The idle speed and mixture adjustments must be performed after installation of carburetor on engine. After these adjustments have been checked and corrected, install metering rod dust cover and gasket. Tighten screws securely.



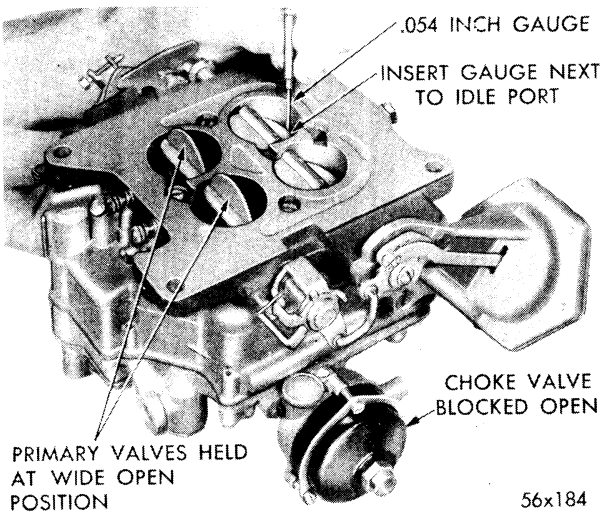


Fig. 89—Checking Opening of Secondary Throttle Valves (Step 1)

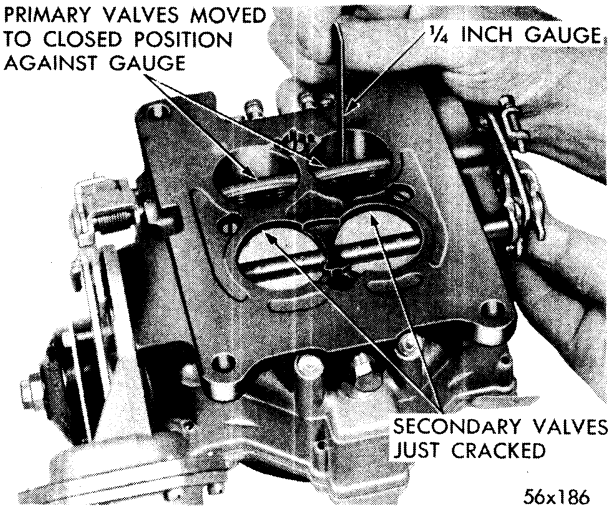


Fig. 91—Checking Opening of Secondary Throttle Valves (Step 2)

g. Bowl Vent Cap Adjustment

With throttle valves closed, bowl vent cap should lift approximately 1/16 inch off its seat. Use Tool T-109-197, as shown in Figure 88, to check clearance. To increase clearance, remove metering rod dust cover and bend actuating arm. To decrease lift, press down on cap until correct lift has been obtained.

h. Throttle Linkage Adjustment

To check throttle linkage for correct opening or positioning of secondary throttle valves in relation to primary throttle valves, it will be necessary to block choke valve in wide open position and invert carburetor. Proceed as follows:

(1) Open primary throttle valves to wide open position. It should then be possible to insert wire gauge Tool T-109-193 (.054 inch) between upper edge of secondary throttle valves (next to idle port) and bore of carburetor, as shown in Figure 89.

Using Tool T-109-213, bend secondary operating rod, as shown in Figure 90, until correct clearance of .054 inch has been obtained.

(2) Close primary throttle valves until it is possible to insert Tool T-109-31 (¼ inch) unloader gauge between **upper** edge of primary throttle valve and bore (next to idle port), as shown in Figure 91. In this position, secondary throttle valves should just crack open.

If an adjustment is necessary, bend tang on throttle shaft dog, using Tool T-109-214, as shown in Figure 92, until inner arm of flex spring just contacts inner log of

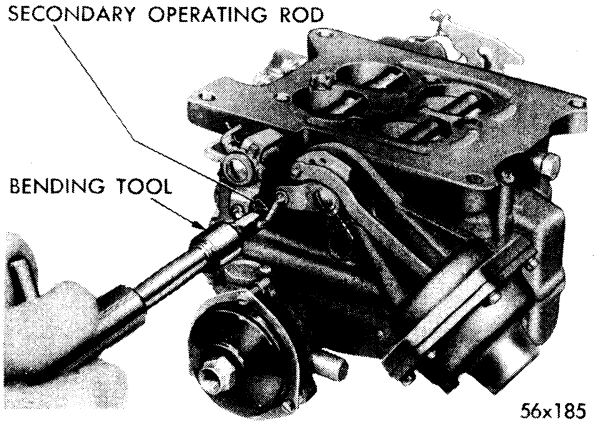


Fig. 90—Bending Secondary Operating Rod

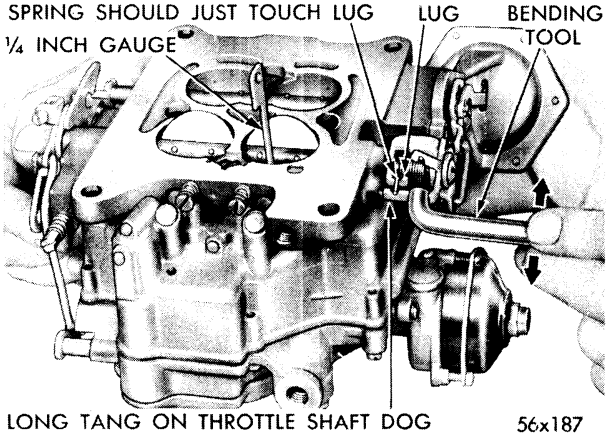


Fig. 92—Bending Tang on Throttle Shaft Dog (Step 2-A)

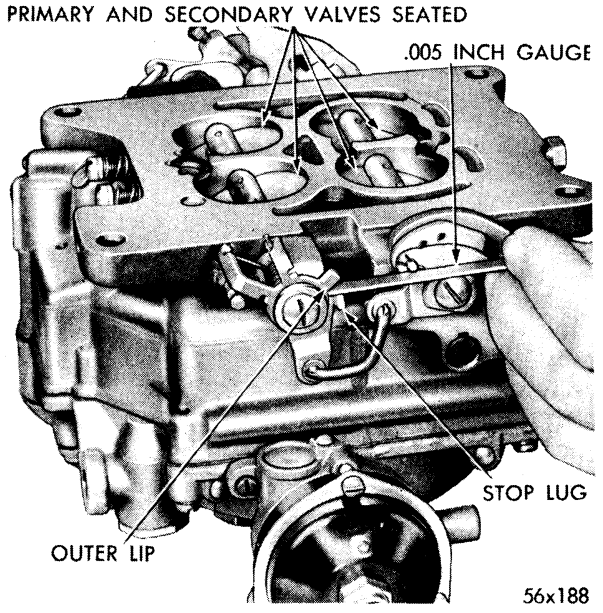


Fig. 93—Checking Opening of Secondary Throttle Valves (Step 3)

secondary operating lever.

(3) Close primary and secondary throttle valves tightly. It should be possible to insert gauge, Tool T-109-237. (.005 inch) between outer lip of secondary operating lever and stop lug on primary shaft dog, as shown in Figure 93.

If an adjustment is necessary, bend outer lip of secondary operating lever, using Tool T-109-214 in Figure 94, until correct clearance has been obtained. **After bending lip, be sure secondary operating lever operates freely and does not bind in any position.**

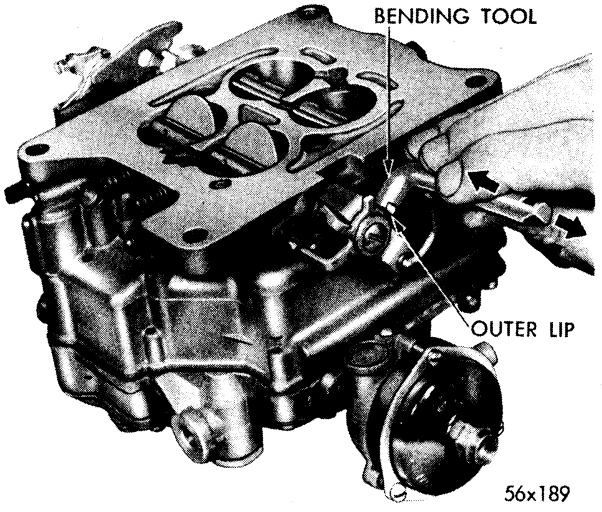


Fig. 94—Bending Outer Lip of Secondary Operating Lever (Step 3-A)

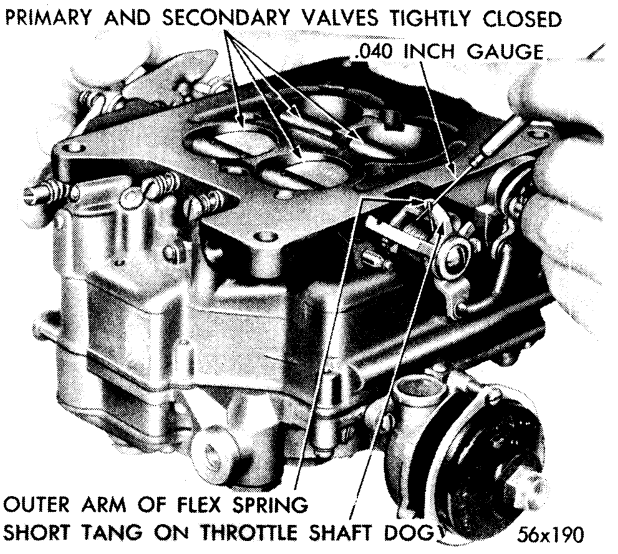


Fig. 95—Checking Opening of Secondary Throttle Valves (Step 4)

(4) With primary and secondary throttle valves tightly closed, it should be possible to insert wire gauge Tool T-109-193 (.040 inch) between short tang on primary throttle shaft dog and outer arm of flex spring, as shown in Figure 95.

If adjustment is necessary, bend short tang on throttle shaft dog, as shown in Figure 96, until correct clearance has been obtained. The idle speed and mixture adjustments can be made after carburetor has been installed on engine, as described in Paragraph 16. Install carburetor on engine, using new mounting flange gasket.

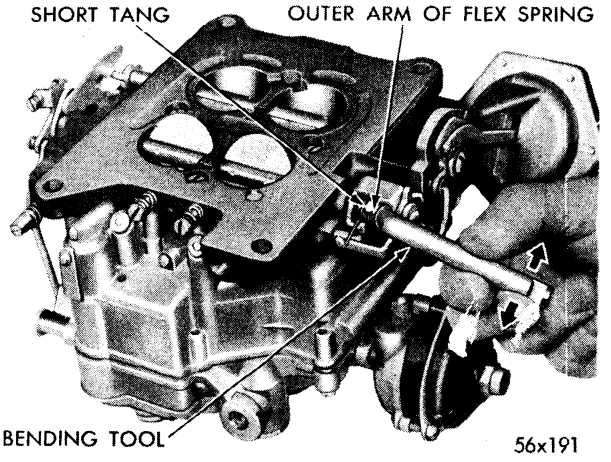


Fig. 96—Bending Short Tang on Throttle Shaft Dog (Step 4-A)

SERVICE DIAGNOSIS

22. 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.

23. 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 new needle valve and seat.

h. Install new throttle linkage.

i. Check and readjust automatic choke.

24. 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.

25. POOR PERFORMANCE—(mixture too rich)

a. Clean and reoil air cleaner.

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.

EXHAUST SYSTEM

The C-71 Model (single rocker shaft engine) exhaust system consists of exhaust and intake manifolds, heat control valve, cross-over pipe, "Y" exhaust pipe, exhaust extension pipe, muffler, and tail pipe, as shown in Figure 97.

The exhaust system of the C-70, C-72, and C-73 Models (double rocker shaft engine) is a dual exhaust system which consists of exhaust and intake manifolds, heat control valve, two exhaust pipes, two mufflers and two tail pipes, as shown in Figure 98.

SERVICE PROCEDURES

26. INTAKE AND EXHAUST MANIFOLDS (All Models)

Figures 99, 100, 101, and 102 show intake manifold and cross-over passages, illustrating flow of exhaust gases through intake manifold. This action tends to warm intake risers, which helps to vaporize fuel-air mixture in intake manifold.

a. Removal of the Intake Manifold

Remove air cleaner, drain radiator. Remove generator and disconnect carburetor linkage. Disconnect 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.

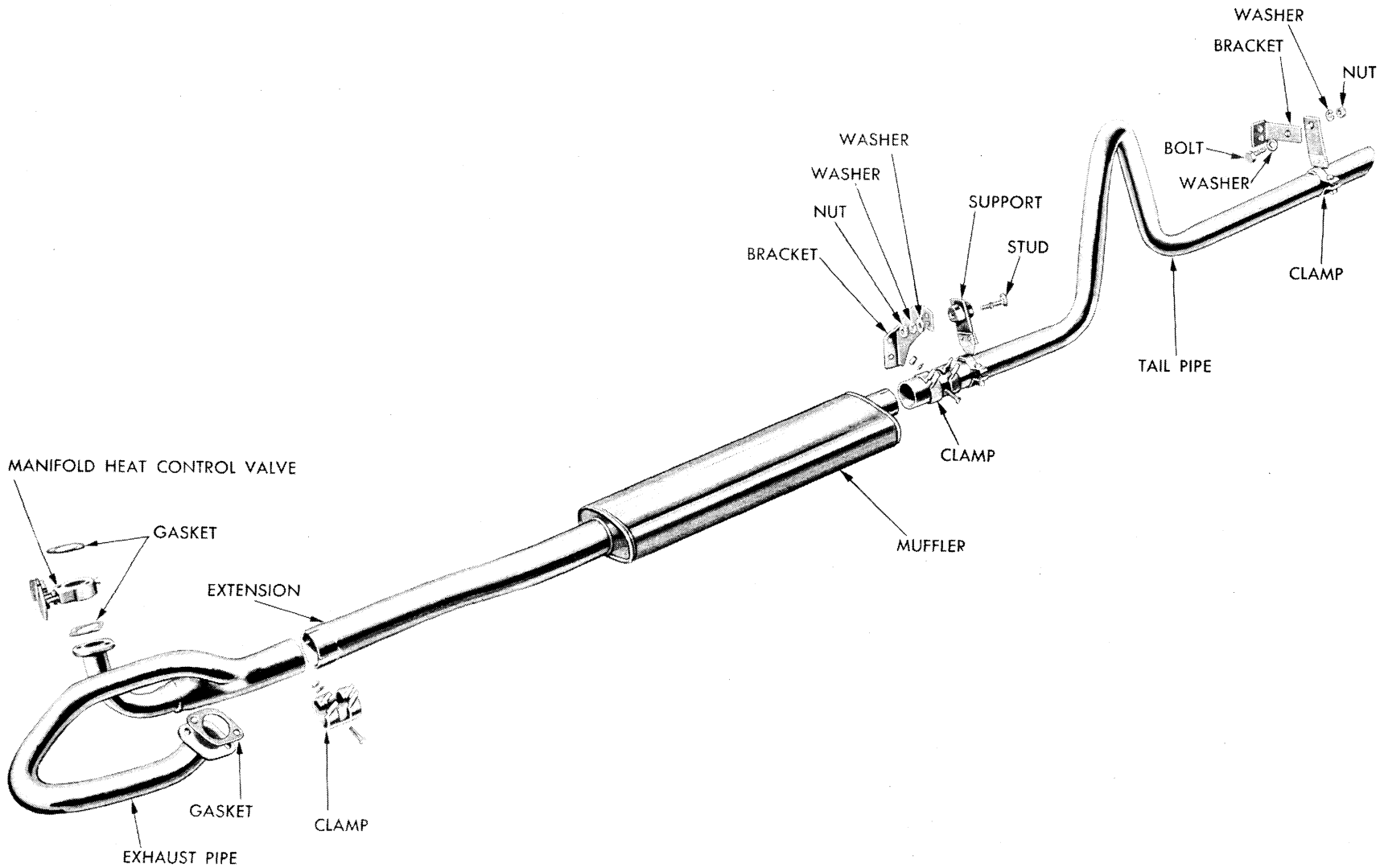


Fig. 97—Exhaust System (Single Rocker Shaft Engine)

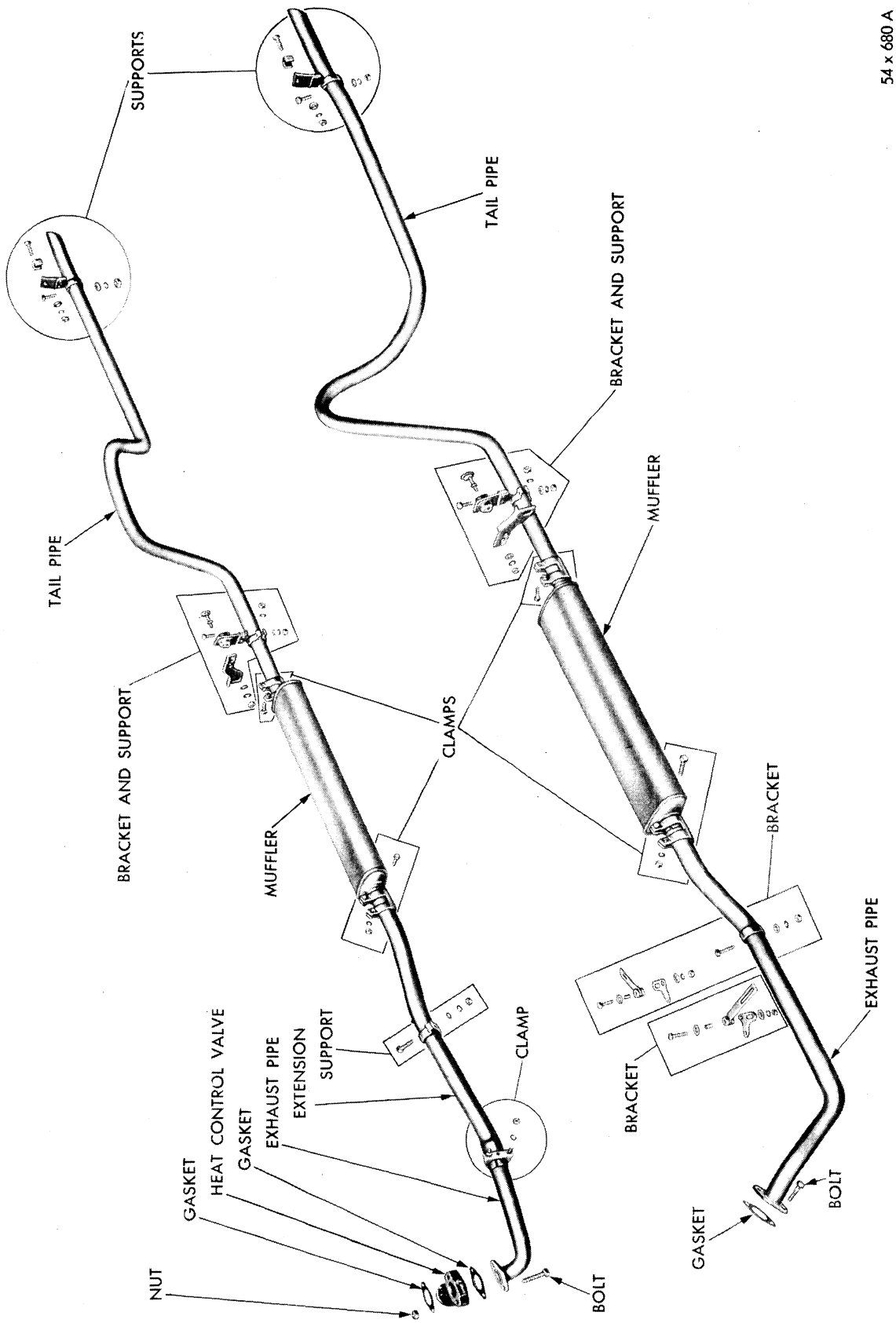


Fig. 98—Typical Dual Exhaust System

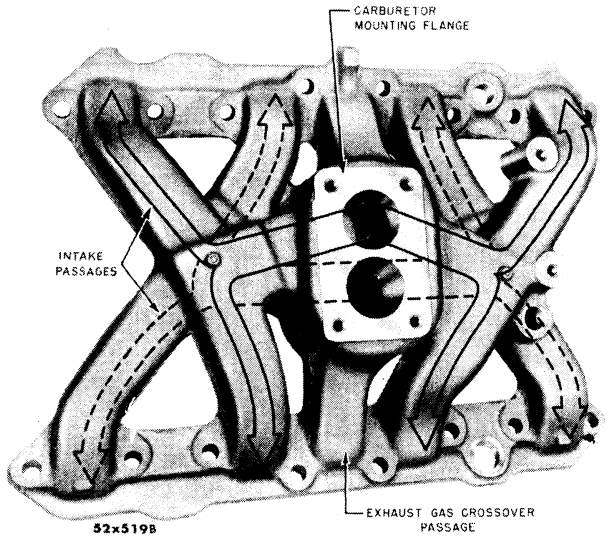


Fig. 99—Intake Manifold (Single Rocker Shaft Engine)

b. Removal of Left Side Exhaust Manifold

Remove nuts and bolts that hold exhaust pipe to manifold flange. Remove and discard gasket. Remove exhaust manifold retaining nuts, slide manifold off studs and 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 manifold heat control valve and exhaust pipe to exhaust manifold flange. Lift off heat control valve and gaskets. Discard gaskets. 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, slide manifold off studs and away from cylinder head.

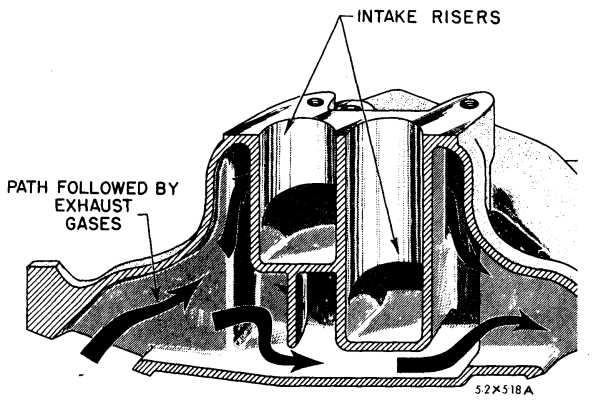


Fig. 100—Exhaust Cross-Over Passage Through Manifold (Single Rocker Shaft Engine)

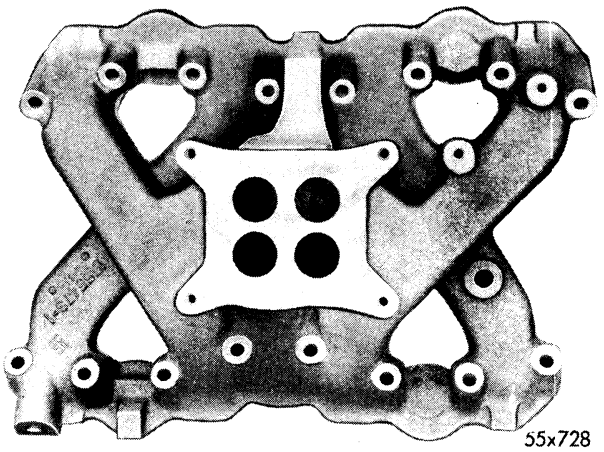


Fig. 101—Intake Manifold (Double Rocker Shaft Engine)

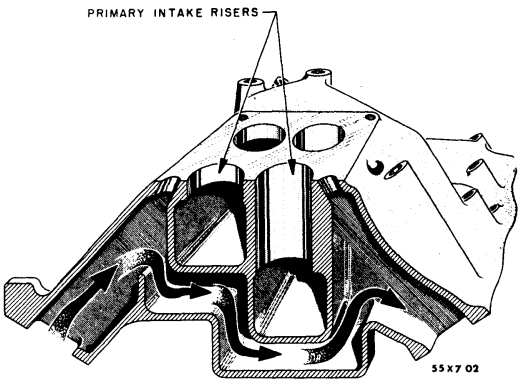


Fig. 102—Exhaust Cross-over Passages Throught Intake Manifold (Double Rocker Shaft Engine)

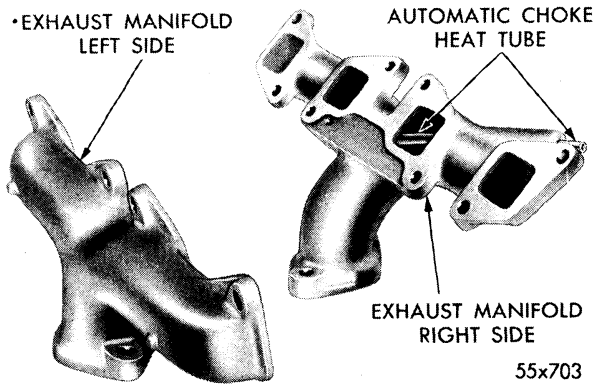


Fig. 103—Exhaust Manifolds

NOTE

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

27. 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 and cavity inlet passage. The passage and cavity must be clean and free from any obstructions. (See Fig. 103). New gaskets should be used when installing exhaust and intake manifolds and all mating surfaces must be clean and smooth.

28. 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 clamps which are insulated to eliminate vibration. A support, with a special insulator and clamp, 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.

29. EXHAUST SYSTEM (C-71 MODEL)

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 clamps several sharp blows with a soft hammer if clamps are rusted to pipes.

30. REMOVAL

Refer to Figure 97 and proceed as follows:

a. Cross-over Exhaust Pipe

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. Remove manifold heat control valve. Discard gasket. **On all cars be sure the exhaust system is sufficiently supported.** Remove "Y" pipe.

c. Muffler

Loosen or remove clamp bolts at muffler-to-exhaust pipe connection. Remove muffler.

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.

31. 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.

32. DUAL EXHAUST SYSTEM

The dual exhaust system is standard equipment on the C-72, C-73 and C-70 Models, and C-71 with Power Package.

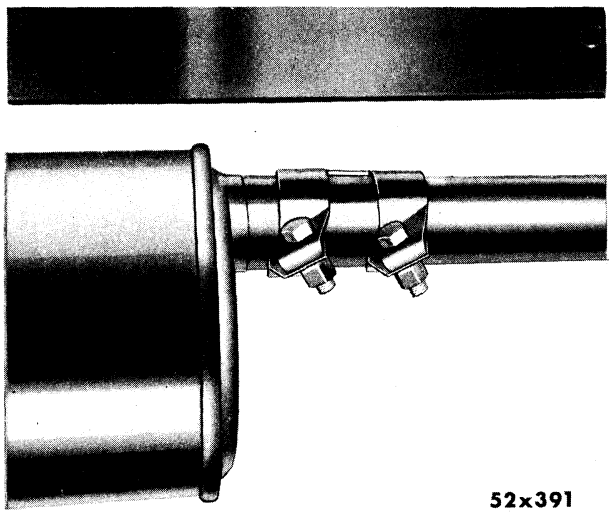


Fig. 104—Tail Pipe to Muffler Clamp

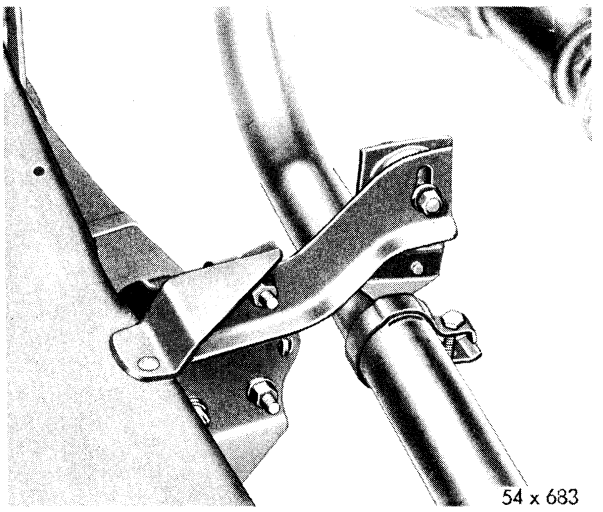


Fig. 105—Tail Pipe Front Support Bracket and Clamp

The service procedure for dual exhaust system (removal, installation and alignment) will be comparable to exhaust system for the C-71 with following exceptions.

In dual exhaust system, cross-over and "Y" exhaust pipes are not used; there is an individual exhaust pipe, muffler, and tail pipe for each cylinder bank. (Refer to Fig. 98.)

33. ALIGNMENT OF EXHAUST SYSTEMS

Figures 97, 98, 104, 105, and 106 illustrate various types of supports, insulators and clamps with procedures as follows:

Tighten exhaust manifold flange bolts and nuts evenly, to 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.

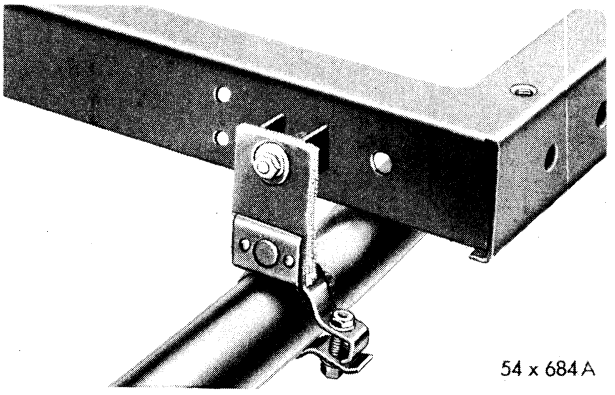


Fig. 106—Tail Pipe Rear Support and Clamp

MANIFOLD HEAT CONTROL VALVE

34. DESCRIPTION

The manifold heat control valve, as shown in Figure 107, is controlled by a thermostatic coil spring, counterweight, and velocity of exhaust gas through exhaust manifold. The thermostatic coil spring 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.

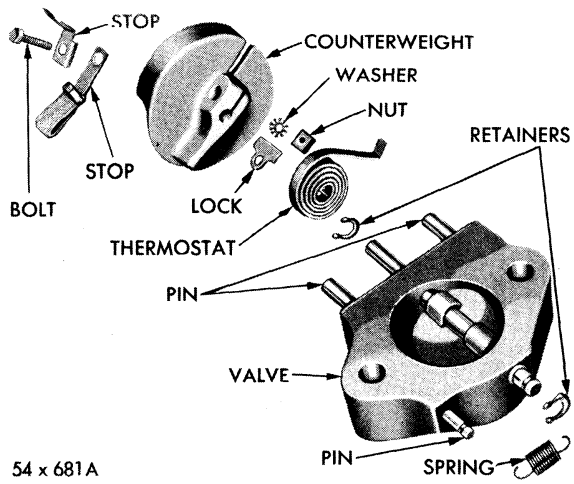


Fig. 107—Typical Manifold Heat Control Valve

NOTE

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

35. 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 coil spring is weak or broken. In either case, heat control valve should be disassembled and repaired.

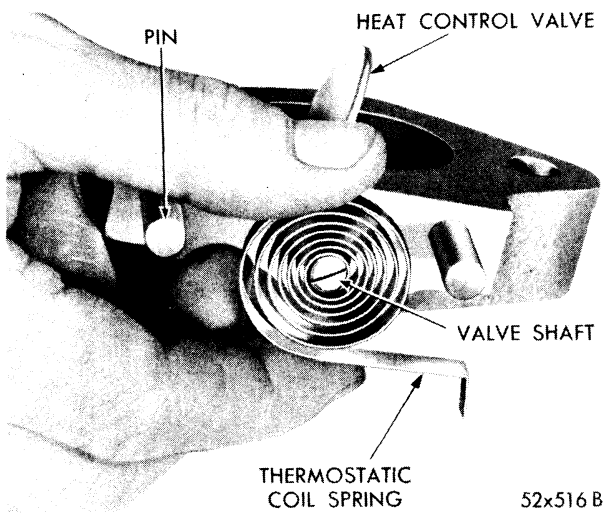


Fig. 108—Installing Thermostatic Coil Spring

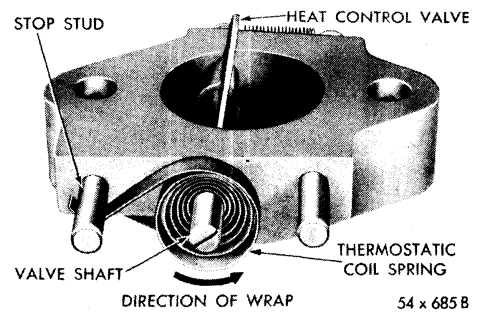


Fig. 109—Positioning Thermostatic Coil Spring

a. Disassembly

Refer to Figure 107 and proceed as follows:

Loosen retaining nut and remove counterweight, lock and stop from end of shaft, exposing the thermostatic coil spring. Unhook coil spring from pin and remove by prying out of valve shaft slot. If valve shaft is frozen in manifold, lubricate both ends with good grade of penetrating oil 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.

b. Assembly

Before installing heat control valve on engine,

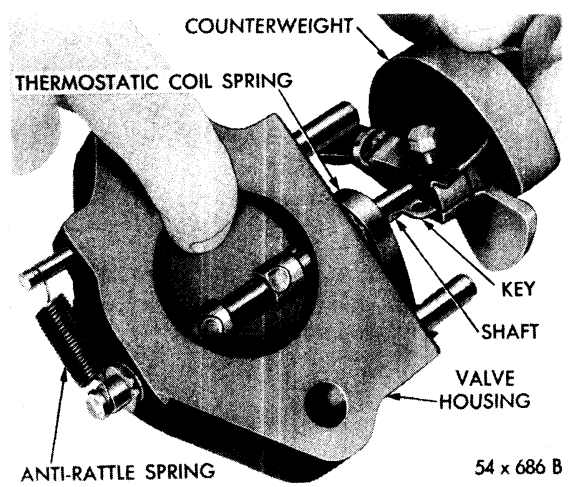


Fig. 110—Installing Heat Control Valve Counterweight

lubricate valve shaft with graphite paste. Position valve shaft in extreme counter-clockwise position. Place new coil spring in position over shaft slot, with outer end tongue of spring in upper left-hand position, as shown in Figure 108. Press inner end of coil into slot of shaft and seat firmly.

Move outer end tongue of spring around and hook under pin, as shown in Figure 109. Place counterweight over shaft (with shield in upward position) and insert lock in shaft slot, as shown in Figure 110. 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, as shown in Figure 111. Test valve for proper operation.

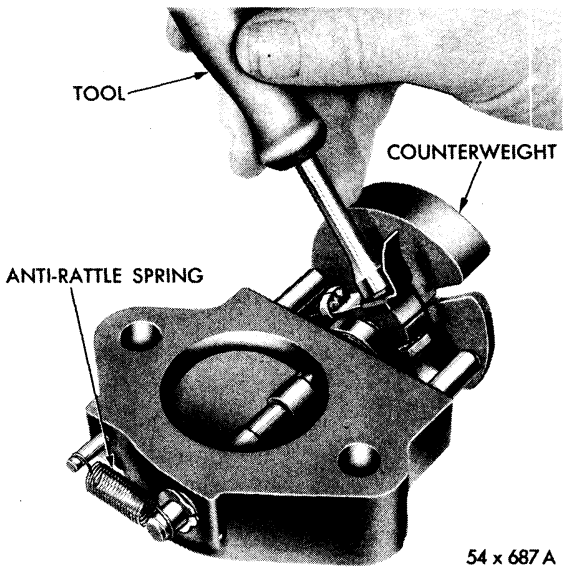


Fig. 111—Tightening Counterweight Bolt

SERVICE DIAGNOSIS

36. EXCESSIVE EXHAUST NOISE

a. Check system for bind. Loosen all hangers and shake car down by driving.

b. Install new muffler, check complete exhaust system for signs of failure, repair as required.

c. Install new manifold. Be sure manifold registers evenly with cylinder block before tightening nuts and bolts.

d. Install new gaskets as required after checking manifold for distortion. Be sure manifold registers evenly with cylinder block. 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 manifold and check mating surfaces. Place manifold on smooth surface and check mating flanges for alignment. If manifold shows sign of distortion (more than .004 inch), install new manifold and gaskets.

g. Check for leaks.

h. Replace exhaust pipe.

i. Tighten clamps or replace as necessary.

37. LEAKING EXHAUST GASES

a. Locate leak and correct.

b. Install new manifold and gaskets.

c. Install new gasket and tighten connections securely. 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. If necessary, install new manifold gaskets. Tighten nuts to 25 foot-pounds torque.

f. Remove manifold and check alignment of both intake and exhaust manifold mounting flanges. If misaligned, loosen bolts holding intake to exhaust manifold and install assembly.

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

h. 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.

i. Tighten clamp at rear muffler connection.

38. ENGINE HARD TO WARM UP

a. Check operation of heat control valve and make necessary repairs.

39. ENGINE WILL NOT RETURN TO IDLE

a. Remove the manifold heat control valve and check operation of the unit. Make necessary repairs.

40. 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.