FUEL SYSTEM

CONTENTS

GENERAL INFORMATION

SERVICING CARBURETOR

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

When overhauling the carburetor, several items of importance should be observed to assure a good job:

(1) All parts (except the choke diaphragm assembly) should be carefully cleaned in a suitable solvent, then inspected for damage or wear.

(2) Use air pressure only, to clear the various orifices and channels.

(3) Replace questionable parts with NEW ones. When checking parts removed from the 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.

(4) Always use a complete kit when overhauling the carburetor. Using the code number stamped on the air horn, adjacent to the fuel inlet, refer to the parts catalog and order the correct repair kit for the carburetor being worked on.

CLEANING CARBURETOR PARTS

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

The choke diaphragm can be damaged by solvents. Avoid placing the diaphragm assembly in **ANY** liquid. Clean the external surfaces with a clean cloth or soft wire brush. Shake dirt or other foreign material from the stem side of the diaphragm. Depressing the diaphragm stem to the retracted position, will provide an additional hole for the removal of dirt. Compressed air can be used to remove loose dirt, **but should not be connected to the vacuum inlet fitting.**

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

AUTOMATIC CHOKE (Well Type)

A new design well for the automatic choke has been incorporated in all engines except the 440 cu. in. tricarb installation and the 426 cu. in. Hemi. This new design allows faster opening of the choke mechanism resulting in leaner fuel mixtures during the warm-up period for reduced emissions and fuel consumption. (Fig. 1).

To function properly, it is important that all parts be clean and move freely. Other than an occasional cleaning, the automatic choke control requires no servicing. However, it is very important that the choke control unit works freely at the thermostatic coil spring housing and at the choke shaft. Move the choke rod up and down to check for free movement in the coil housing. If unit binds, a new unit should be installed. **The well type choke is serviced as an assembly. Do not attempt to repair or change the setting, unless authorized by service literature. Changes of the choke setting materially affect summer temperature cold starting and seldom are a satisfactory correction of drive-ability problems, which are generally associated with carburetors or vacuum diaphragms.**

Two types of wells are in general usage. One is cast as an integral part of the manifold. The second is a

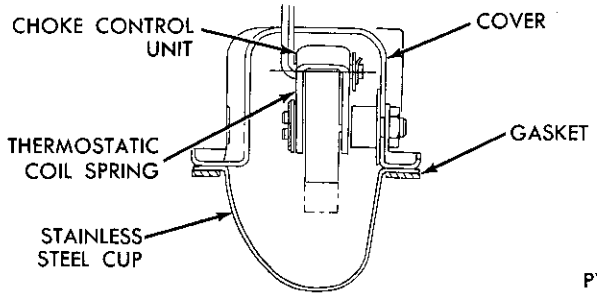


Fig. 1—Choke Control (Open Well) 8-cylinder Engine

stainless steel cup fastened over a port in the manifold (Fig. 1).

The stainless steel well cups are held in place by choke retainer bolts. A steel-asbestos gasket seals the exhaust gas within the manifold. **Loosening or removing the choke retainer bolts will allow exhaust gases to escape into the engine compartment. DO NOT RUN THE ENGINE WITHOUT THE CHOKE FIRMLY BOLTED TO THE MANIFOLD. FIRE OR HEAT DAMAGE MAY OCCUR.**

When installing the steel well cup, make certain the gasket is in good condition and is in place to prevent exhaust leakage.

Do not lubricate any of the choke parts or the control unit. This causes dirt to accumulate, and would result in binding of the choke mechanism.

The choke control unit is accurately adjusted when first assembled. Under normal servicing do **NOT** change the setting or disassemble the control unit. If however, the setting has been disturbed, reset as follows: Loosen locknut and turn shaft with screwdriver until index mark on disc is in alignment with correct mark on the frame. Hold in this position with screwdriver while tightening nut, (Refer to Specifications for indexing).

All the carburetors referred to in the Fuel System are either equipped for use with a Cleaner Air System (C.A.S.) or an Evaporation Control System, (E.C.S.) depending on the area in which the vehicle is to be used. The servicing procedures covering these carburetors are nearly identical. Differences between the two types of carburetors are covered (where applicable) in the service procedures.

CLEANER AIR SYSTEM (C.A.S.)

The cleaner air system consists of a special air cleaner, breather cap, ventilation valve, carburetor, distributor and various other automatic control devices, (Fig. 2) as required.

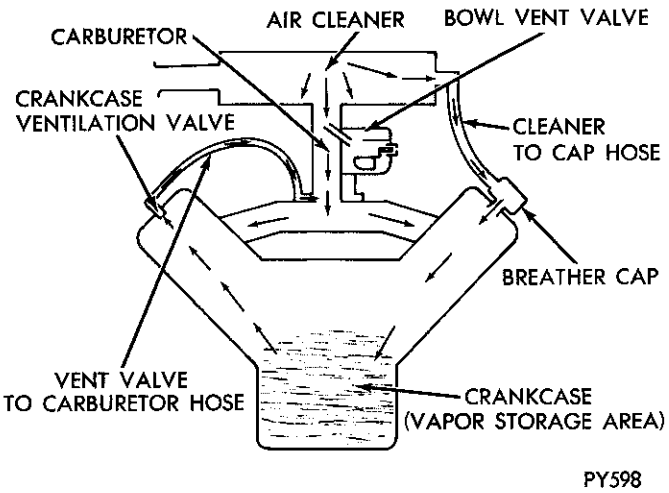


Fig. 2—Cleaner Air System (C.A.S.)

The function of the cleaner air system is to reduce the unburned hydro-carbons emitted by the vehicle's engine. Fresh air is drawn into the air cleaner, for consumption by the engine. A portion of this fresh air is diverted through a hose to the breather cap and into the crankcase. Manifold vacuum causes crankcase vapors (including fresh air and unburned hydro-carbons) to flow through the crankcase ventilation valve to the base (or throttle body) of the carburetor. These vapors are joined with the fuel mixture in the intake manifold and are delivered into the combustion chamber, from which they are ejected as essentially completely burned exhaust products.

EVAPORATION CONTROL SYSTEM (E.C.S.)

The evaporation control system consists of the C.A.S. system plus, a special vented fuel tank, separator, fuel tank vapor tube, breather cap, enclosed bowl vent valve, a vacuum pressure relief fuel tank cap and hoses (Fig. 3).

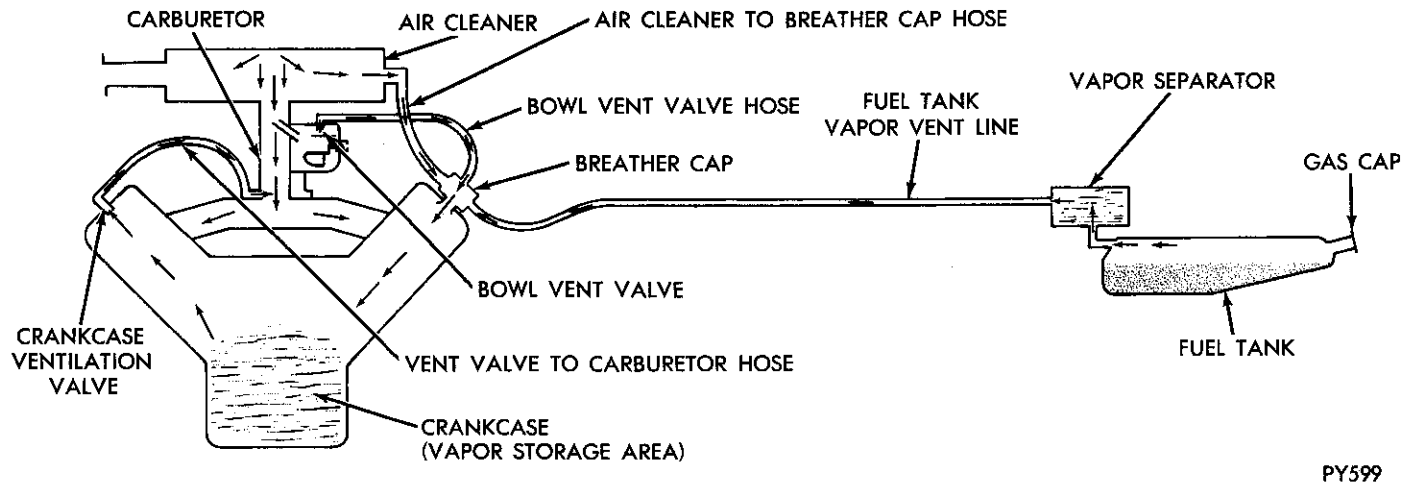


Fig. 3—Evaporation Control System (E.C.S.)

The function of the evaporation control system is to reduce the loss of fuel from the fuel system to the atmosphere by evaporation and reduce the unburned hydro-carbons emitted by the vehicle's engine. When fuel evaporates from the carburetor or fuel tank, it passes through vent hoses or tubes to the crankcase. With the engine running, vapors are purged from the crankcase through the crankcase ventilation system, as in the Cleaner Air System previously described.

The fuel tank contains a one gallon overfill limiter tank. When the fuel tank is filled, the overfill limiter tank remains essentially empty, to allow for thermal expansion. Each corner of the fuel tank is vented and each of the hoses from these vents are connected to the separator. A tube from the separator leads to the breather cap. Thus evaporated fuel vapor from the fuel tank, flows through the separator, to the engine crankcase and then through the crankcase ventilation system. In addition, the carburetor fuel bowl vent valve is also included, by a tube from the vent valve to the breather cap, or fuel pump. (6 Cylinder engines.) This completely seals the fuel system.

Idle Speed Adjustment (Curb Idle)

To make the idle speed adjustment on carburetors, secure an accurate ignition tachometer and a Sun Electric Combustion-Vacuum Unit, Model 80, Exhaust Condenser, Model EC, and Hose 669-14 or equivalent. (The above analyzer is recommended; however, other reliable makes of analyzers in good condition may be used). Proceed as follows:

(1) Engine running at normal operating temperature, and timing checked, (refer to Distributor Specifications).

(2) Air Cleaner installed.

(3) Automatic transmissions in neutral position (not in park position).

(4) On air conditioned cars, turn air conditioning **off.**

(5) Connect ignition tachometer.

(6) Insert probe of exhaust gas analyzer in tail pipe as far as possible (2 ft. minimum distance). On dual exhaust cars use left side tail pipe (side opposite heat valve). It is very important that probe and connecting tubing be free of leaks to prevent erroneous reading. If a garage exhaust system is used to conduct exhaust gases away, a plenum chamber or other means must be used to reduce vacuum or exhaust system to 1/2 inch water or less.

(7) Connect exhaust gas analyzer, warm up and calibrate according to manufacturer's instructions.

(8) Disconnect hose between distributor vacuum control valve and intake manifold.

(9) Set idle speed to specified value for specific engine-transmission combination.

(10) **IMPORTANT: When adjusting mixture screws to obtain air/fuel ratio specified, do not turn the mixture screw more than 1/16 turn at a time. The combustion analyzer is so sensitive that the ratio must be changed in very small increments if accurate readings are to be obtained. The meters read in air/fuel ratio so that a higher reading indicates a leaner mixture and vice versa.**

(a) Adjust each screw 1/16 turn richer (counterclockwise) and wait 10 seconds before reading meter.

(b) If necessary, repeat step "a" until meter indicates a definite increase in richness (lower reading). This step is very important since meter reverses its readings and indicates a richer mixture as carburetor is leaned out if carburetor is set too lean.

(c) When it has been established that meter is indicating a lower reading (richer mixture) when idle mixture screws are turned in richer direction, proceed to adjust carburetor to give 14.2 air/fuel ratio, turning screws counterclockwise (richer) to lower meter reading and clockwise (leaner) to increase meter reading.

(d) If idle speed changes as mixture screws are turned, adjust speed to specified value and readjust mixture as required so that 14.2 air/fuel ratio is obtained at specified idle speed.

ROUGH IDLE AND LOW SPEED SURGE

Rouge idle and low speed surge on vehicles (using 1-1/2" BBD, AVS, and Holley 4160 carburetors) may be the result of improper idle setting balance between the right and left carburetor bores. To correct this condition the following steps should be followed.

(1) Remove the plastic caps from the two idle screws in base of carburetor (1-1/2" BBD and AVS) or cup or in the sides if the primary metering block (Holley). (Figs. 1, BBD, AVS, and Holley).

(2) With exhaust thoroughly warmed up, install an approved exhaust gas analyzer for carburetor idle speed and mixture adjustment as described under "Idle Speed Adjustment".

(3) With a narrow screw driver, turn the two idle screws clockwise until they are both seated.

(4) Turn both idle screws **1-1/2** turns counterclockwise for 1-1/2" BBD carburetors and 2 to 3 turns counterclockwise for AVS carburetors as a starting point (experience may dictate more or less turns as a rough setting but both screws should be turned equally).

(5) Start engine and set specified idle speed for engines with 300 or more miles. Set 75 rpm below specifications if under 50 miles or 50 rpm below specifications if 50 to 300 miles are on engine.

(6) Observe air/fuel ratio reading of exhaust gas analyzer. Turn each screw 1/16 turn richer (counter-

clockwise) and note change in air/fuel meter reading. From this point on, follow instructions for idle setting until 14.2 air/fuel ratio is obtained at approximate idle speed. It is very important that both idle limiter screws be turned the same amount on each adjustment so that as finally set both screws will be the same number of turns from the seated position.

(7) Install plastic caps over idle screws.

SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
POOR IDLING	(a) Idle air bleed carbonized or of incorrect size.	(a) Disassemble carburetor. Then, use compressed air to clear idle bleed after soaking it in a suitable solvent.
	(b) Idle discharge holes plugged or gummed.	(b) Disassemble carburetor. Then, use compressed air to clear idle discharge holes after soaking main and throttle bodies in a suitable solvent.
	(c) Throttle body carbonized or worn throttle shaft.	(c) Disassemble carburetor. Check throttle valve shaft for wear. If excessive wear is apparent, replace throttle body assembly.
	(d) Damaged or worn idle mixture needle.	(d) Replace worn or damaged idle needle. Adjust air mixture.
	(e) Low grade fuel or incorrect float level.	(e) Test fuel level in carburetor. Adjust as necessary to obtain correct float level.
	(f) Loose main body to throttle body screws.	(f) Tighten main body to throttle body screws securely to prevent air leaks and cracked housings.
	(g) Worn or corroded needle valve and seat.	(g) Clean and inspect needle valve and seat. If found to be in questionable condition, replace assembly. Then, test fuel pump pressure. Refer to Specifications for correct fuel pump pressure.
	(h) Incorrect valve lash.	(h) Adjust valves.
	(i) Engine miss (ignition).	(i) Check ignition system.
	(j) Incorrect timing.	(j) Reset timing.
POOR ACCELERATION	(a) Accelerator pump piston (or plunger) leather too hard, worn, or loose on stem.	(a) Disassemble carburetor. Replace accelerator pump assembly if leather is hard, cracked or worn. Test follow-up spring for compression.
	(b) Faulty accelerator pump discharge ball.	(b) Disassemble carburetor. Use compressed air to clean discharge nozzle and channels after soaking main body in a suitable solvent. Test accelerator pump capacity.
	(c) Faulty accelerator pump inlet check ball.	(c) Disassemble carburetor. Check accelerator pump inlet check ball for poor seat or release. If part is faulty, replace.
	(d) Incorrect fuel or float level.	(d) Test fuel or float level in carburetor. Adjust as necessary to obtain correct float level.
	(e) Worn accelerator pump and throttle linkage.	(e) Disassemble carburetor. Replace worn accelerator pump and throttle linkage and measure for correct position.
	(f) Manifold heat valve sticking.	(f) Free up manifold heat control valve; using recommended solvent.
	(g) No power mixture.	(g) Test power piston operation.
	(h) Incorrect timing.	(h) Reset timing.
	(i) Incorrect pump setting.	(i) Reset pump.
CARBURETOR FLOODS OR LEAKS	(a) Cracked body.	(a) Disassemble carburetor. Replace cracked body. Make sure main to throttle body screws are tight.

Condition	Possible Cause	Correction
	(b) Faulty body gaskets.	(b) Disassemble carburetor. Replace defective gaskets and test for leakage. Be sure screws are tightened securely.
	(c) High float level.	(c) Test fuel level in carburetor. Make necessary adjustment to obtain correct float level.
	(d) Worn needle valve and seat.	(d) Clean and inspect needle valve and seat: If found to be in a questionable condition, replace complete assembly and test fuel pump pressure. Refer to Specifications for correct fuel pump pressure.
	(e) Excessive fuel pump pressure.	(e) Test fuel pump pressure. If pressure is in excess of recommended pressure (refer to Specifications), replace fuel pump.
POOR PERFORMANCE MIXTURE TOO RICH	(a) Restricted air cleaner.	(a) Remove and clean air cleaner.
	(b) Leaking float.	(b) Disassemble carburetor. Replace leaking float. Test float level and correct as necessary, to proper level.
	(c) High float level.	(c) Adjust float level as necessary to secure proper level.
	(d) Excessive fuel pump pressure.	(d) Test fuel pump pressure. Refer to specifications for recommended pressure. If pressure is in excess of recommended pressure, replace fuel pump assembly.
	(e) Worn metering jet.	(e) Disassemble carburetor. Replace worn metering jet, using a new jet of correct size and type.
POOR COLD ENGINE STARTING INCORRECT PROCEDURE	(a) (See owner's Manual.)	(a) Instruct owner.
CHOKE VALVE FAILS TO CLOSE	(a) Choke thermostat adjustment leaner than specified.	(a) Adjust.
	(b) Choke thermostat corroded such that it has cracked and distorted lean.	(b) Replace assembly.
	(c) Choke linkage, shaft or related parts corroded, bent or dirty such that system is not entirely free to move from open to closed position.	(c) Repair, clean or replace.
	(d) Choke valve improperly seated.	(d) Reseat valve.
	(e) Air cleaner interfers with choke shaft or linkage.	(e) Rotate cleaner to correct position, instruct owner.
	(f) Air cleaner gasket interfers with choke valve or linkage.	(f) Reinstall gasket properly.
	(g) Spring staging spring distorted or missing.	(g) Replace or install new spring.
LOW ENGINE OUTPUT (10°F or lower)	(a) Engine lubricating oil incorrect viscosity.	(a) Recommend 5W-20.
	(b) Choke thermostat adjustment incorrect, rich.	(b) Adjust to correct setting.
ENGINE RUNS LEAN, FIRST HALF MILE		
CHOKE LEAN	(a) Review items under (Poor Starting).	(a) See "Choke Valve Fails to Close."
	(b) Diaphragm adjustment lean.	(b) Readjust to specification.
ENGINE RUNS LEAN AFTER HALF MILE		
ENGINE HEAT INSUFFICIENT	(a) Heat valve stuck open.	(a) Free with solvent.
	(b) Heat valve thermostat distorted.	(b) Replace thermostat.

Condition	Possible Cause	Correction
	(c) Heat valve failed within exhaust. See engine section for proper diagnosis.	(c) Replace heat valve.
	(d) Water temperature subnormal.	(d) Check thermostat.
CARBURETOR MIXTURES LEAN	(a) Air leak bypassing the carburetor.	(a) Repair.
	(b) Carburetor has economy metering system.	(b) Inform customer.

ENGINE RUNS EXCESSIVELY RICH AFTER COLD START

CHOKE SYSTEM RICH	(a) Choke thermostat adjustment richer than specified.	(a) Correct.
	(b) Choke vacuum diaphragm inoperative or misadjusted.	(b) Correct or replace.
	(c) Choke vacuum passage blocked or leaking.	(c) Correct.
CARBURETOR RICH	(a) Incorrect gasket or gasket installation between carburetor and intake manifold.	(a) Replace or correct.

EXCESSIVE STALLS AFTER COLD START

CHOKE SYSTEM LEAN	(a) Review items under "Poor Starting-Choke Valve Fails to Close."	
	(b) Choke vacuum diaphragm adjustment lean.	(b) Adjust to Specification.
ENGINE OUTPUT LOW	(a) Fast idle speed low.	(a) Adjust to Specification.
	(b) Fast idle cam position adjustment incorrect.	(b) Adjust to Specification.
	(c) Engine lubrication oil of incorrect viscosity.	(c) Recommended 5W-20.
	(d) Incorrect timing.	(d) Reset timing.
CARBURETOR LEAN	(a) Curb idle set very lean.	(a) Adjust.
	(b) Air leak bypassing the carburetor.	(b) Repair.

BBD SERIES CARBURETORS (1½")

INDEX

GENERAL INFORMATION

The Ball and Ball dual throat 1-1/2 inch Carburetor Model C.A.S. (Cleaner Air System) BBD-4725S, BBD-4726S and BBD-4894S are used on the 383 cu. in. Engines when the vehicles are equipped with manual or automatic transmissions respectively (Fig. 1). BBD-4726S is used only on vehicles without air conditioning while BBD-4894S is used only on vehicles with air conditioning. This carburetor is equipped with a hot idle compensator valve, which is a thermostatically operated air bleed, to relieve an overrich condition at idle. This condition is the result of excessive heat and resultant overrich mixtures. These three carburetors are also equipped with a distributor ground switch, which retards the distributor when the carburetor is at curb idle, for better emission control.

The Ball and Ball dual throat 1-1/2 inch carburetor models E.C.S. (Evaporation Control System) BBD-4727S and BBD-4728S are used on the 383 cu. in. engines when the vehicles are equipped with manual and automatic transmissions respectively (Fig. 2). Both

of these carburetors are equipped with a hot idle compensator valve which is a thermostatically operated air bleed to relieve an overrich condition at idle. This condition is the result of excessive heat and resultant overrich mixtures. These two carburetors are also equipped with a distributor ground switch, which retards the distributor when the carburetor is at curb idle, for better emission control.

Since the service procedures are identical on all BBD carburetors, the illustrations showing the various disassembly procedures will not always show any one specific carburetor.

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

On each BBD series carburetor, the 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.

SERVICE PROCEDURES

DISASSEMBLING CARBURETOR (Figs. 1 or 2.)

(1) Insert three Tool T-109-287S and one Tool T-109-288S elevating legs through carburetor throttle body stud holes. (These tools are used to protect throttle valves from damage and to provide a suitable base for working.)

(2) Remove hairpin clip and disengage fast idle connector rod from fast idle cam and choke lever.

(3) Remove hairpin clip and disengage accelerator rod from throttle lever and pump rocker arm.

(4) Remove vacuum hose between carburetor throttle body fitting and vacuum diaphragm.

(5) Remove clip from choke operating link and disengage link from diaphragm plunger and choke lever. (Figs. 1 or 2).

(6) Remove vacuum diaphragm and bracket assembly and place to one side, to be cleaned as a special item. **A liquid cleaner may damage the diaphragm material.**

(7) Remove screws that attach hot idle compensator valve cover to main body. Remove cover and lift out hot idle compensator valve and gasket (Fig. 3).

(8) Remove air horn retaining screws and lift air

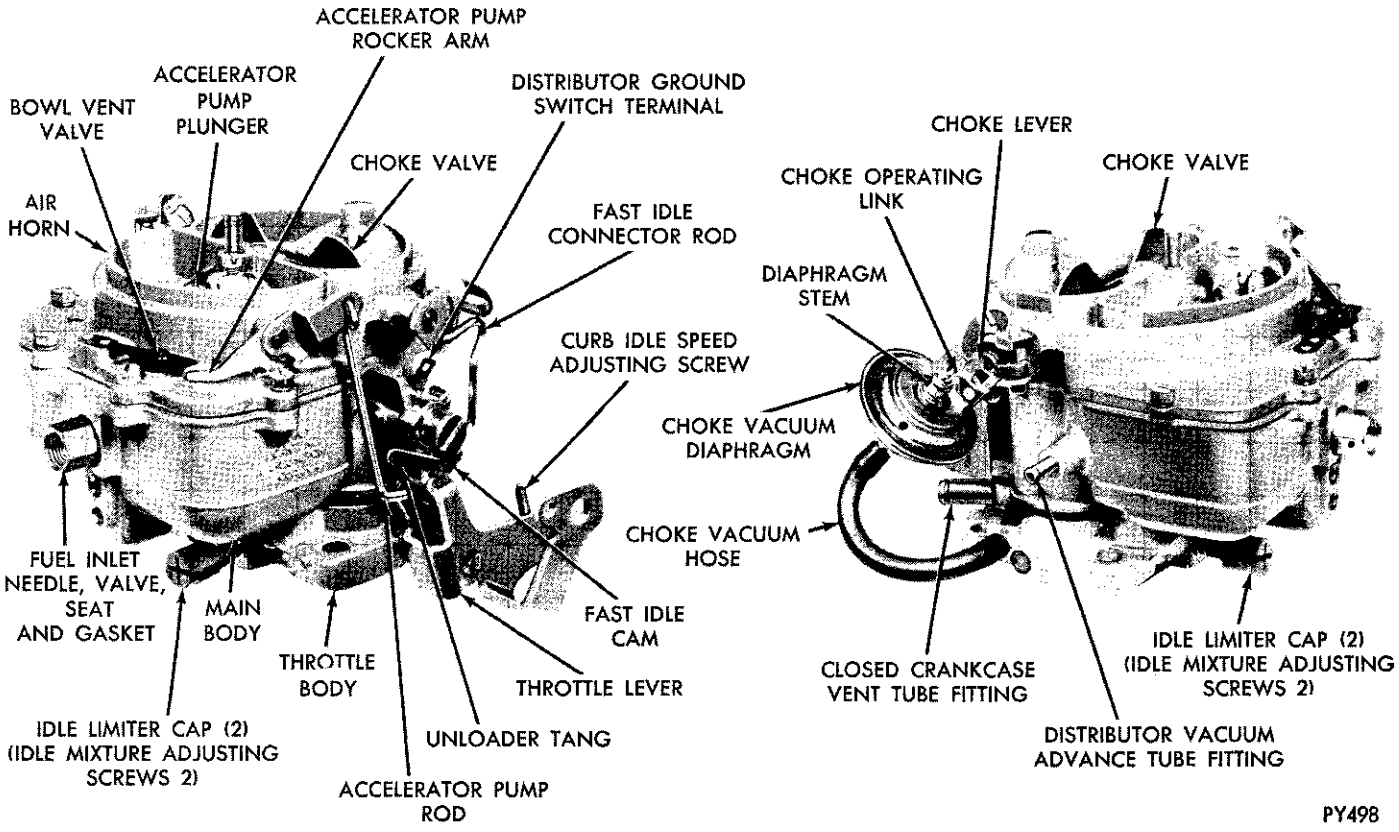


Fig. 1—Carburetor Assembly (BBD-1-1/2 inch) C.A.S.

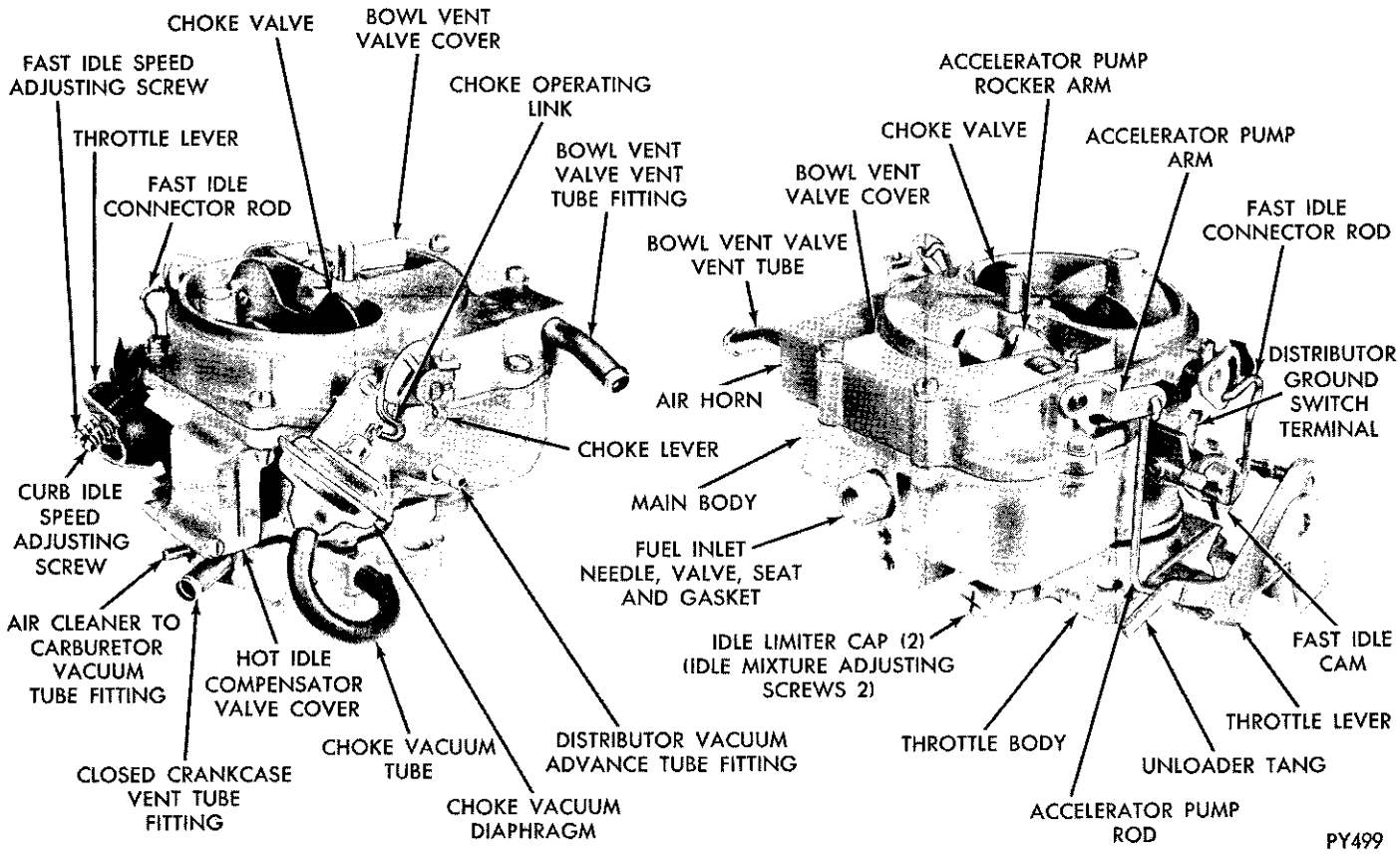


Fig. 2—Carburetor Assembly (BBD 1-1/2 inch) E.C.S.

horn straight up and away from main body. Discard gasket (2 screws recessed).

(9) Disengage accelerator pump plunger from accelerator pump arm by pushing up on bottom of plunger and sliding plunger shaft off hook. Slide plunger out of air horn and remove compression spring and seat. Remove bowl vent valve cover.

If old plunger can be used again or if a new plunger is to be installed, place plunger in a jar of clean gasoline or kerosene to prevent leather from drying out.

(10) Remove fuel inlet needle valve, seat and gasket from main body.

(11) Lift out float fulcrum pin retainer, and lift out floats and fulcrum pin.

(12) Remove step-up piston and retaining screw and slide step-up piston and rods out of well, (Fig. 4). Lift out step-up piston spring. Remove step-up piston gasket from bottom of well.

(13) Remove main metering jets (Fig. 5).

(14) Remove venturi cluster screws, then lift venturi cluster and gaskets up and away from main body, (Fig. 6). Discard gaskets. **Do not remove idle orifice**

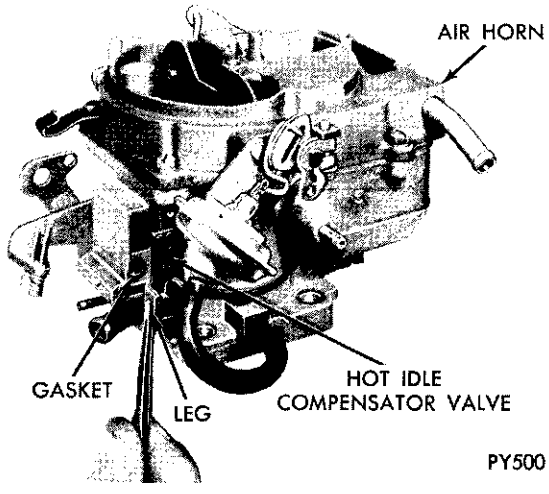


Fig. 3—Removing or Installing Hot Idle Compensator Valve

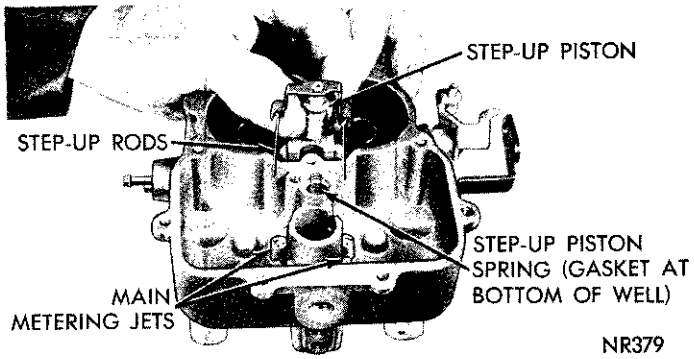


Fig. 4—Removing or Installing Step-Up Piston

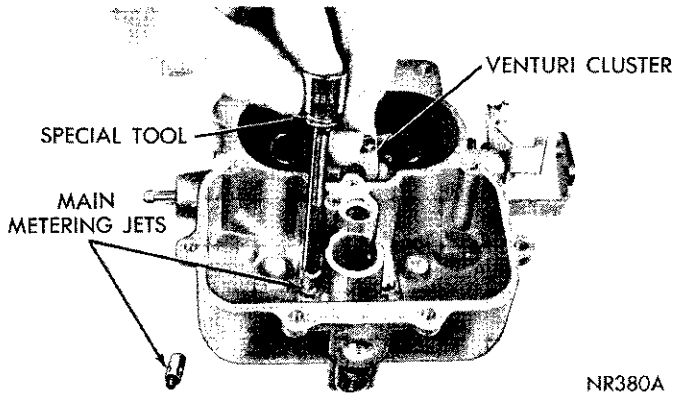


Fig. 5—Removing or Installing Main Metering Jets

tubes or main vent tubes from cluster. They can be cleaned in a solvent and dried with compressed air.

(15) Invert carburetor and drop out accelerator pump discharge check ball and intake check ball. (The intake check ball is the largest.)

(16) Remove screws that attach throttle body to main body. Separate the bodies and discard gasket.

(17) Remove plastic limiter caps from idle air mixture screws. (Be sure and count number of turns to seat the screws, as the same number of turns (from the seat) must be maintained at installation.) Remove screws and springs from throttle body.

The carburetor now has been disassembled into three sub-assemblies, the air horn, main body and throttle body and the components of each disassembled as far as necessary for cleaning and inspection.

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

There is about .005 inch clearance between the throttle shaft and the throttle shaft bores in the throttle body. Any clearance over .010 inch, a new throttle shaft and/or throttle body should be installed.

INSPECTION AND REASSEMBLY

Throttle Body

(1) Inspect the throttle shaft and throttle body for excessive wear. If either or both are worn to the point where the carburetor operation will be affected, replace as required.

During manufacture, the location of the idle transfer port and the spark advance control ports to the throttle valve, is carefully established for one particular assembly, (Fig. 7).

If a new shaft should be installed in an old, worn throttle body, it would be very unlikely that the original relationship of the ports to the valves would be obtained. Changing the relationship of the valves to the ports would adversely affect normal car operation between the speeds of 15 and 30 miles per hour. If it has been determined, however, that a new shaft or

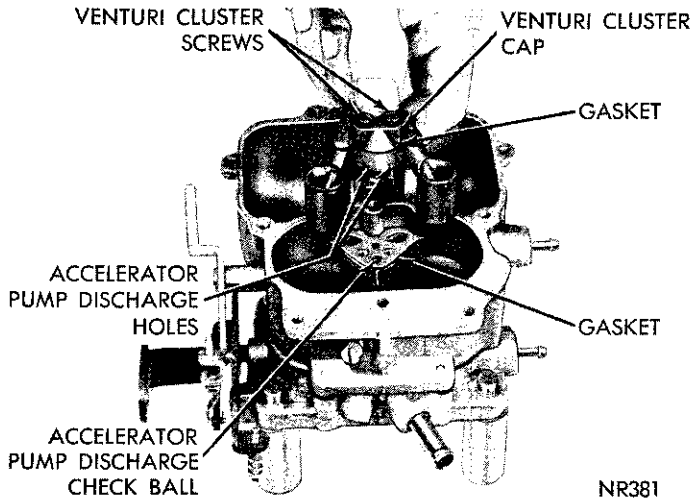


Fig. 6—Removing or Installing Venturi Cluster

valves is to be installed, adhere to the following instructions:

(2) Mark position of throttle valves in bores.

(3) Remove screws that hold throttle valves to shaft and slide valves out of bores. **These screws are staked on the opposite side and care should be used at removal so as not to break off in the shaft.**

Remove the staked end of the screws with a file.

(4) Slide throttle shaft and lever out of body.

(5) Install new throttle shaft and lever.

(6) Install throttle valves in their respective bores (with valve numbers toward manifold). Install new screws but do not tighten. Hold valves in place (fully closed position) with fingers pressing on high sides of valves. Tap valves lightly with a screwdriver to seat in throttle bores. Partially tighten screws. Hold up to a strong light to check for a proper position in bore. (They may have to be rotated slightly as the valves are eliptical.) When properly positioned tighten screws securely and stake, using pliers.

(7) Install idle mixture screws and springs in body. (The tapered portion must be straight and smooth. If tapered portion is grooved or ridged, a new idle mixture screw should be installed to insure having correct idle mixture control.) **DO NOT USE A SCREW DRIVER.** Turn screws lightly against their seats with

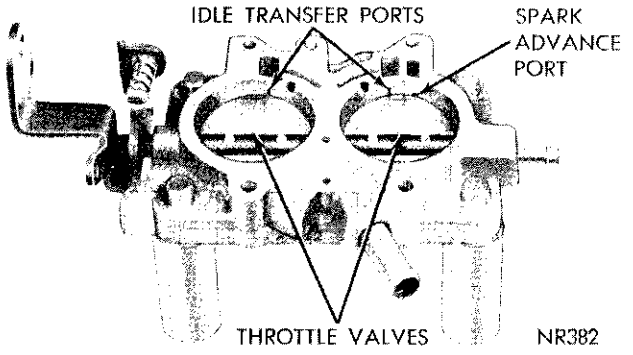


Fig. 7—Ports in Relation to Throttle Valves

fingers. Back off the number of turns counted at disassembly. Install new plastic caps with tabs against stop. **This screw has a left hand thread. Turn counterclockwise (Richer) and clockwise (Leaner).**

Main Body

(1) Invert main body and place a new gasket in position and place throttle body on main body and align. Install screws and tighten securely.

(2) Install accelerator pump discharge check ball in discharge passage and check accelerator pump system; fuel inlet and discharge check balls as follows:

(3) Pour clean gasoline into carburetor bowl, approximately 1/2 inch deep. Remove pump plunger from jar of gasoline, flex leather several times, then slide down into pump cylinder. Raise plunger and press lightly on plunger shaft to expel all air from pump passage.

(4) Using a small clean brass rod, hold discharge check ball down firmly on its seat. Again raise plunger and press downward. No fuel should be emitted from either intake or discharge passage, (Fig. 8).

If any fuel does emit from either passage, it indicates the presence of dirt or a damaged check ball seat. Check the passage again and repeat test. If leakage is still evident, install a new check ball. The fuel inlet check ball is located at the bottom of the plunger well.

(5) Install new gaskets on venturi cluster, and install in position in main body. Install cluster screws and tighten securely. Test pump discharge by pressing pump plunger down. Two fine streams of fuel should be forced from cluster. If either stream is restricted or diverted, remove cluster and reclean. After test, pour fuel from the bowl and remove pump plunger.

(6) Install main metering jets. Tighten securely. (Fig. 5).

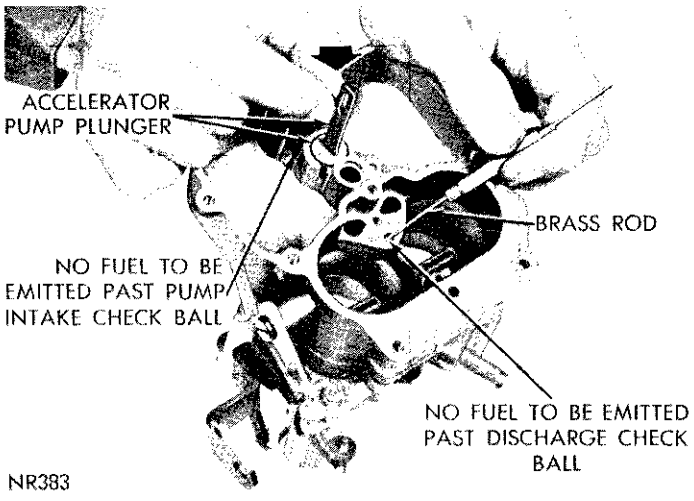


Fig. 8—Testing Accelerator Pump Intake and Discharge Check Balls

(7) Before installing step-up piston, be sure step-up rods are able to move freely, each side of the vertical position, (Fig. 9). (The step-up rods must be straight, smooth and free to move forward and backward from vertical.)

(8) Slide step-piston gasket down into position in piston well, then install the step-up piston spring, step-up piston and rods. Carefully guide step-up rods into main metering jets (Fig. 4). Install retaining screw and tighten securely. Check piston for free operation in well.

A step-up piston stuck in the **Up** position will cause a rich mixture at part throttle, whereas a piston stuck in the **Down** position will cause a lean mixture at wide open throttle and poor acceleration.

Measuring Float Setting

The carburetors are equipped with a rubber-tipped fuel inlet needle. The rubber tip is flexible enough to make a good seal on the needle seat, and to give increased resistance to flooding. Care should be taken to perform this operation accurately in order to secure the best performance and fuel economy.

(1) To correctly set float height when carburetor is being overhauled, install floats with fulcrum pin and pin retainer in main body.

(2) Install rubber-tipped needle, seat and gasket in body and tighten securely.

(3) Invert main body so that weight of float only is forcing needle against seat. Hold finger against retainer to fully seat fulcrum pin.

(4) Using Tool T-109-280 or a "T" scale, measure float, (Fig. 10). There should be 5/16 inch from surface of fuel bowl to crown of each float at center.

If an adjustment is necessary, hold the floats on bottom of the bowl and bend float lip toward or away from needle. Recheck the 5/16 inch setting again and repeat the lip bending operation as required.

CAUTION: When bending the float lip, do not allow the lip to push against the needle as the synethetic rubber tip can be compressed sufficiently to cause a false setting which will affect correct level of fuel in the bowl.

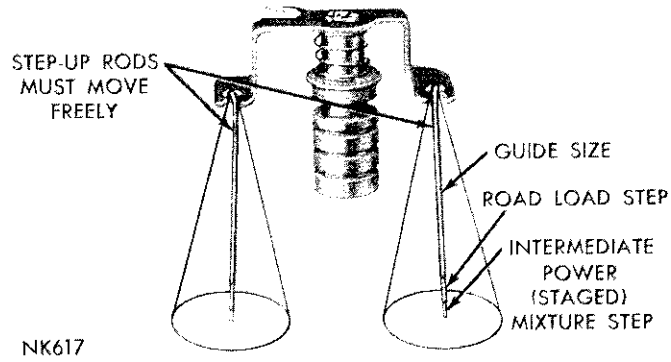


Fig. 9—Step-Up Rods Freeplay

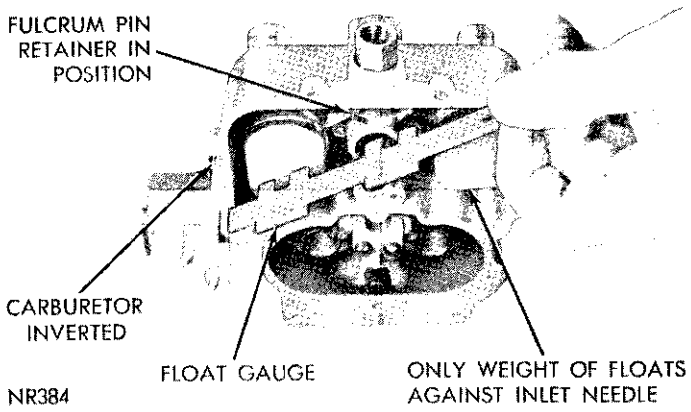


Fig. 10—Checking Float Setting

After being compressed, the tip is very slow to recover its original shape.

CAUTION: It is very important that the float lip be perpendicular to the needle or slanted not more than ten degrees away from the needle when the float height is correct.

Air Horn

(1) Test freeness of choke mechanism in air horn. The choke shaft must float free to operate correctly. If choke shaft sticks in bearing areas, or appears to be gummed from deposits in air horn, a thorough cleaning will be required.

(2) Remove accelerator pump plunger from gasoline, slide compression spring and spring seat over shaft. Install assembly in air horn and engage with accelerator pump arm.

(3) Place a new gasket on main body, and install air horn. Install attaching screws and tighten securely. (When installing air horn, be sure leather on plunger does not wrinkle or fold back.)

(4) Engage accelerator pump rod with pump rocker arm and install loose end in outer hole of throttle lever. Install hairpin clip to secure (Fig. 1).

(5) Engage fast idle connector rod (loop at top) in fast idle cam and in slotted choke lever. Install retaining clips to secure.

(6) Install hot idle compensator valve gasket in position in recess in main body, followed by valve. (Be sure valve is positioned with legs toward outside of main body.) (Fig. 3). Place cover over opening and install attaching screws. Tighten securely. (If so equipped).

Choke Vacuum Diaphragm

Inspect the diaphragm vacuum fitting to be sure that the passage is not plugged with foreign material. Leak check the diaphragm to determine if it has internal leaks. To do this, first depress the diaphragm stem, then place a finger over the fitting to seal the opening. Release the stem. If the stem moves more than 1/16 inch in ten (10) seconds, the leakage is excessive and the assembly must be replaced.

Install the diaphragm assembly on the airhorn as follows:

(1) Assemble diaphragm to air horn and tighten attaching screws securely.

(2) Install choke operating link in position between diaphragm plunger (stem) and choke lever. Install clip to secure.

(3) Inspect rubber hose for cracks before placing it on correct carburetor fitting. (Fig. 1). Do not connect vacuum hose to diaphragm fitting until after vacuum kick adjustment has been made. (See Carburetor Adjustments.)

CARBURETOR ADJUSTMENTS

It is very important that the following adjustments are made on a reconditioned carburetor and in the sequence listed:

Accelerator Pump

(1) Back off idle speed adjusting screw. Open choke valve so that fast idle cam allows throttle valves to be completely seated in bores. Be sure that pump connector rod is installed in outer hole of throttle lever.

(2) Close throttle valves tightly. Measure the distance between top of air horn and end of plunger shaft, (Fig. 11). This measurement should be 1 inch.

(3) To adjust pump travel, bend pump operating rod using Tool T-109-213, at lower angle of rod, until correct setting has been obtained.

Fast Idle Speed and Cam Position Adjustment

The fast idle engine speed adjustment should be made on the vehicle, as described in the Fast Idle Speed Adjustment (On the Vehicle) Paragraph. How-

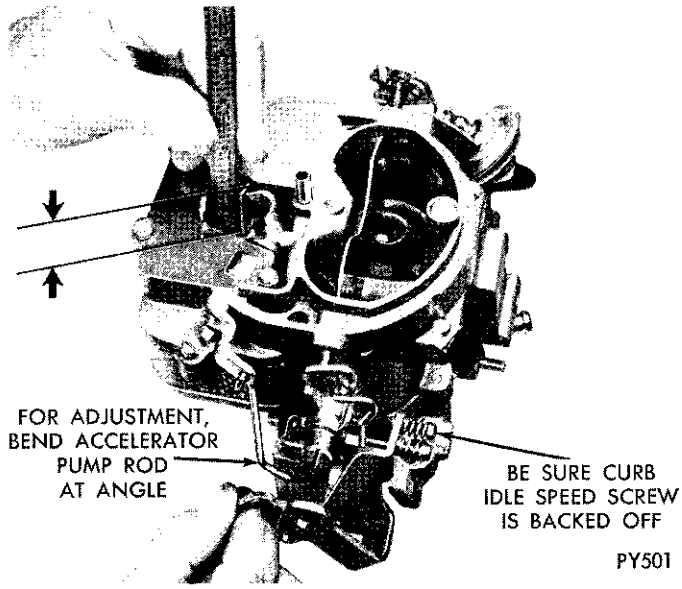


Fig. 11—Checking Accelerator Pump Setting

ever, the Fast Idle Cam Position Adjustment can be made on the bench. This adjustment is important to assure that the speeds of each step of the cam occur at the proper time during engine warm-up.

(1) With fast idle speed adjusting screw contacting second highest speed step on fast idle cam, move choke valve toward closed position with light pressure on choke shaft lever.

(2) Insert specified drill (see specifications) between choke valve and wall of air horn. An adjustment will be necessary if a slight drag is not obtained as drill is being removed.

(3) If an adjustment is necessary, bend fast idle connector rod at lower angle, using Tool T109-213, until correct valve opening has been obtained (Fig. 12).

Vacuum Kick Adjustment—This test can be made **ON** or **OFF** vehicle.

The choke diaphragm adjustment controls the fuel delivery while the engine is running. It positions the choke valve within the air horn by action of the linkage between the choke shaft and the diaphragm. The diaphragm must be energized to measure the vacuum kick adjustment. Use either a distributor test machine with a vacuum source, or vacuum supplied by the vehicle.

(1) If adjustment is to be made with engine running, disconnect fast idle linkage to allow choke to close to the kick position with engine at curb idle. If an auxiliary vacuum source is to be used, open throttle valves (engine not running) and move choke to closed position. Release throttle first, then release choke.

(2) When using an auxiliary vacuum source, disconnect vacuum hose from carburetor and connect it to hose from vacuum supply with a small length of tube to act as a fitting. Removal of hose from diaphragm may require forces which damage the system. Apply a vacuum of 10 or more inches of mercury.

(3) Insert specified drill (refer to Specifications) between choke valve and wall of air horn (Fig. 13). Apply sufficient closing pressure on lever to which choke rod attaches to provide a minimum choke valve opening without distortion of diaphragm link. Note that the cylindrical stem of diaphragm will extend as internal spring is compressed. This spring must be fully compressed for proper measurement of vacuum kick adjustment.

(4) An adjustment will be necessary if a slight drag is not obtained as drill is being removed. Shorten or lengthen diaphragm link to obtain correct choke opening. Length changes should be made carefully by bending (open or closing) the bend provided in diaphragm link. **CAUTION: DO NOT APPLY TWISTING OR BENDING FORCE TO DIAPHRAGM.**

(5) Reinstall vacuum hose on correct carburetor fitting. Return fast idle linkage to its original condition if disturbed as suggested in Step No. 1.

(6) Make following check. With no vacuum applied to diaphragm, the **CHOKE VALVE SHOULD MOVE FREELY** between open and closed positions. If movement is not free, examine linkage for misalignment or interferences caused by bending operation. Repeat adjustment if necessary to provide proper link operation.

Choke Unloader (Wide Open Kick)

The choke unloader is a mechanical device to partially open the choke valve at wide open throttle. It is used to eliminate choke enrichment during cranking of an engine. Engines which have been flooded or stalled by excessive choke enrichment can be cleared

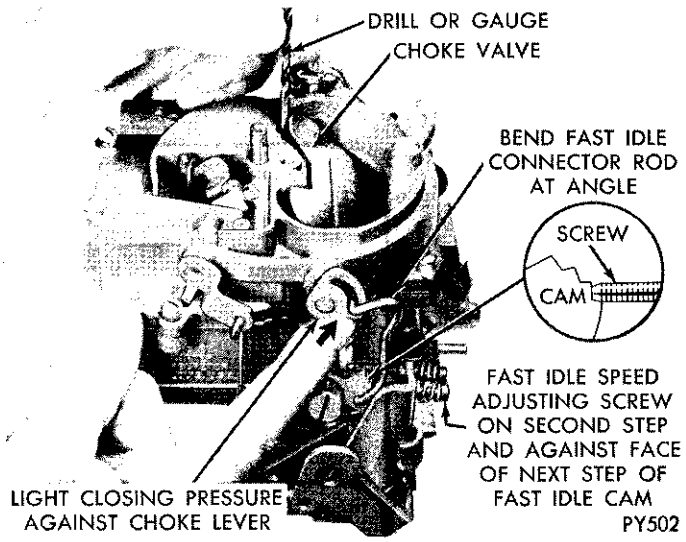


Fig. 12—Fast Idle Cam Position Adjustment

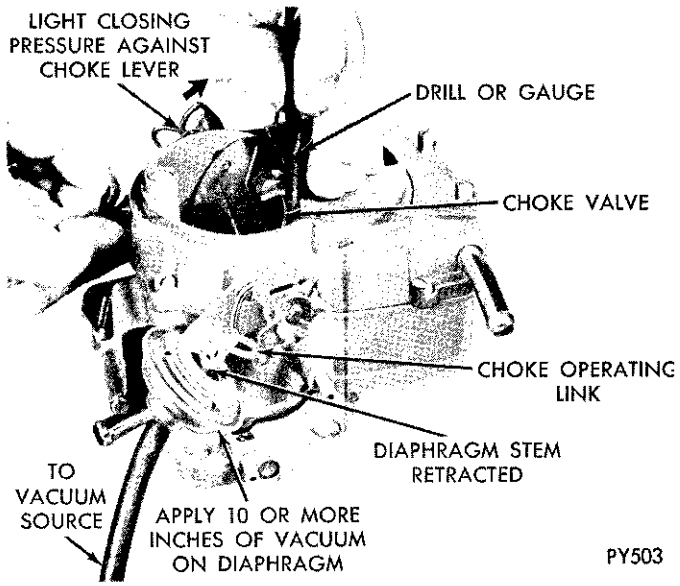


Fig. 13—Checking Choke Vacuum Kick Setting (Wide Open Kick)

by use of the unloader. Adjust the choke unloader as follows:

(1) Hold throttle valves in wide open position. Insert specified drill (see Specifications) between upper edge of choke valve and inner wall of air horn. (Fig. 14).

(2) With a finger lightly pressing against shaft lever, a slight drag should be felt as drill is being withdrawn. If an adjustment is necessary, bend unloader tang on throttle lever until correct opening has been obtained (Fig. 15). Use Tool T109-214.

Bowl Vent Adjustment (E.C.S.)

(1) Open choke valve so that fast idle cam allows valves to close, (curb idle).

(2) Be sure that pump operating rod is in long stroke hole in throttle lever. Remove bowl vent valve cover if not previously done.

(3) Close throttle valves tightly. Using a narrow ruler, measure the distance from top of bowl vent valve rubber tip, to top of air horn casting (Fig. 16). This measurement should be 5/32 inch.

(4) If an adjustment is necessary, bend bowl vent lift arm, using a suitable tool, until correct opening has been obtained. **(WARNING: DO NOT BEND BOWL VENT VALVE LEAF SPRING DURING BENDING OPERATION OR IMPROPER VENT VALVE OPERATION WILL RESULT.)** Install bowl vent valve cover and secure with attaching screws.

(5) **On C.A.S. carburetors,** with the throttle valves closed, (curb idle), there should be 1/16 inch clearance between bowl vent valve and seat on air horn (Fig. 16). (When measured at outermost or largest dimension with a drill shank).

(6) If an adjustment is necessary, bend vent valve lifter arm until correct clearance has been obtained.

Idle Speed Adjustment (Curb Idle)

Refer to General Information at Front of Section.

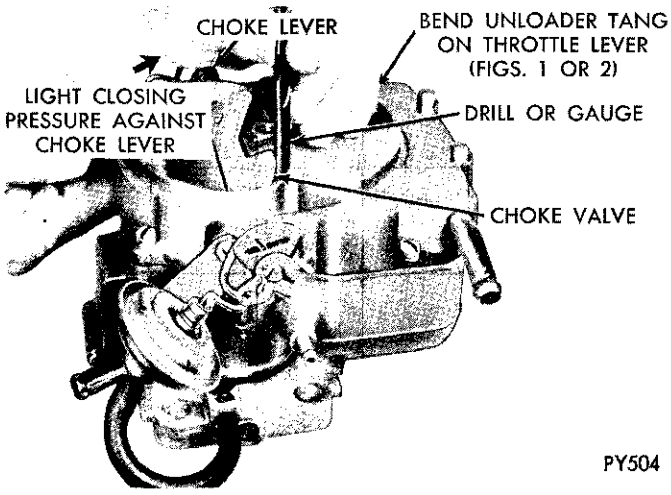


Fig. 14—Checking Choke Unloader Setting

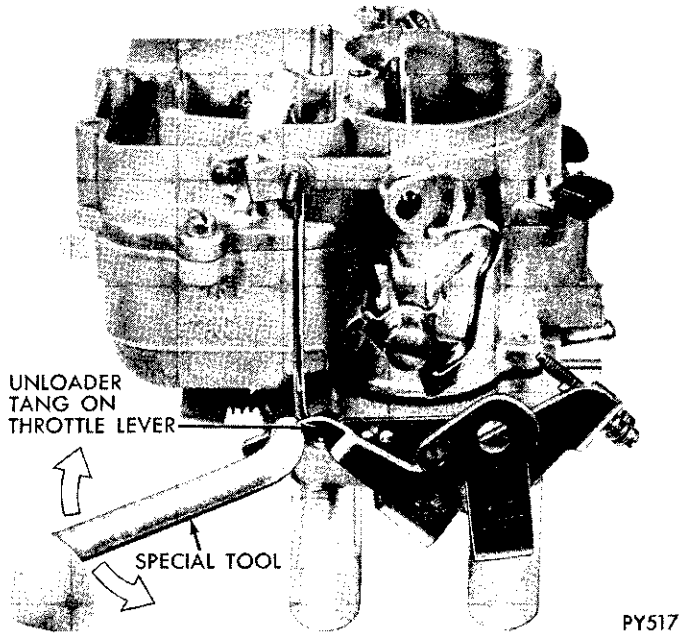


Fig. 15—Bending Choke Unloader Tang

Measuring Float Setting (On Vehicle)

(1) Remove hairpin clip and disengage accelerator pump rod from throttle lever and pump rocker arm. Disconnect automatic choke rod by unsnapping clip.

(2) Remove air horn attaching screws and lift air horn straight up and away from main body. Remove gasket.

(3) Set float fulcrum pin by pressing a finger against fulcrum pin retainer.

There should be enough fuel in the bowl to raise floats so that the lip bears firmly against needle. Additional fuel may be admitted by slightly depressing

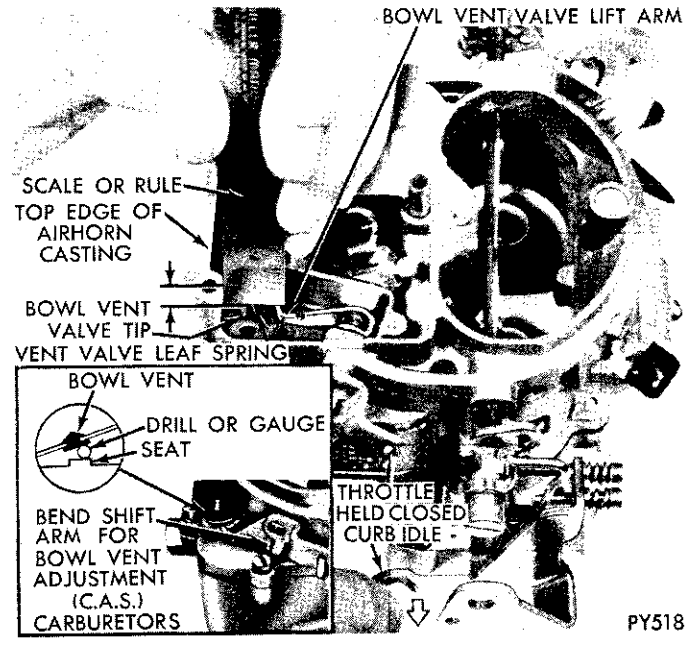


Fig. 16—Measuring Bowl Vent Valve Opening (C.A.S., E.C.S.)

float. If fuel pressure in the line is insufficient to force additional fuel into bowl, add necessary fuel from a clean container.

WARNING: Since the manifold may be hot, it is dangerous to spill fuel onto these surfaces. Take the necessary precautions to avoid spillage.

(4) With only pressure from buoyant float holding lip against inlet needle, check float setting, using Tool T-109-280, or a "T" scale. There should be 5/16 inch from surface of bowl (gasket removed) to crown of floats at center.

If an adjustment is necessary, hold the floats on the bottom of the bowl, then bend the float lip toward or away from the needle. Recheck the 5/16 inch setting again, then repeat the lip bending operation as required. **When bending the float lip, do not allow the lip to push against the needle as the rubber tip can be compressed sufficiently to cause a false setting which will affect correct level of fuel in the bowl. After being compressed, the rubber tip is very slow to recover its original shape. It is very important that the float lip be perpendicular to the needle or slanted not more than 10 degrees away from the needle when the float is set correctly.**

(5) After float has been correctly set, reassemble the air horn.

Fast Idle Speed Adjustment (On Vehicle)

Fast idle engine speed is used to overcome cold engine friction, stalls after cold starts and stalls because of carburetor icing. Set this adjustment after the vehicle odometer indicates over 500 miles to insure a normal engine friction level. Prepare engine by driving at least 5 miles. Connect a tachometer and set the curb idle speed and mixture, then proceed as follows:

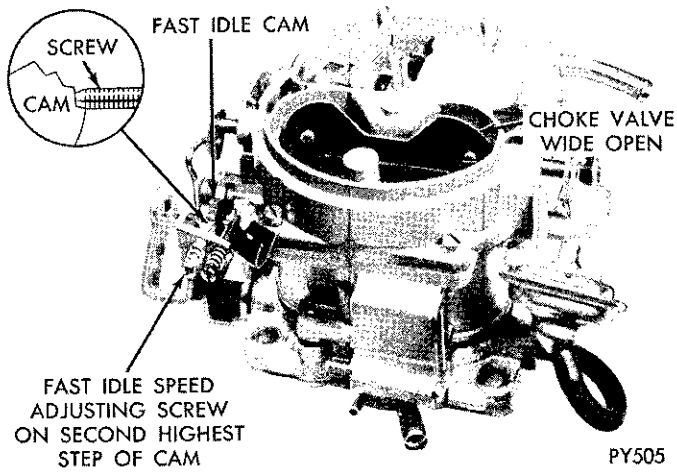


Fig. 17—Fast Idle Speed Adjustment (On Vehicle)

(1) With engine off and transmission in PARK or NEUTRAL position, open throttle slightly.

(2) Close choke valve until fast idle screw can be positioned on second highest-speed step of fast idle cam (Fig. 17).

(3) Start engine and determine stabilized speed. Turn fast idle speed screw in or out to secure specified speed. (See Specifications.)

(4) Stopping engine between adjustments is not necessary. However, reposition fast idle speed screw on cam after each speed adjustment to provide correct throttle closing torque.

To set the idle speed on vehicles, refer to Fuel System General Information Paragraph.

HOLLEY 2200 SERIES CARBURETOR

INDEX

GENERAL INFORMATION

The Holley dual throat, 2200 series carburetor model C.A.S. (Cleaner Air System) R-4371A, (Fig. 1) is used on the 383 cu. in. engine when the vehicles are equipped with an automatic transmission and without air conditioning only. This carburetor is equipped with a distributor ground switch, which retards the distributor when the carburetor is at curb idle, resulting in better emission control.

Each throat of the carburetor has its own throttle valve and main metering systems and are supplemented by the float, accelerating, idle and power systems.

CARBURETOR SYSTEMS

The carburetor utilizes four basic fuel metering

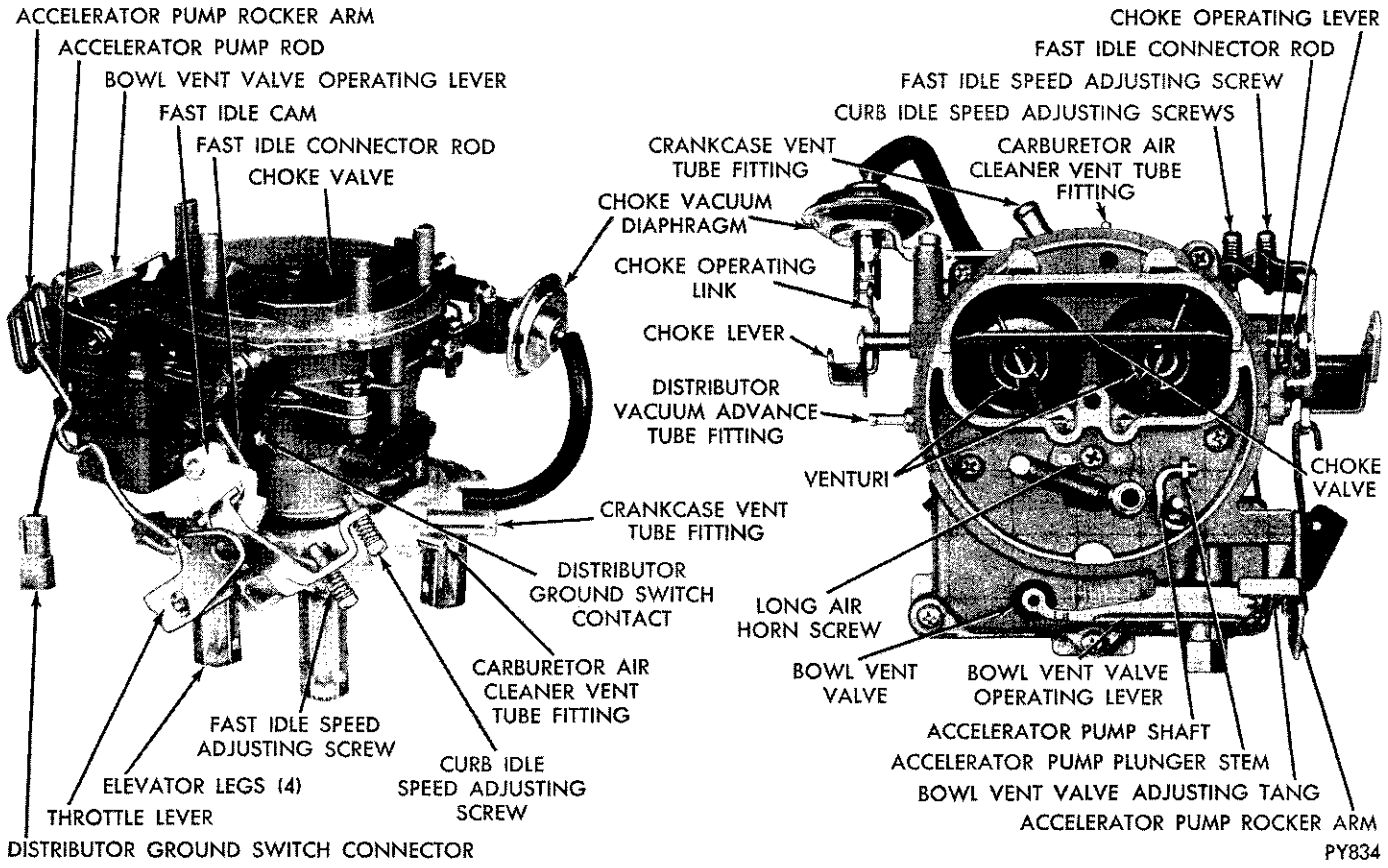


Fig. 1—Carburetor Assembly (Holley 2210 Series)

systems. The Idle System provides a rich mixture for smooth idle and low speed performance; the Accelerator Pump System, provides additional fuel during acceleration; the Main Metering System, provides an economical mixture for normal cruising conditions; and the Power Enrichment System, provides a richer mixture when high power output is desired.

In addition to these four basic systems, there is a fuel inlet system that constantly supplies the fuel to the basic metering systems, and a choke system which temporarily enriches the mixture to aid in starting and running a cold engine.

Fuel Inlet System (Fig. 2)

All fuel enters the fuel bowl through the fuel inlet fitting in the bowl cover.

The "Viton" tipped fuel inlet needle seats directly in the fuel inlet seat. The fuel inlet needle is controlled by a nitrophyl float (a cellular buoyant material which cannot collapse or leak) and stainless steel float lever which is hinged by a "Delrin" float fulcrum pin.

The fuel inlet system must constantly maintain the specified level of fuel as the basic fuel metering systems are calibrated to deliver the proper mixture only when the fuel is at this level. When the fuel level in the bowl drops the float also drops permitting additional fuel to flow past the fuel inlet needle into the bowl. A baffle over the needle assists in separating the air bubbles from the fuel to provide a more solid fuel supply in the bowl.

The float chamber is vented internally into the air horn. An external vent actuated by the pump lever is opened at curb idle or when the engine is not running to release fuel vapors from the bowl.

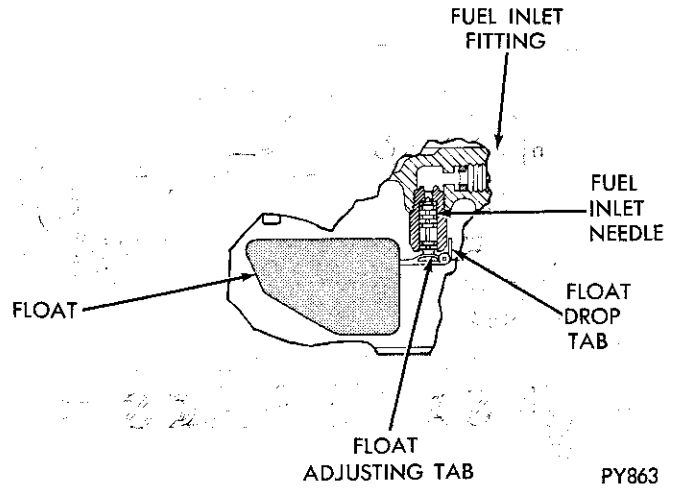


Fig. 2—Fuel Inlet System

Idle System (Fig. 3)

Fuel used during curb idle and low speed operation flows through the main metering jet into the main well.

A horizontal connecting passage permits the fuel to flow from the main well into the idle well. Fuel continues up the idle well and through an idle feed restriction into an idle channel where the fuel is mixed with air which enters through idle air bleeds located in the air horn.

At curb idle the fuel and air mixture flows down the idle channel and is further mixed or broken up by air entering the idle channel through the transfer slot which is above the throttle valve at curb idle.

During low speed operation the throttle valve moves exposing the transfer slot and fuel begins to flow through the transfer slot as well as the idle port. As the throttle valves are opened further and engine speed increases the air flow through the carburetor also increases. This increased air flow creates a vacuum or depression in the venturi and the main metering system begins to discharge fuel.

Main Metering System (Fig. 4)

As the engine approaches cruising speed the increased air flow through the venturi creates vacuum (low pressure area) in the venturi of the carburetor. Near atmospheric pressure present in the bowl in the area above the fuel causes the fuel to flow to the lower pressure area created by the venturi and magnified by the booster venturi.

Fuel flows through the main jet into the main well; air enters through the main well air bleeds and into the main well through holes in the main well tube. The mixture of fuel and air being lighter than raw fuel responds faster to changes in venturi vacuum and is also more readily vaporized when discharged into the venturi.

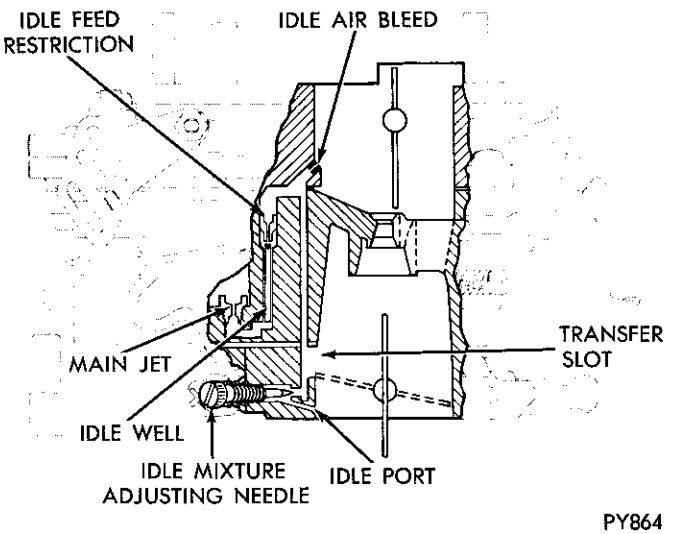


Fig. 3—Idle System

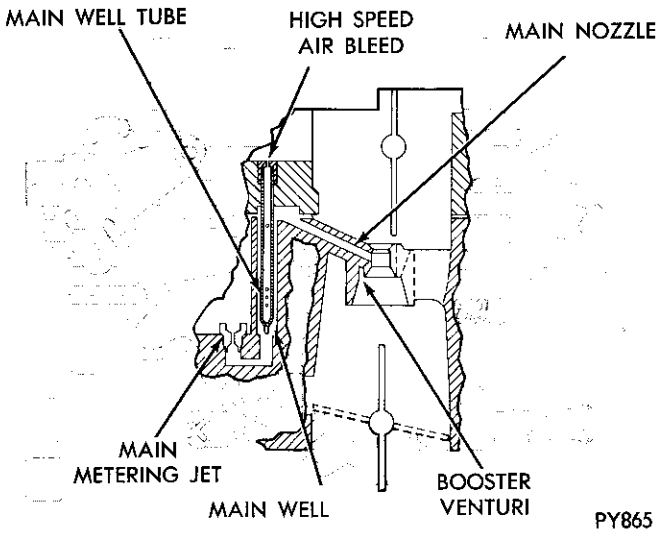


Fig. 4—Main Metering System

The main discharge nozzle passage is a part of the booster venturi which is an integral part of the main body casting. Distribution tabs in the main venturi provide further vaporization of the fuel and air mixture.

The main metering system is calibrated to deliver a lean mixture for best overall economy. When additional power is required a vacuum operated power system enriches the fuel-air mixture.

Power Enrichment System (Fig. 5)

The power enrichment system consists of a power valve installed in the center of the carburetor body between the main jets and a vacuum piston installed in the bowl cover. A vacuum passage leads from the top of the piston down to the manifold flange.

When manifold vacuum is high the vacuum piston is raised to the top of its cylinder and the spring on the piston stem is compressed.

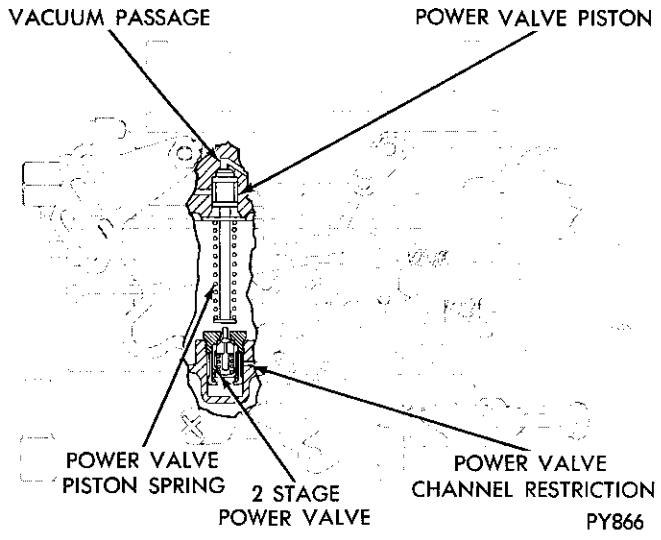


Fig. 5—Power Enrichment System

When manifold vacuum drops to a predetermined level the spring overcomes the vacuum and pushes the piston stem down.

The piston stem in turn pushes the power valve stem down opening the power valve and permitting fuel to flow through the power valve through power valve channel restrictions and into the main well on either side of the power valve.

Accelerating Pump System (Fig. 6)

When the throttle valves are opened suddenly the air flow through the carburetor responds almost immediately. However, there is a brief time interval or lag before the fuel can overcome its inertia and maintain the desired fuel-air ratio.

The piston type accelerating pump system mechanically supplies the fuel necessary to overcome this deficiency for a short period of time.

Fuel enters the pump cylinder from the fuel bowl through a slot in the pump well above the normal position of the pump piston. When the engine is turned off, fuel vapors in the pump cylinder are vented through the area between the pump rod and pump plunger.

As the throttle lever is moved the pump link operating through a system of levers and a pump override spring pushes the pump piston down. Fuel is forced through a passage around the pump discharge needle valve and out the pump discharge jets which are drilled in the main body.

Automatic Choke System (Fig. 7)

The automatic choke provides the richer fuel-air mixture required for starting and operating a cold engine. A bi-metal spring inside the choke housing, which is installed in a well in the intake manifold, holds the choke valve in the closed position.

When the engine starts, manifold vacuum is applied to the choke diaphragm through a rubber hose from the throttle body to the choke diaphragm assembly. The adjustment of the choke valve opening, when the engine starts and vacuum is applied to the choke diaphragm, is called vacuum kick.

Manifold vacuum alone is not strong enough to provide the proper degree of choke opening during the entire choking period. The impact of in rushing air past the offset choke valve provides the additional opening force.

As the engine warms up manifold heat transmitted to the choke housing relaxes the bi-metal spring until it eventually permits the choke to open fully.

Distributor Vacuum Advance

As engine speed increases, the spark timing must be advanced so that the burning in the cylinder may be completed at the proper time to achieve maximum pressure and efficiency.

A vacuum spark port located in the throttle bore, just above the closed throttle valve, is connected to the distributor vacuum chamber by a series of passages to a fitting in the carburetor body and a flexible hose.

As the throttle is opened, this port is exposed to manifold vacuum which varies with changes in engine speed and load.

This changing vacuum is applied to the distributor vacuum diaphragm.

The diaphragm, in turn rotates the distributor breaker plate through a connecting rod changing the spark timing to meet engine demands.

At curb idle, the curb idle screw contacts the distributor retarding solenoid. This in turn retards the distributor to maximum retard for improved emission control at idle.

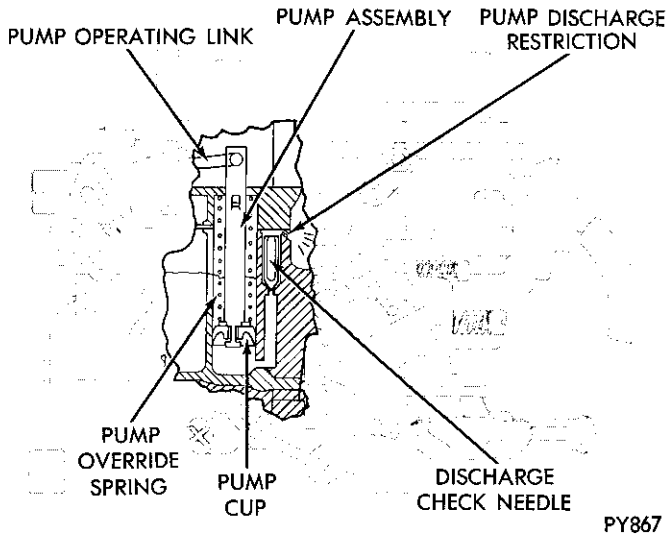


Fig. 6—Accelerating Pump System

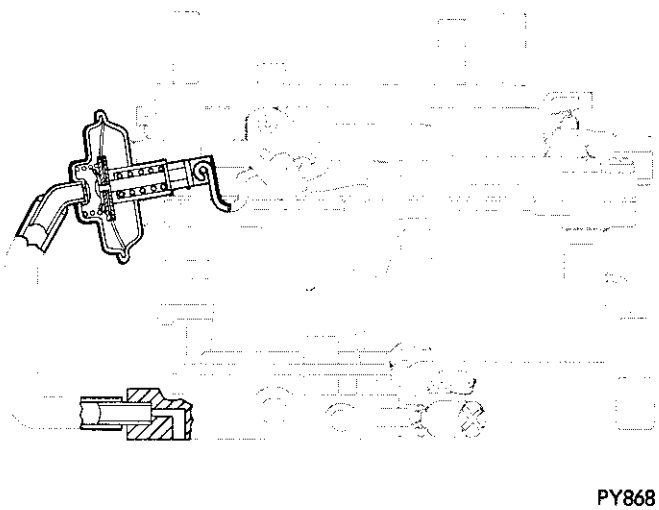


Fig. 7—Automatic Choke System

SERVICE PROCEDURES

DISASSEMBLING CARBURETOR

(1) Insert three Tool T-109-287S and one Tool T109-288S elevating legs through carburetor throttle body mounting stud holes. (These tools are used to protect throttle valves from damage and to provide a suitable base for working.) (Fig. 1).

(2) Remove nut and washer attaching accelerator pump rocker arm to accelerator pump shaft. Remove arm from flats on pump shaft, then disengage accelerator pump rod from center slot in arm and from hole in throttle lever. (Fig. 2).

(3) Remove nut and washer that attaches choke lever to choke shaft. Disengage fast idle connector rod from lever and fast idle cam. (Fig. 3).

(4) Remove choke vacuum diaphragm hose from throttle body tube fitting. Remove screws that attach choke diaphragm and mounting bracket to air horn.

(5) Remove choke diaphragm and at the same time, disengage choke operating link from slot in choke operating lever. (Fig. 4). Place choke unit to one side to be cleaned as a special item. **A liquid cleaner may damage diaphragm material.**

(6) Remove "E" clip that retains bowl vent valve operating lever on stub shaft of air horn. Slide lever off shaft, being careful not to lose lever spring. (Note position of spring). (Fig. 5).

(7) Remove eight air horn ataching screws, then lift air horn straight up and away from main body (long screw in center.) **USE EXTREME CARE WHEN HANDLING AIR HORN SO AS NOT TO BEND OR DAMAGE WELL TUBES.** (Fig. 6).

(8) Disengage accelerator pump plunger from pump shaft by pushing **up** on bottom of plunger, then tilting slightly toward center, then slide off pump shaft. Slide plunger stem out of air horn and remove compression spring (Fig. 7).

(9) Slide accelerator pump shaft out of air horn. (Fig. 8).

(10) Remove fuel inlet fitting and gasket from air horn.

(11) With air horn inverted, remove screw that attaches fuel baffle to air horn (Fig. 9).

(12) Slide nylon float fulcrum pin out of air horn, then remove float. Invert air horn and drop out fuel inlet needle. Using a wide blade screw driver, remove fuel inlet needle valve seat and gasket (Fig. 10).

(13) Remove air horn gasket. **(Note: This gasket is a self sealing type and will stick to air horn mounting surface. Care should be used at removal so as not to**

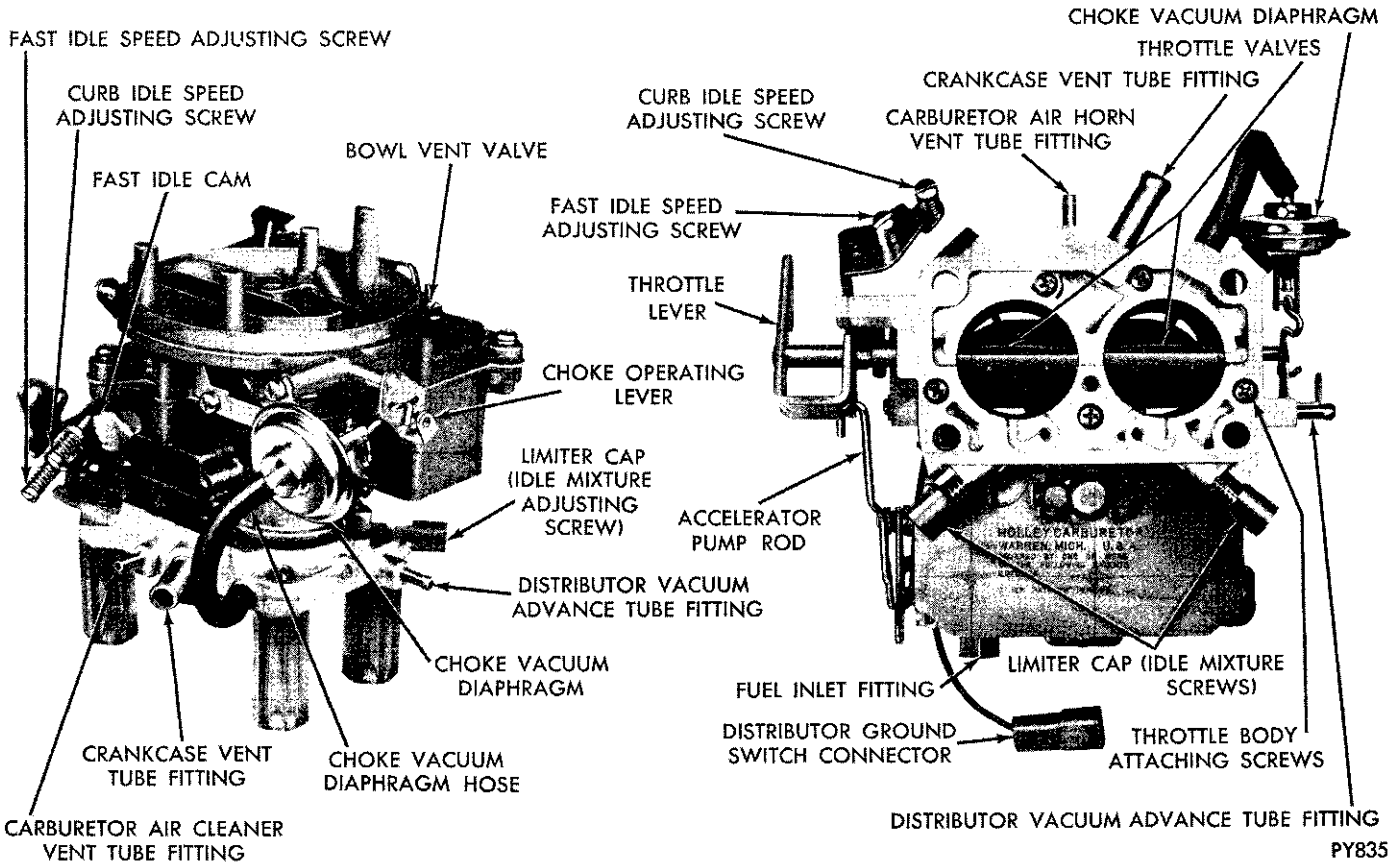


Fig. 1—Carburetor Assembly

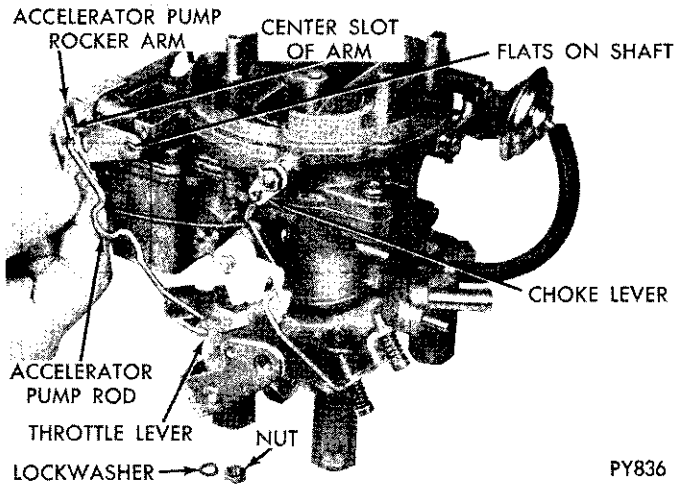


Fig. 2—Removing or Installing Accelerator Pump Rocker Arm

mar or scratch mating surface of air horn.

(14) Remove vacuum power piston from air horn, using tool C-4141 (Fig. 11). (This assembly is staked in position and care must be used at removal.) Remove staking using a suitable sharp tool.

(15) **WARNING: DO NOT ATTEMPT TO REMOVE MAIN WELL TUBES FROM AIR HORN.** These tubes are a pres fit in air horn, and will be damaged if removed. They can be cleaned in a solvent and blown dry with compressed air. If carburetor parts are cleaned in a basket, be sure other carburetor parts are not striking these tubes.

(16) Using Tool TMC-36A, remove main metering jets (Fig. 12). (Number 65 located on throttle lever side of bowl; number 63 on opposite side.)

(17) Using Tool T109-73S, remove power valve assembly (Fig. 13).

(18) Invert main body and drop out accelerator pump discharge check needle from discharge passage (Fig. 15).

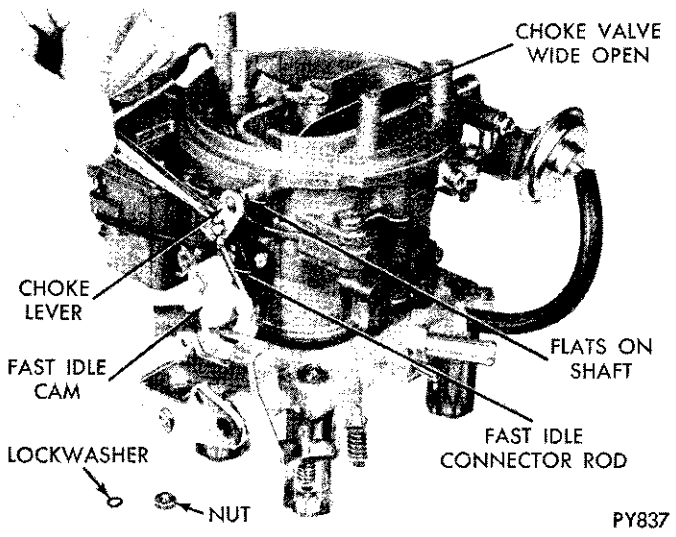


Fig. 3—Removing or Installing Fast Idle Connector Rod

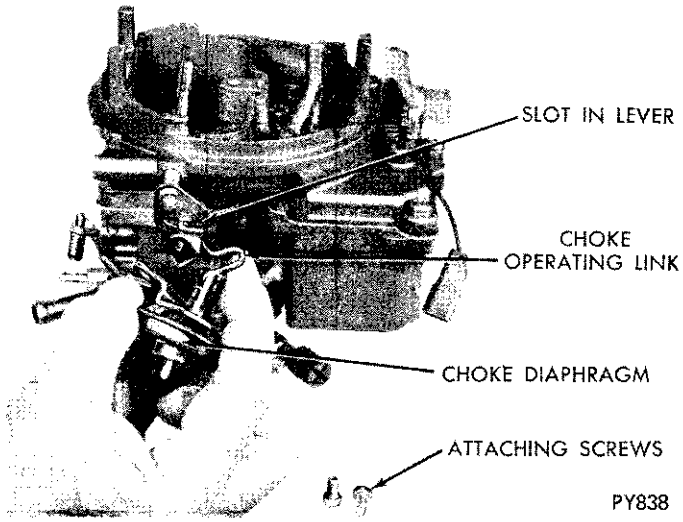


Fig. 4—Removing or Installing Choke Diaphragm

(19) Remove fast idle cam retaining "E" clip, then slide fast idle cam off stub shaft (Fig. 14).

(20) Invert main body and remove throttle body to main body attaching screws. Separate bodies and discard gasket.

(21) Turn idle limiter caps to stop. (Top of throttle lever side and bottom of stop on other.) Remove idle limiter caps by prying off with suitable tool. (Be careful not to bend screws.) Be sure and count number of turns to seat the screws, as the same number of turns (from the seat) must be maintained at installation. Remove screws and springs from throttle body.

The carburetor now has been disassembled into three sub-assemblies, the air horn, main body, throttle body and the components of each disassembled as far as necessary for cleaning and inspection.

Caution: In normal routine cleaning and overhaul of the carburetor, do not remove throttle valves unless

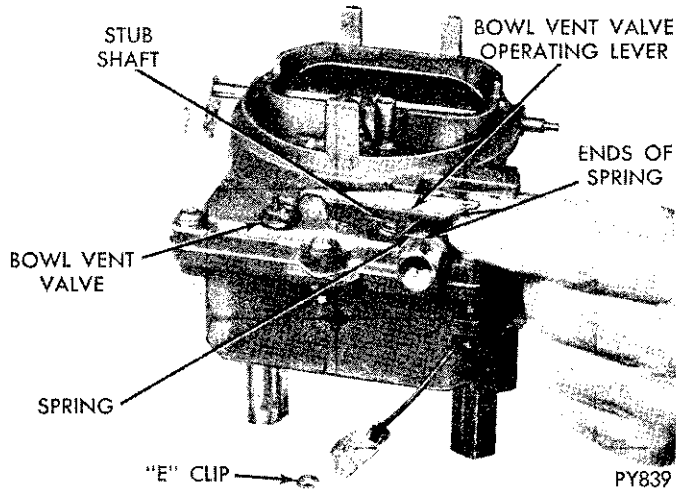


Fig. 5—Removing or Installing Bowl Vent Valve Operating Lever

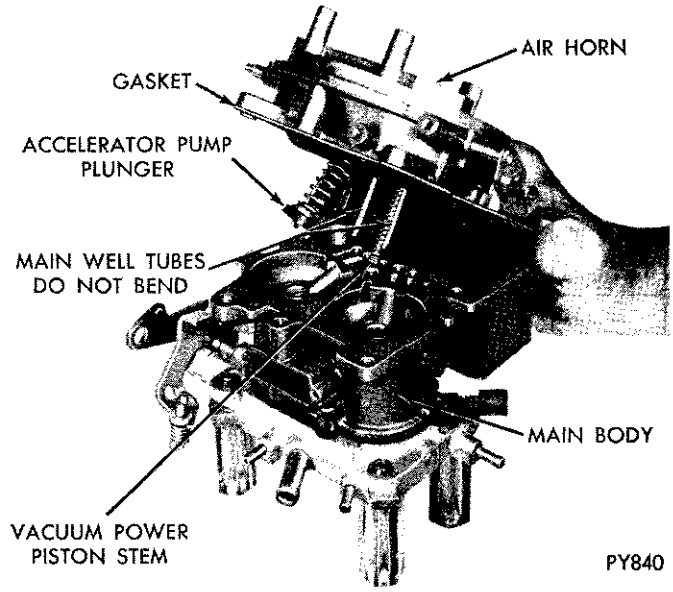


Fig. 6—Removing or Installing Air Horn

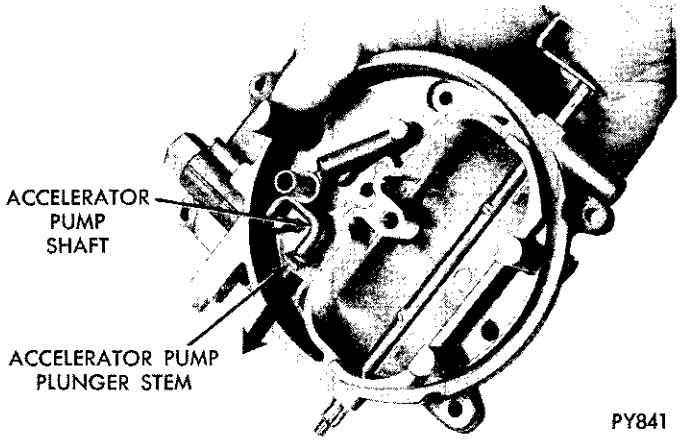


Fig. 7—Removing or Installing Accelerator Pump Plunger

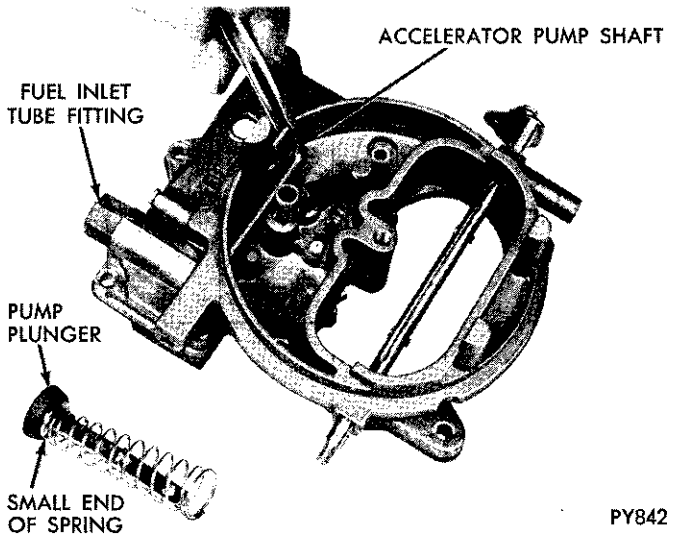


Fig. 8—Removing or Installing Accelerator Pump Shaft

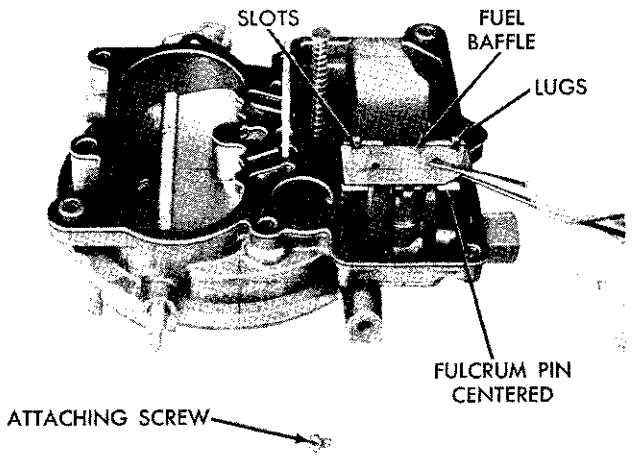


Fig. 9—Removing or Installing Fuel Baffle

they are nicked or damaged. If necessary to remove, proceed as follows:

(1) Remove screws that hold throttle valves in throttle shaft. **These screws are staked to prevent loosening and care is necessary to avoid breaking off in shaft. Remove staking with a file.**

(2) Slide damaged valves out of bores. It should be noted at this time, that the numbered side is on the bottom (or carburetor mounting flange side) and opposite the idle mixture screw ports.

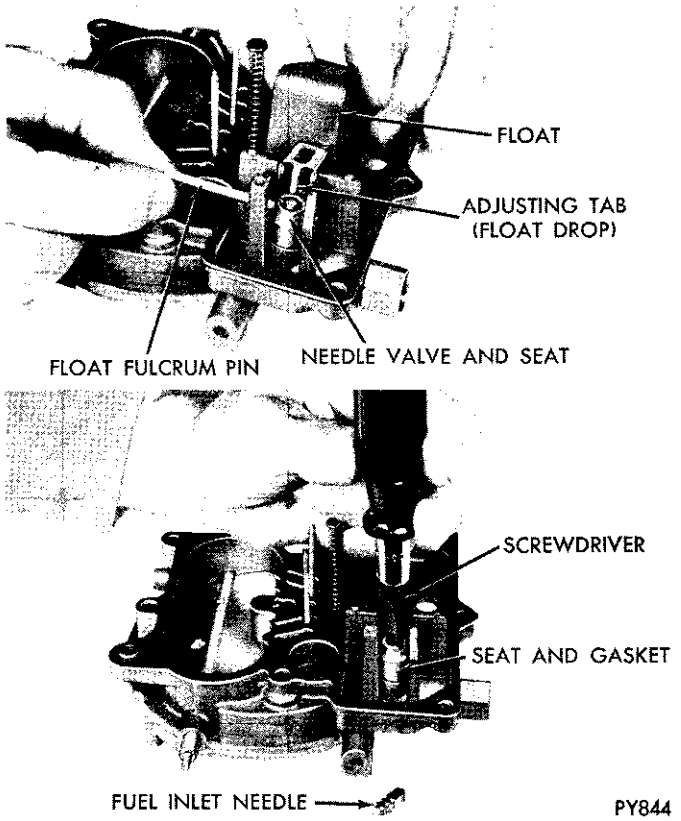


Fig. 10—Removing or Installing Float and Needle Seat

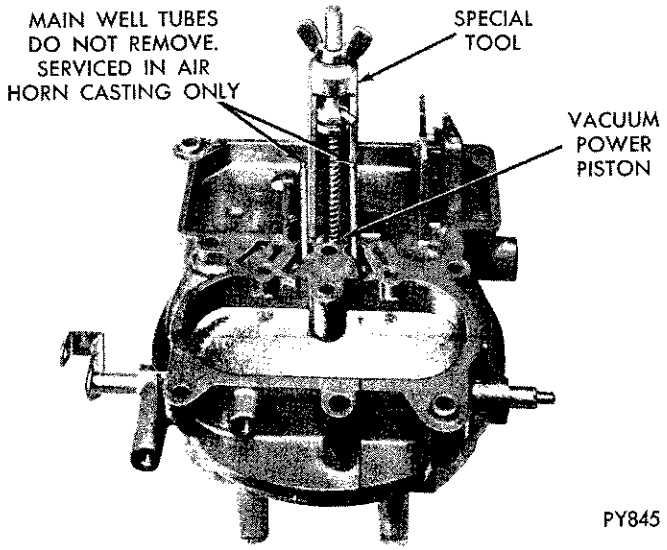


Fig. 11—Removing Vacuum Power Piston

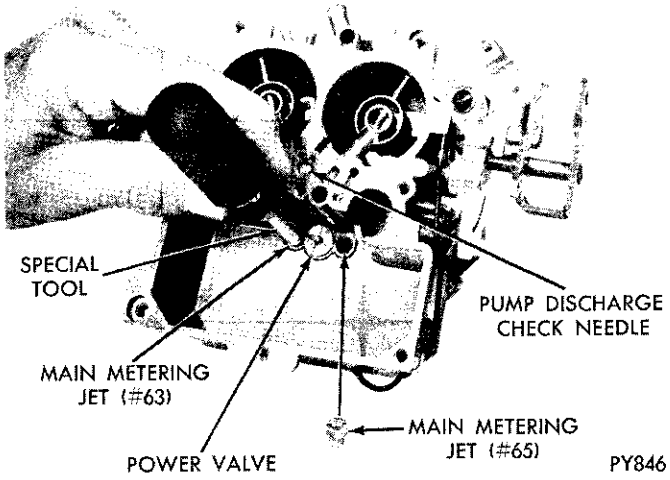


Fig. 12—Removing or Installing Main Metering Jets

CLEANING CARBURETOR PARTS

Refer to General Information Section at front of Fuel System, for cleaning instructions.

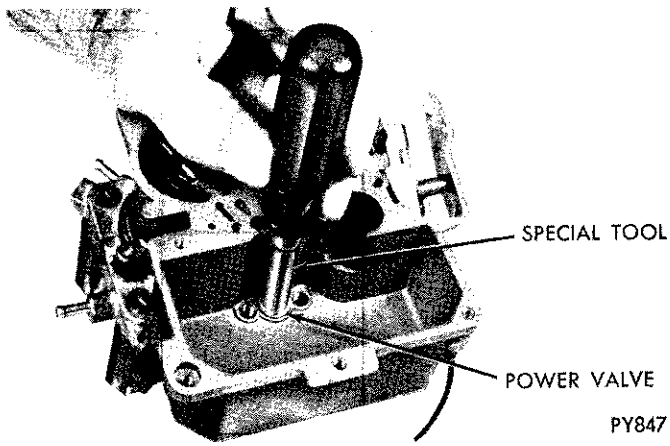


Fig. 13—Removing or Installing Power Valve

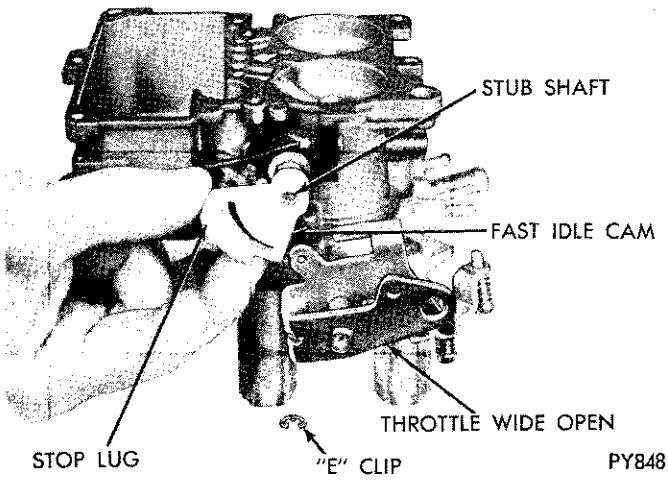


Fig. 14—Removing or Installing Fast Idle Cam

INSPECTION AND REASSEMBLY

DO NOT clean any rubber or plastic parts including diaphragms and electrical parts (that may be attached to carburetor) in cleaning solvent because of possible damage.

Check for cracks, warpage, stripped screw threads, damaged or marred mating surfaces, on all major castings. The passages in the castings should be free of restrictions. Install new castings as required. Check float assembly for damage or any condition that would impair this item from further service. The choke and throttle valves should be replaced if the edges have been nicked or if the protective plating has been removed. Be sure that the choke and throttle shafts are not bent or scored. Replace any broken or distorted springs. Replace all threads and lockwashers that show signs of stripped threads or distortion.

Throttle Body

If the throttle valves were removed because of dam-

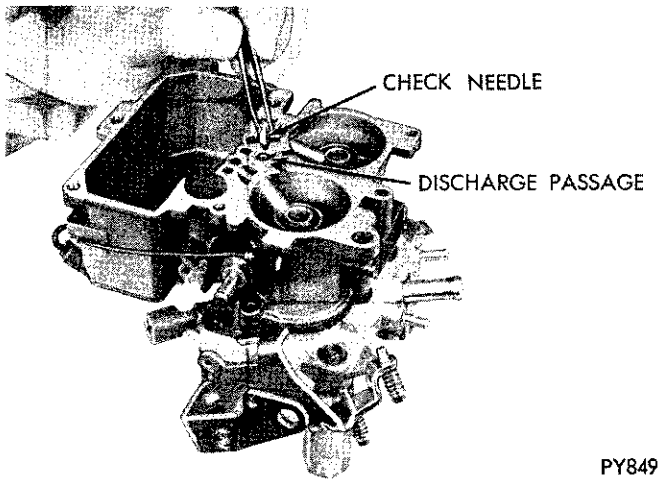


Fig. 15—Installing Accelerator Pump Discharge Check Needle

age, install new valves as follows:

(1) Slide new valves into position in throttle shaft, with the valve number on the bottom, (or mounting flange side,) and away from idle air mixture adjusting screw ports.

(2) Install new valve screws but do not tighten.

(3) Hold valves in place with fingers. (Fingers pressing on high side of valves.)

(4) Tap valve lightly with a screw driver to center in bores. Now, tighten valve attaching screws securely. Operate the throttle shaft. From closed to open position, they must operate smoothly without drag or sticking. Hold throttle body up to a strong light. The light which is visible around the outer diameter of valves in bore should be uniform. Stake screws, using a pair of pliers.

(5) Install idle mixture screws and springs in body. (The tapered portion must be straight and smooth. If the tapered portion is grooved or ridged, a new idle mixture screw should be installed to insure having correct idle mixture control.) **DO NOT USE A SCREW DRIVER.** Turn screws lightly against their seats with fingers. Back off the number of turns (from the seat) counted at disassembly. Install new plastic caps with tab against stop.

Main Body

(1) Invert main body and place a new gasket in position. Place throttle body on main body and align. Install attaching screws and tighten securely.

(2) Install accelerator pump discharge check needle in discharge passage (Fig. 15). Check accelerator pump, fuel inlet and discharge systems as follows:

(3) Pour clean gasoline into fuel bowl, approximately 1 inch deep. Slide accelerator pump plunger into cylinder. Raise plunger and press down lightly on plunger stem to expell all air from pump passage.

(4) Using a small clean brass rod, hold discharge check needle down on its seat. Again raise plunger and press downward. No fuel should be emitted from pump discharge passage (Fig. 16).

If any fuel does emit from discharge passage, it indicates the presence of dirt or a damaged or worn check needle, or seat. Clean the passage again and retest as above. If leakage is still evident, attempt to form a new seat as follows:

(5) With discharge check needle installed, insert a piece of drill rod down on needle. Lightly tap drill rod with a hammer to form a new seat. Remove and discard old needle and install a new one. Retest as described previously. If service fix does not correct the condition, a new main body should be installed. Remove accelerator pump plunger, discharge check needle and fuel from main body.

(6) Install power valve, using Tool T109-73S, (Fig. 13). Tighten securely.

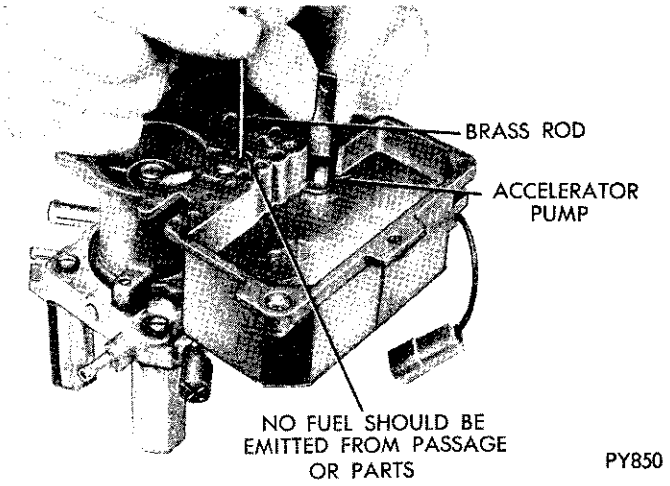


Fig. 16—Testing Accelerator Pump Discharge Check Needle

(7) Install main metering jets, using Tool TMC-36A. (Fig. 12). Tighten securely. (Number 65 on throttle lever side and number 63 an other side of bowl.)

(8) Install accelerator pump discharge check needle in pump discharge passage (Fig. 15).

Air Horn

(1) Test freeness of choke mechanism in air horn. The choke shaft must float free to operate correctly. If choke sticks in bearing bores, or appears to be gummed from deposits in air horn, a thorough cleaning will be required.

(2) Install vacuum power piston in its cylinder (Fig. 17). Lock in position by prick punching rim of cylinder (at least three places.) Do not over-stake. Compress piston to be sure no binding exists. If piston sticks or binds enough to hinder smooth operation, a new piston should be installed.

(3) Slide accelerator pump plunger compression spring over plunger stem, with small diameter toward

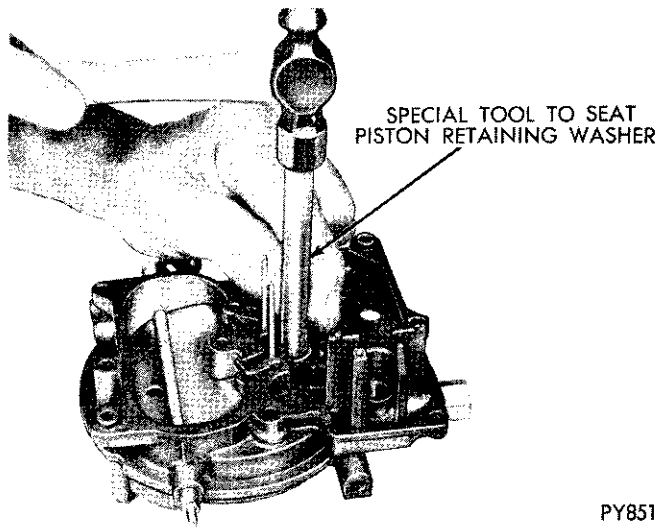


Fig. 17—Installing Vacuum Power Piston

plunger. Install pump shaft in air horn (Fig. 8).

(4) As plunger is being installed in air horn, slightly tilt plunger to engage with plunger shaft.

(5) Install fuel inlet needle valve seat and gasket in air horn. Tighten securely, using a wide blade screwdriver. Install fuel inlet needle in seat (Fig. 10).

(6) Install float in position, then slide nylon fulcrum pin through float hinge to retain float. Center fulcrum pin (Fig. 9).

(7) Install fuel baffle on bosses with slots engaged lugs. Install attaching screw and tighten securely (Fig. 9).

Measuring Float Setting

The carburetors are equipped with a viton tipped fuel inlet needle. The tip is flexible enough to make a good seal on the needle seat, and to give increased resistance to flooding. **Care should be taken to perform this operation accurately in order to secure best performance and fuel economy.**

(1) To correctly set float height when carburetor is being overhauled, proceed as follows:

(2) Invert air horn so that weight of float **only** is forcing needle against seat.

(3) Measure the clearance between top of float and float stop (Fig. 18). The clearance should be .200 inch ± 1/64 (#7 drill). Be sure drill or gauge is perfectly level when measuring.

If an adjustment is necessary, bent float lip toward or away from needle, using a narrow blade screwdriver (Fig. 19), until correct clearance or setting has been obtained.

(4) Check float drop, by holding air horn in an upright position. The bottom edge of float should be parallel to underside surface of air horn (Fig. 20). If an adjustment is necessary, bend tang on float arm until parallel surfaces have been obtained.

Installing Air Horn

(1) Place a new gasket on air horn, then check to be sure main well tubes are straight. Lower air horn straight down on main body; guiding accelerator

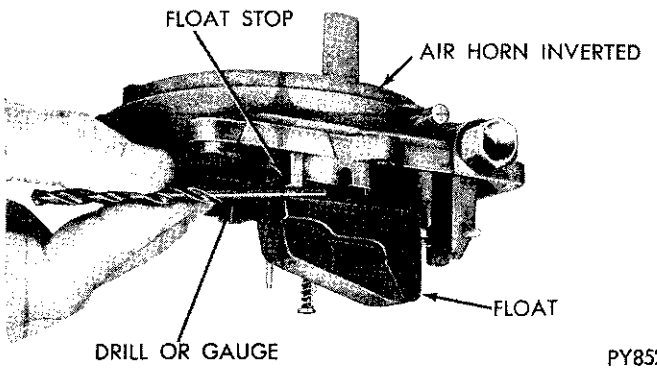


Fig. 18—Checking Float Setting

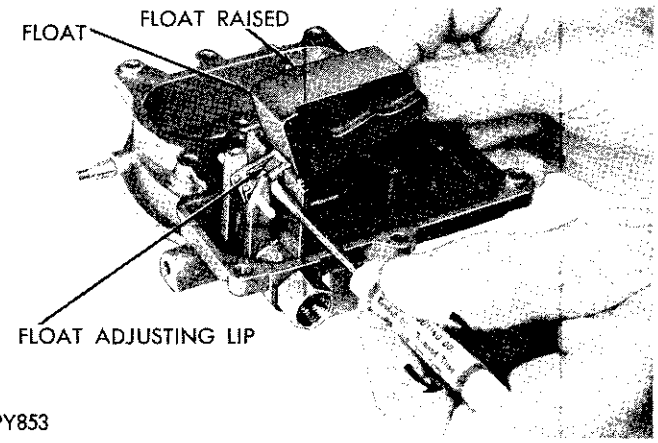


Fig. 19—Bending Float Adjusting Lip

pump plunger into its cylinder. **Caution: Do not cut lip of plunger on sharp edge of cylinder.** Install attaching screws (long screw in center) and tighten securely (Fig. 6).

(2) Install fuel inlet tube fitting and gasket in air horn and tighten securely.

(3) Engage hooked end of accelerator pump rod in throttle lever (hook end toward outside). Engage other end of rod in center slot of pump rocker arm (Fig. 2).

(4) Install rocker arm on accelerator pump shaft with flats in alignment (Fig. 2). Install attaching lockwasher and nut. Tighten securely.

(5) Install bowl vent valve lever on air horn, by first inserting spring into position in arm, with ends of spring pointing toward fuel inlet fitting (Fig. 5). Slide assembly over stub shaft on air horn. Align spring and arm with stub shaft and end of spring over raised portion of fuel inlet fitting. Install "E" clip to secure. Vent valve should be in closed position.

(6) Install fast idle cam on air horn stub shaft, with steps toward fast idle adjusting screw. Install "E" clip to secure (Fig. 14).

(7) To install fast idle connector rod, engage plain end in slot of fast idle cam (from inside). Engage other end of rod in choke lever. With choke valve wide open,

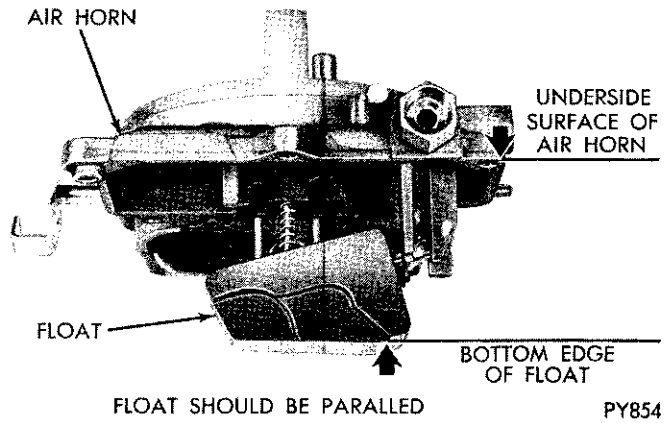


Fig. 20—Checking Float Drop

slide lever over choke shafts; (aligning flats) and pointing directly to fast idle cam stub shaft (Fig. 3). Install attaching lockwasher and nut. Tighten securely.

Choke Vacuum Diaphragm

Inspect the diaphragm vacuum fitting to be sure that the passage is not plugged with foreign material. Leak check the diaphragm to determine if it has internal leaks. To do this, first depress the diaphragm stem, then place a finger over the fitting to seal the opening. Release the stem. If the stem moves more than 1/16 inch in 10 (ten) seconds, the leakage is excessive and the assembly must be replaced.

Install choke diaphragm assembly on the air horn as follows:

(1) Engage free end of choke operating link in slot of choke lever.

(2) Install choke diaphragm and mounting bracket on air horn. Install attaching screws and tighten securely.

(3) Inspect rubber hose for cracks before placing it on correct carburetor fitting, (Fig. 1) after vacuum kick adjustment has been made.

CARBURETOR ADJUSTMENTS

It is very important that the following adjustments are made on a reconditioned carburetor and in the sequence listed:

Fast Idle Speed and Cam Position Adjustment

The fast idle engine speed adjustment should be made on the vehicle, as described in the Fast Idle Speed Adjustment (On Vehicle) paragraph. However, the Fast Idle Cam Position Adjustment can be made on the bench. This adjustment is important to assure that the speeds of each step of the cam occur at the proper time during engine warm-up.

(1) With fast idle speed adjusting screw contacting second highest speed step on the fast idle cam, move choke valve toward closed position with light pressure on choke shaft lever.

(2) Insert specified drill (see Specifications) between top of choke valve and wall of air horn (Fig. 21). An adjustment will be necessary if a slight drag is not obtained as drill shank is being removed.

(3) If an adjustment is necessary, bend fast idle connector rod at angle, using Tool T109-213, until correct valve opening has been obtained.

Vacuum Kick Adjustment—(This test can be made On or Off vehicle.)

The choke diaphragm adjustment controls the fuel delivery while the engine is running. It positions the choke valve within the air horn by action of the linkage between the choke shaft and the diaphragm. The diaphragm must be energized to measure the vacuum

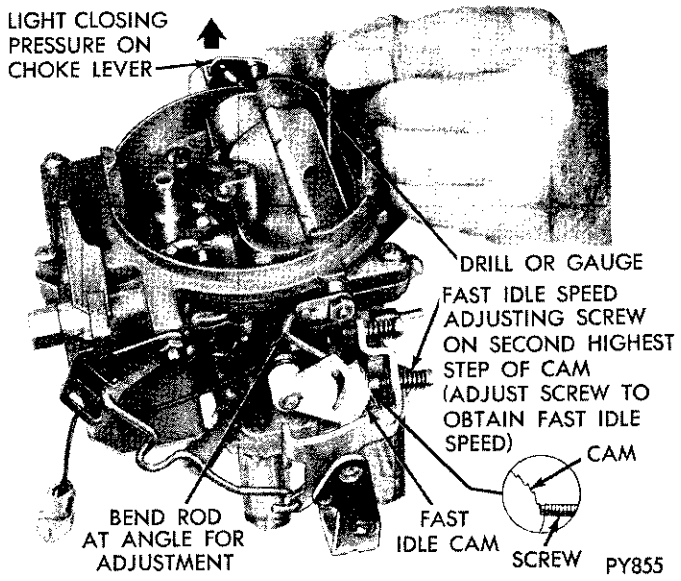


Fig. 21—Fast Idle Speed and Cam Position Adjustment

kick adjustment. Use either a distributor test machine with a vacuum source, or vacuum supplied by another vehicle.

(1) If adjustment is to be made with engine running, disconnect fast idle linkage to allow choke to close to the kick position with engine at curb idle. If an auxiliary vacuum source is to be used, open throttle valves (engine not running) and move choke to closed position. Release throttle first, then release choke.

(2) When using an auxiliary vacuum source, disconnect vacuum hose from carburetor and connect it to hose from vacuum supply, with a small length of tube to act as a fitting. Removal of hose from diaphragm may require forces which can damage the system. Apply a vacuum of 10 or more inches of mercury.

(3) Insert specified drill (refer to Specifications) be-

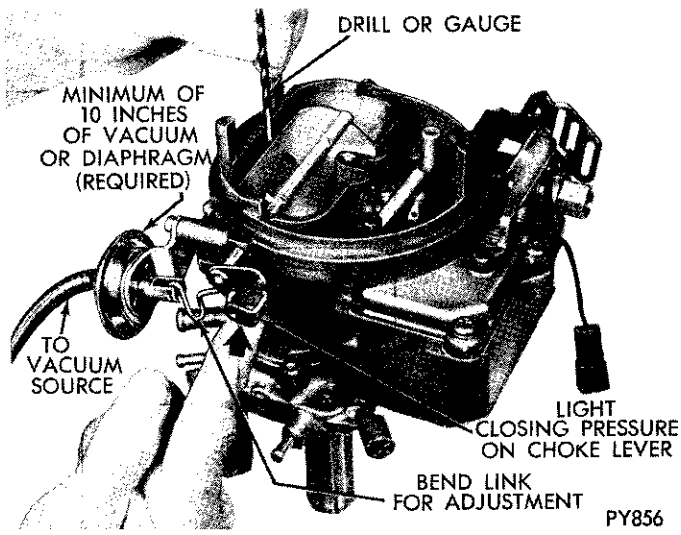


Fig. 22—Vacuum Kick Adjustment

tween top of choke valve and wall of air horn (Fig. 22). Apply sufficient closing pressure on lever to which choke rod attaches to provide a minimum choke valve opening, without distortion of diaphragm link. Note that the cylindrical stem of diaphragm will extend as internal spring is compressed. This spring must be fully compressed for proper measurement of vacuum kick adjustment.

(4) An adjustment will be necessary if a slight drag is not obtained as drill is being removed. Shorten or lengthen diaphragm link to obtain correct choke opening. Length changes should be made carefully by bending (open or closing) the bend provided in diaphragm link. **CAUTION: DO NOT APPLY TWISTING OR BENDING FORCE TO DIAPHRAGM.**

(5) Reinstall vacuum hose on correct carburetor fitting. Return fast idle linkage to its original condition if disturbed as suggested in Step No. 1.

(6) Make following check. With no vacuum applied to diaphragm, the **choke valve should move freely** between open and closed positions. If movement is not free, examine linkage for misalignment or interferences caused by bending operation. Repeat adjustment if necessary to provide proper link operation.

Choke Unloader (Wide Open Kick)

The choke unloader is a mechanical device to partially open the choke valve at wide open throttle. It is used to eliminate choke enrichment during cranking of an engine. Engines which have flooded or stalled by excessive choke enrichment can be cleared by use of the unloader. Adjust the choke unloader as follows:

(1) Hold throttle valves in wide open position. Insert specified drill (see Specifications) between upper edge of choke valve and inner wall of air horn (Fig. 23).

(2) With a finger lightly pressing against shaft lever, a slight drag should be felt as drill is being withdrawn. If an adjustment is necessary, bend unloader tang on throttle lever until correct opening has been obtained (Fig. 23). Use Tool T109-213.

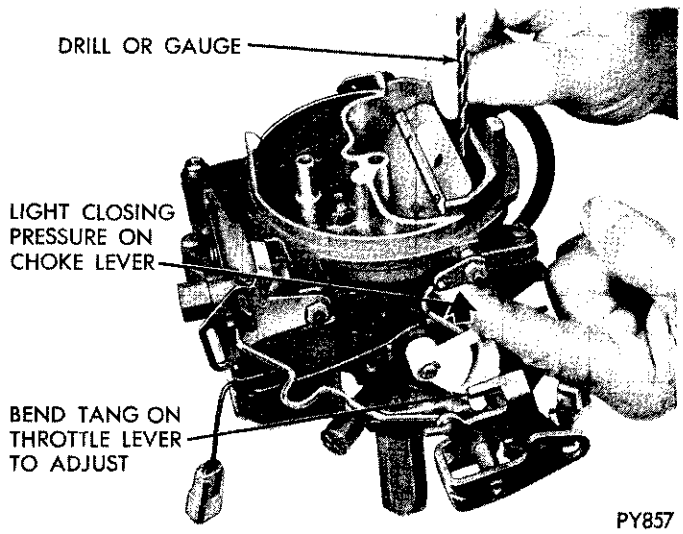


Fig. 23—Choke Unloader Adjustment (Wide Open Kick)

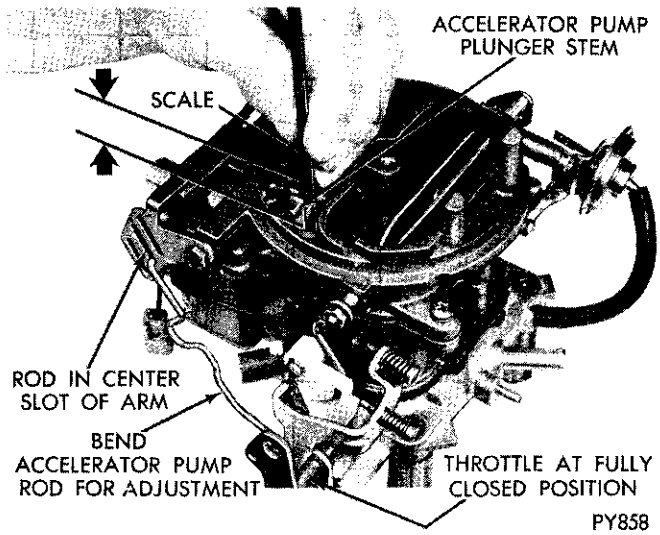


Fig. 24—Accelerator Pump Adjustment

Accelerator Pump

(1) Back off curb idle speed adjusting screw. Open choke valve so that fast idle cam allows throttle valves to be completely seated in bores. Be sure that pump connector rod is installed in center slot of accelerator pump rocker arm.

(2) Close throttle valves tightly. Measure the distance between top of air horn and end of plunger shaft (Fig. 24). This measurement should be 9/16 inch.

(3) To adjust pump travel, bend pump operating rod, using Tool T109-213, at loop of rod, until correct setting has been obtained.

Bowl Vent

(1) With curb idle speed adjusting screw at curb

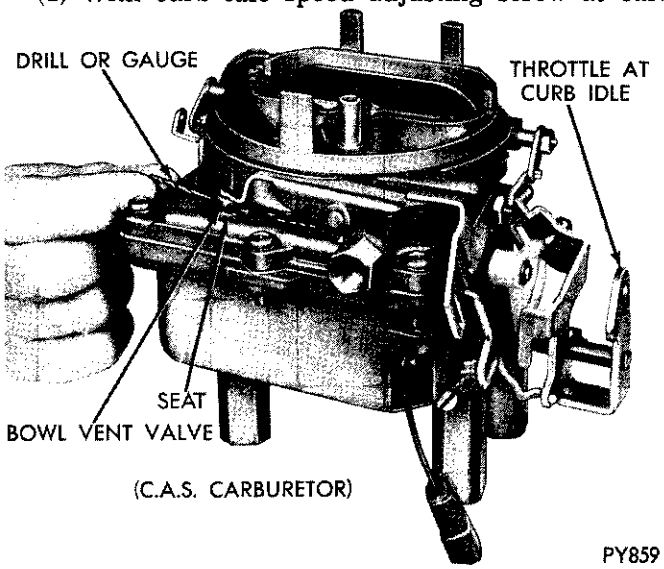


Fig. 25—Bowl Vent Adjustment

idle, there should be 5/64 inch clearance between bowl vent valve and seat on air horn when throttle valves are closed (Fig. 25).

(2) If an adjustment is necessary, bend tang on accelerator pump rocker arm, using Tool T109-41, until correct vent valve opening has been obtained.

Idle Speed Adjustment (Curb Idle)

(Refer to General Information at Front of Section.)

Fast Idle Speed Adjustment (On Vehicle)

Fast idle engine speed is used to overcome cold engine friction stalls, after cold starts and stalls because of carburetor icing. Set this adjustment after the vehicle odometer indicates over 500 miles to insure a normal engine friction level. Prepare engine by driving at least five miles. Connect a tachometer and set the curb idle speed and mixture, then proceed as follows:

(1) With engine off and transmission in **PARK** or **NEUTRAL** position, open throttle slightly.

(2) Close choke valve until fast idle screw can be positioned on second highest step of fast idle cam (Fig. 26).

(3) Start engine and determine stabilized speed. Turn fast idle speed screw **in** or **out** to secure specified speed. (See Specifications.)

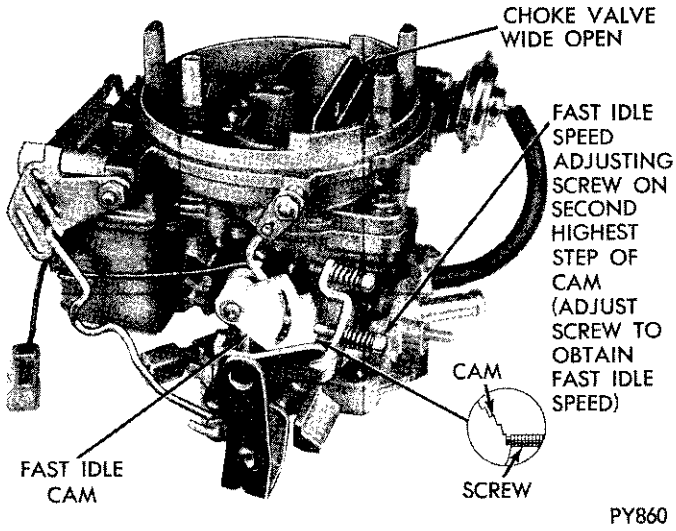


Fig. 26—Fast Idle Speed Adjustment (On Vehicle)

(4) Stopping engine between adjustments is not necessary. However, reposition fast idle speed screw on cam after each speed adjustment to provide correct throttle closing torque.

To set idle speed on vehicles, refer to Fuel System General Information Paragraph.

AVS SERIES CARBURETOR

INDEX

GENERAL INFORMATION

383 Cubic Inch Engine

The Carter four barrel carburetor models C.A.S. (Cleaner Air System) AVS-4736S and AVS-4732S are used on the 383 cu. in. engines when the vehicles are equipped with automatic transmissions. AVS-4732S is used on vehicles with air conditioning only, and is equipped with a hot idle compensator valve. This valve is a thermostatically operated air bleed, to relieve an overrich condition at idle. This condition is the result of excessive heat and resultant overrich mixtures (Fig. 1).

The Carter four barrel carburetor model E.C.S. (Evaporation Control System) AVS-4734S is used when the vehicle is equipped with an automatic transmission. This carburetor is also equipped with a hot idle compensator valve, as AVS-4732S above. (Fig. 1).

All of these carburetors are equipped with a distributor ground switch, which retards the distributor when the carburetor is at curb idle, for better emission control.

440 Cubic Inch Engine

The Carter four barrel carburetor models C.A.S. (Cleaner Air System) AVS-4737S, AVS-4738S and AVS-4741S are used on the 440 cu. in. engines when the vehicles are equipped with a standard or automatic transmission respectively. AVS-4741S is used with air conditioning only and has a hot idle com-

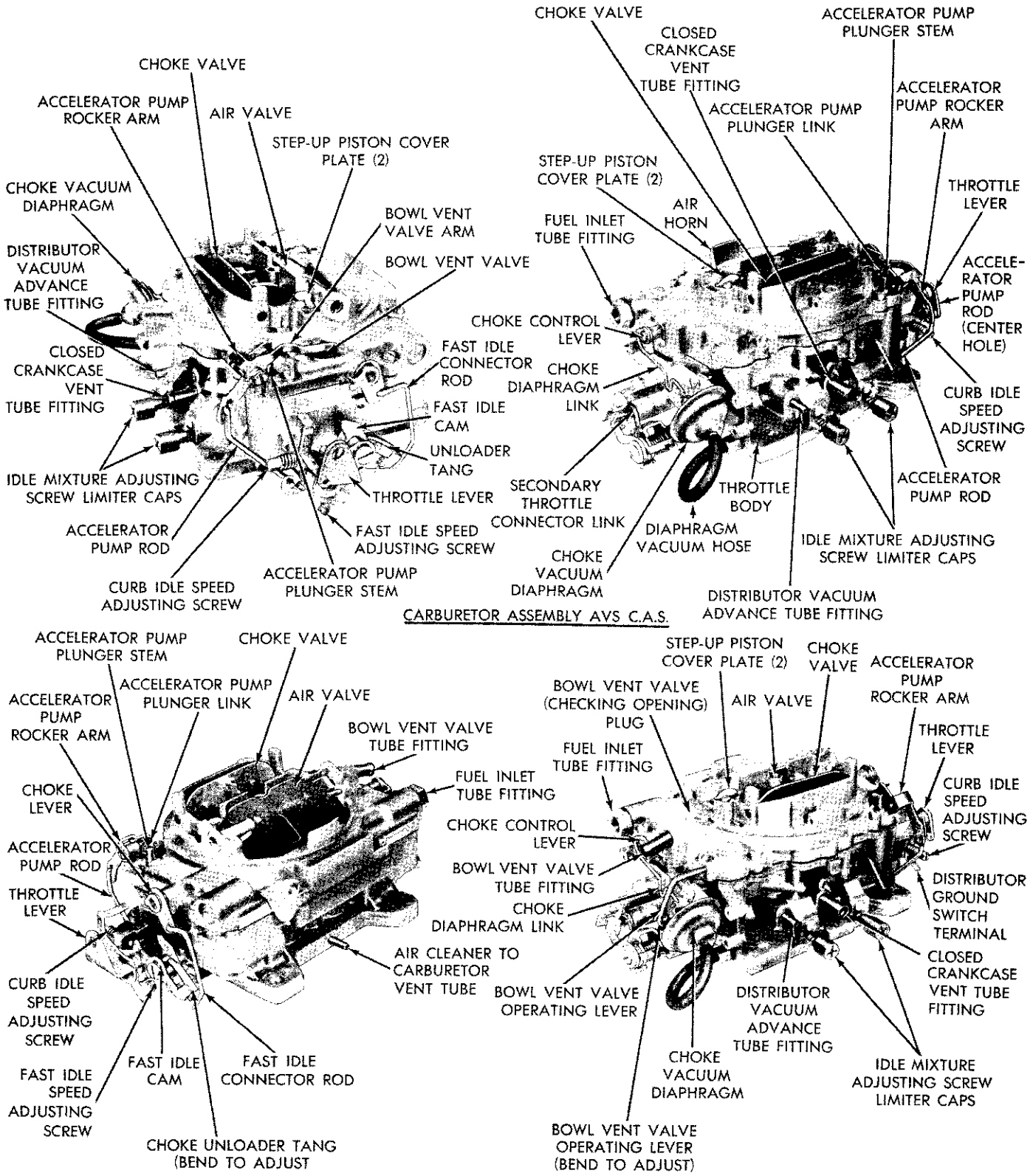


Fig. 1—Carburetor Assembly

pensator valve, as described previously. (Fig. 1).

The Carter four barrel carburetor models E.C.S. (Evaporation Control System) AVS-4739S and AVS-4740S are used on the 440 cu. in. engines when the vehicles are equipped with standard or automatic transmissions respectively. These two carburetors are also equipped with a hot idle compensator valve as is AVS-4741S above. (Fig. 1).

These five AVS carburetors are equipped with a distributor ground switch, which retards the distributor when the carburetor is at idle, for better emission control. The idle speed solenoid which is mounted on these carburetors, (Fig. 21) is used to maintain a higher idle speed when the vehicle is running and allows the throttle to close to a low idle speed throttle position when the ignition key is turned off, to prevent "after running."

Since the service procedures are identical on all Carter AVS carburetors, the illustrations showing the various disassembly procedures will not always show any one specific carburetor.

The throttle valves of the secondary half of the carburetor are mechanically connected to the primary valves and open with the primary after an approximate 60° lag; and continue to open until both primary and secondary throttle valves reach the wide open position simultaneously. As engine speed increases, the forces exerted by the velocity of intake air down through the venturis of the carburetor increases and tends to overcome the air valve spring attached to the air valve, permitting the air valve to position its self according to engine requirements.

The AVS (air valve secondary) carburetor contains many features, some of which are the locations for the step-up rods and pistons. The step-up rods, pistons and springs are accessible for service without removing the air horn or the carburetor from the engine. The primary venturi assemblies are replaceable and contain many of the calibration points for both the high and low speed system. One fuel bowl feeds both the primary and secondary nozzles on the right side while the other fuel bowl takes care of the primary and secondary nozzles on the left side. This provides improved performance in cornering, quick stops and acceleration.

All the major castings of the carburetor are aluminum, with the throttle body cast integral with the main body. This allows an overall height reduction in the carburetor. The section containing the accelerator pump is termed the primary side of the carburetor. The rear section is the secondary. The five conventional systems used in previous four barrel carburetors are also used in this unit. The five conventional systems are, two float systems, two low speed systems, (primary side only) two high speed systems, one accelerator pump system and one automatic choke control system.

SERVICE PROCEDURES

DISASSEMBLING CARBURETOR (Fig. 1)

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

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

(3) Remove hairpin clip that holds throttle connector rod in center hole of accelerator pump arm. Disengage rod from arm and throttle lever, then remove from carburetor.

(4) Remove screws attaching step-up piston and rod cover plates. Hold cover down with a finger to prevent piston and rods from flying out. Lift off plates and slide step-up pistons and rods out of air horn, (Fig. 2). Remove step-up piston springs.

(5) Remove vacuum hose between carburetor throttle body and vacuum diaphragm.

(6) Remove clip from choke operating link and disengage link from diaphragm plunger (stem) and choke lever. (Fig. 1).

(7) Remove vacuum diaphragm and bracket assembly and place to one side to be cleaned as a special item. A liquid cleaner may damage diaphragm material.

(8) Remove screws that attach idle solenoid bracket and solenoid to air horn and main body. Remove sole-

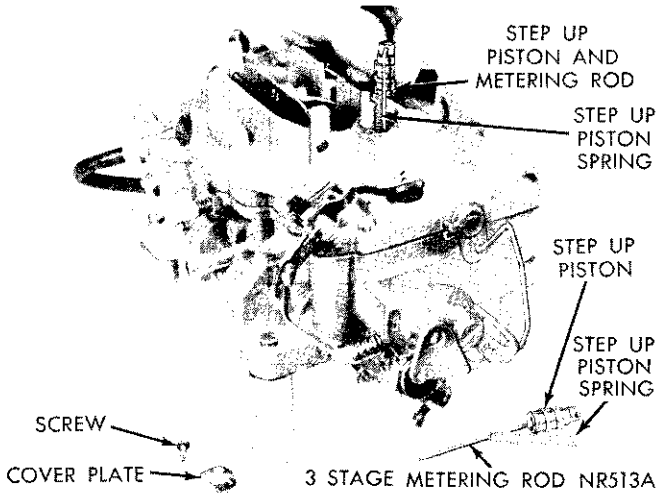


Fig. 2—Removing or Installing Step-Up Pistons and Rods

noid assembly from carburetor. (If so equipped.)

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

(10) Remove hot idle compensator and gasket (if so equipped).

Disassembling Air Horn

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

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

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

(3) Remove shoulder screw and spring holding accelerator pump rocker arm and bowl vent arm to air horn (C.A.S.). Remove arms and disengage pump link from pump stem. Slide accelerator pump plunger and spring out of air horn. Remove gasket.

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

(5) Remove fuel inlet fitting and filter screen from air horn.

(6) Test freeness of choke mechanism in air horn. The choke shaft must float free to operate correctly. If choke shaft sticks in bearing area, or appears to be gummed from deposits in air horn, a thorough cleaning will be required.

Main Body Disassembly

(1) Remove screws that attach accelerator pump jet housing to main body. Lift out jet housing and gasket (Fig. 3). Discard gasket. Now, invert main body and drop out discharge check needle from discharge passage.

(2) Using Tool T-109-58, remove main metering jets (primary side), (Fig. 4). **The primary and secondary main metering jets are not interchangeable. It is very important that these jets be installed in their respective locations in the main body at reassembly.**

(3) Again using Tool T-109-58, remove main metering jets (secondary side), (Fig. 4). Remove intake check.

(4) Remove screws that attach primary venturi (choke and pump side) to main body. Lift venturi straight up and away from main body, (Fig. 5). Discard gaskets. **The venturi assemblies are not interchangeable, side for side and must be reinstalled in their original locations at reassembly.**

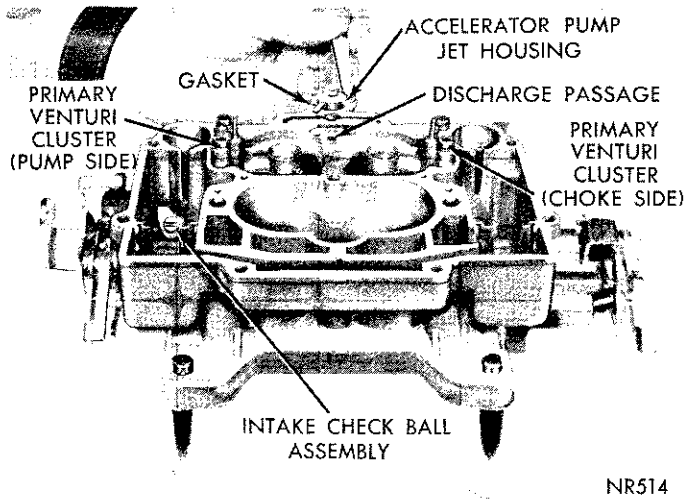


Fig. 3—Removing or Installing Accelerator Pump Jet Housing

(5) Using Tool T-109-59, screw driver bit, remove accelerator pump intake check valve located inside fuel bowl, adjacent to accelerator pump cylinder.

(6) Remove plastic limiter caps from idle air mixture screws. (Be sure and count number of turns to seat the screws (from stop), as the same number of turns (from seat) must be maintained at installation.) Remove screws and springs from throttle body.

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

It is usually not advisable to remove the throttle shafts or valves unless wear or damage necessitates the installation of new parts. During the manufacture of the carburetor, the location of the idle transfer ports and the idle discharge ports to the valve is carefully established for one particular assembly, (Fig. 6).

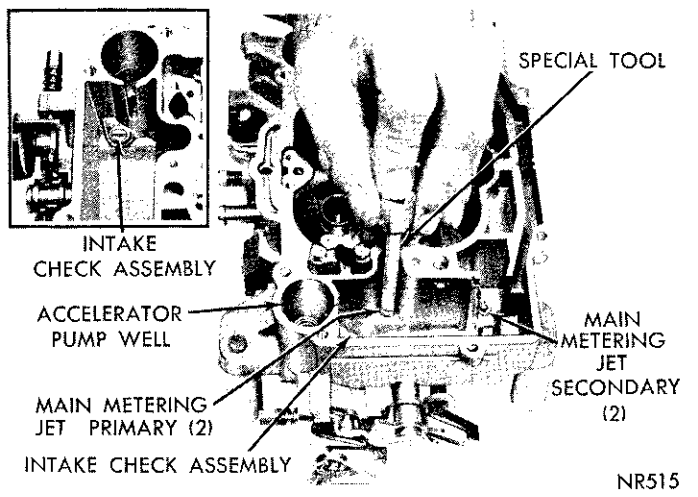


Fig. 4—Removing or Installing Main Metering Jets

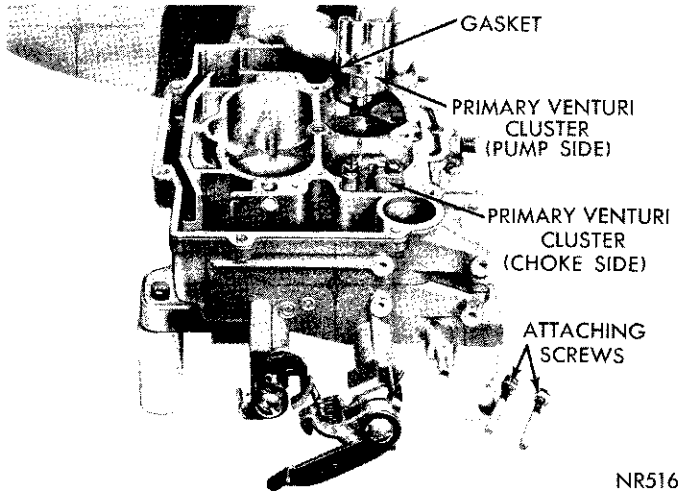


Fig. 5—Removing or Installing Primary Venturi Cluster

The valves are milled to give proper port relation.

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

It is recommended that if the throttle shafts are excessively worn, that a new carburetor be installed. However, if the throttle valves have become nicked, burred or damaged, new valves may be installed, providing the following instructions are carefully followed. **The screws that attach the throttle valves are staked on the opposite side and care should be used in removal so as not to break the screws in the throttle shaft. Remove the staked portion of the screws with a file.**

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

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

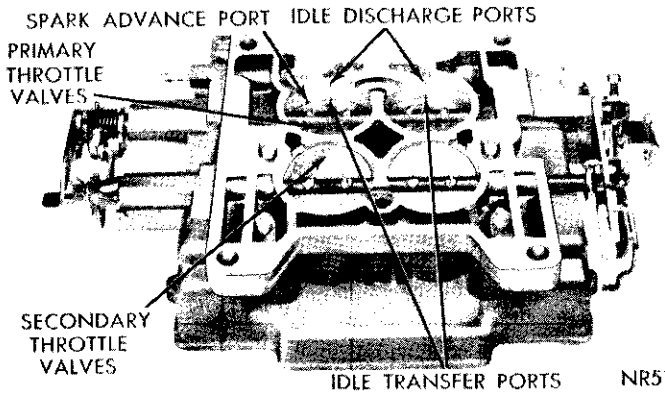


Fig. 6—Ports in Relation to Throttle Valves

The primary valves and secondary valves are not interchangeable and should be kept separate in order that each may be returned to its respective bore (Fig. 7).

INSPECTION AND REASSEMBLY

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

(2) Tap valves lightly in this position, tighten screws securely. Stake screws by squeezing with pliers.

(3) Install idle mixture screws and springs in throttle body. (The tapered portion must be straight and smooth. If tapered portion is grooved or ridged, a new idle mixture screw should be installed to insure having correct idle mixture control.) **DO NOT USE A SCREW DRIVER.** Turn screws lightly against their seats with fingers. Back off the number of turns counted at disassembly. Install new plastic caps with tab against stops. This screw has a left hand thread. Turn counterclockwise (Richer) and clockwise (Leaner).

(4) **Be sure all the metering holes and vent tubes are clean, in the primary venturi.** Place new primary venturi gaskets in position, then install the primary venturi (pump and choke side) by lowering straight down on gaskets (Fig. 5). Install attaching screws and tighten securely.

(5) Install primary and secondary main metering jets, using Tool T-109-58. (Fig. 4.) Tighten jets securely. Install intake check.

(6) Install accelerator pump intake check ball using Tool T-109-59.

(7) Install hot idle compensator and gasket (if so equipped). Tighten screws securely.

Accelerator Pump Test

(1) Pour clean gasoline into carburetor bowl (ap-

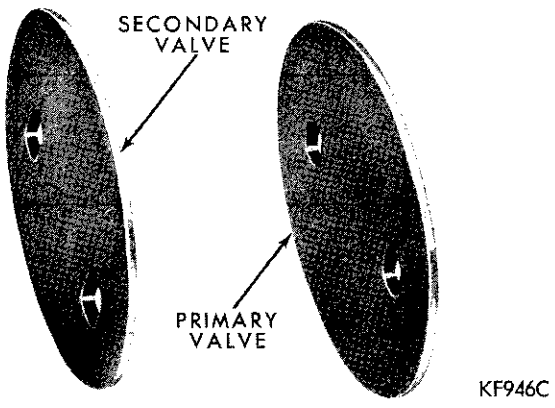


Fig. 7—Throttle Valve Identification

proximately 1/2 inch deep). Remove accelerator pump plunger from jar of gasoline. Flex leather several times, then slide into pump cylinder.

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

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

(4) If either intake check assembly or discharge check needle leaks after above test and service fix, attempt to reseat as follows:

Intake Check Ball

Remove the intake check assembly from the throttle body. Install a new check assembly, then retest as described previously (Fig. 4).

Discharge Check Needle

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

(2) Install accelerator pump discharge check needle, jet housing and gasket. Install housing and attaching screws. Tighten screws securely.

(3) Press down on accelerator pump plunger shaft, and as plunger is being depressed, 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 jet housing should be installed. After test, pour gasoline from carburetor bowl and remove pump plunger.

Assembling Air Horn

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

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

(3) Place pump arm in position over boss of air horn and engage pump link. Install bowl vent arm in position over pump arm. Slide spring over pivot screw and install through arms and boss. Be sure shoulder of screw enters arms. Tighten securely. Engage ends of spring with tang on vent arm and pin on air horn. Check for proper operation.

The carburetors are equipped with synthetic rubber tipped fuel inlet needles. The needle tip is a rubber material which is not affected by gasoline and is stable over a wide range of temperatures. The tip is flexible enough to make a good seal on the needle seat, and to give increased resistance to flooding.

The use of new inlet needles require that care be used when making float adjustments. Avoid applying any pressure on the floats which might compress the tip of the fuel inlet needles. **The tip can be compressed sufficiently to cause a false setting which will affect correct level of fuel in the bowl.**

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

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

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

Float Alignment Setting

(1) Sight down side of each float shell to determine if side of the float is parallel to outer cage of air horn casting, (Fig. 8).

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

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

Float Level Setting

(1) With air horn inverted, air horn gasket in place

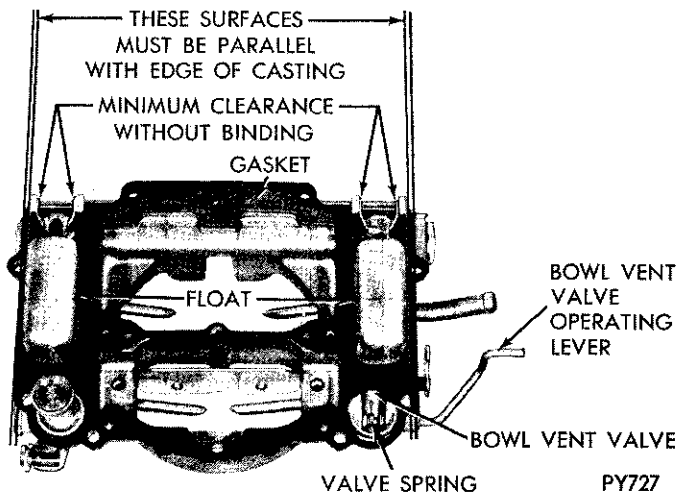


Fig. 8—Checking Float Alignment

and float needle seated, slide float gauge (refer to specifications for carburetor being worked on) between top of the float (at outer end) and air horn gasket, (Fig. 9). Float should just touch gauge (T-109-107).

(2) Check other float in same manner. If an adjustment is necessary, bend float arm using Tool T-109-22, until correct clearance has been obtained. After bending arm, recheck the float alignment.

Float Drop Setting

Float drop is the distance the floats move from the inverted air horn (float level setting position) to the airhorn in upright position.

(1) With air horn inverted (upside down) place air horn in upright position and measure the distance floats move from inverted to upright position. This measurement should be 1/2 inch (Fig. 10). Air horn gasket installed. If an adjustment is necessary, bend stop tabs on float levers until correct drop setting has been obtained. Bend tab toward needle seat to lessen drop, or away from seat to increase drop.

(2) After floats have been checked and adjusted, continue to assemble carburetor as follows:

(3) Place accelerator pump plunger lower spring in pump cylinder, then lower air horn carefully down on main body. Care must be taken to center small brass main bleed tubes so that they will pass through holes in air horn without being damaged. **Be sure the fuel baffles on the air horn, slide down in front, (bowl side) of the float chamber baffles, or the air horn will not index correctly with the main body and can cause the floats to hang up. Be sure the leather on the plunger does not curl or wrinkle. Accelerator pump operation will be affected if this precaution is not observed.** Place curb idle solenoid in position on carburetor. Install attaching screws and tighten securely. (If so equipped.)

(4) Install air horn attaching screws and tighten securely.

The change from low speed, best fuel economy, road load mixtures to richer wide open throttle full power mixtures is now accomplished in two steps. This has made it possible to secure best low speed fuel economy without sacrificing performance in the

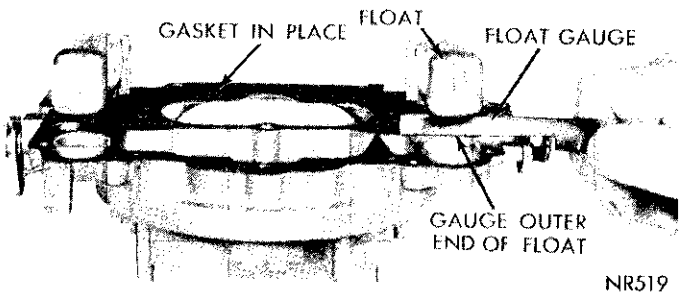


Fig. 9—Checking Float Height

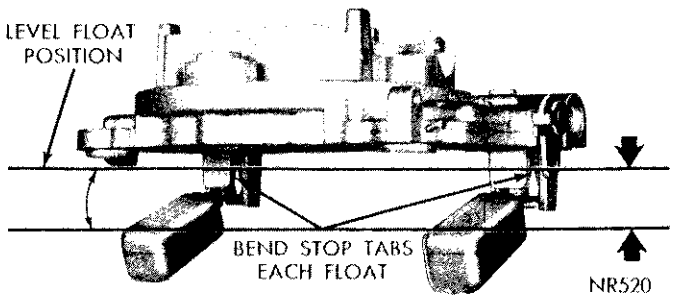


Fig. 10—Checking Float Drop

intermediate speed range. To do this, there is a step-up piston, new metering rods with three diameters, and primary metering jets, (Fig. 11).

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

(6) Check fit of choke valve in air horn. The valve should be evenly spaced on all sides. Loosen screws and reposition if necessary.

(7) Engage throttle connector rod with hole in throttle lever. Install other end in accelerator pump rocker arm, (center hole) and install hairpin clip to secure.

(8) Engage upper end of fast idle connector rod in slot of choke operating lever. Swing rod in an arc and engage with fast idle cam. Secure with hairpin clip.

Installing Vacuum Diaphragm

Inspect the diaphragm vacuum fitting to be sure that the passage is not plugged with foreign material. Leak check the diaphragm to determine if it has internal leaks. To do this, first depress the diaphragm stem, then place a finger over the vacuum fitting to seal the opening. Release the diaphragm stem. If the stem moves more than 1/16 inch in ten (10) seconds, the leakage is excessive and the assembly must be replaced. Install the diaphragm assembly on the carburetor as follows:

(1) Assemble to carburetor and tighten attaching screws securely.

(2) Install choke operating link in position between diaphragm plunger (stem) and choke lever. Install

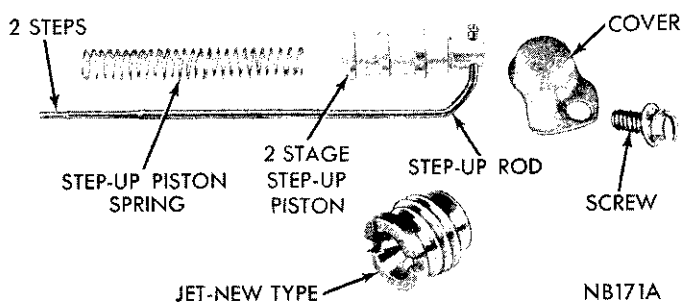


Fig. 11—Step-Up Piston Rod and Jet

clip to secure. Secure choke lever end with spring "E" clip.

(3) Inspect rubber hose for cracks, before placing it on correct carburetor fitting. (Fig. 1). **Do not connect the vacuum hose to the diaphragm fitting until after the vacuum kick adjustment has been made. (See Carburetor Adjustments.)**

CARBURETOR ADJUSTMENTS

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

Fast Idle Speed Cam Position Adjustment

The fast idle engine speed adjustment should be made on the vehicle, as described in the Fast Idle Speed Adjustment (On Vehicle Paragraph.) However, the Fast Idle Cam Position Adjustment can be made on the bench.

This adjustment is important to assure that the speeds of each cam step occur at the proper time during engine warm-up. Adjust as follows:

(1) With fast idle speed adjusting screw contacting second highest speed step on fast idle cam, move choke valve toward closed position with light pressure on choke shaft lever.

(2) Insert specified drill (refer to Specifications), between choke valve and wall of air horn (Fig. 12). An adjustment will be necessary if a slight drag is not obtained as the drill is being removed.

(3) To adjust, bend fast idle connector rod at angle, using Tool T-109-213 until correct valve opening has been obtained (Fig. 12).

Vacuum Kick Adjustment—(This test can be made ON or OFF vehicle.)

The choke diaphragm adjustment controls the fuel delivery while the engine is running. It positions the choke valve within the air horn by use of the linkage between the choke shaft and the diaphragm. The diaphragm must be energized to measure the vacuum kick adjustment. Use either a distributor test machine with a vacuum source, or vacuum supplied by the vehicle.

(1) If adjustment is to be made with engine running, disconnect fast idle linkage to allow choke to close to kick position with engine at curb idle. If an auxiliary vacuum source is to be used, open throttle valves (engine not running) and move choke valve to closed position. Release throttle first, then release choke.

(2) When using an auxiliary vacuum source, disconnect vacuum hose from carburetor and connect it to hose from vacuum supply with a small length of tube to act as a fitting. Removal of hose from diaphragm may require forces which damage the system. Apply a vacuum of 10 or more inches.

(3) Insert specified drill (refer to Specifications) between choke valve and wall of air horn (Fig. 13). Apply sufficient closing pressure on **lever** to which choke rod attaches to provide a minimum choke valve opening without distortion of diaphragm link. Note that on most units, a cylinderical stem extends as an internal spring is compressed. This spring must be fully compressed for proper measurement of vacuum kick adjustment.

(4) An adjustment will be necessary if a slight drag is not obtained as drill is being removed. Shorten or lengthen diaphragm link to obtain correct choke opening. Length changes should be made by carefully opening or closing the bend provided in diaphragm link. **CAUTION: DO NOT APPLY TWISTING OR BENDING FORCE TO DIAPHRAGM.**

(5) Reinstall vacuum hose on correct carburetor

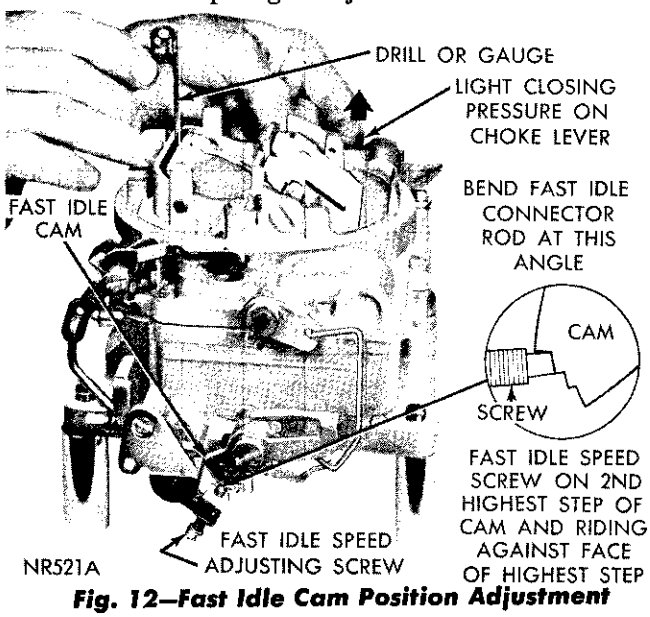


Fig. 12—Fast Idle Cam Position Adjustment

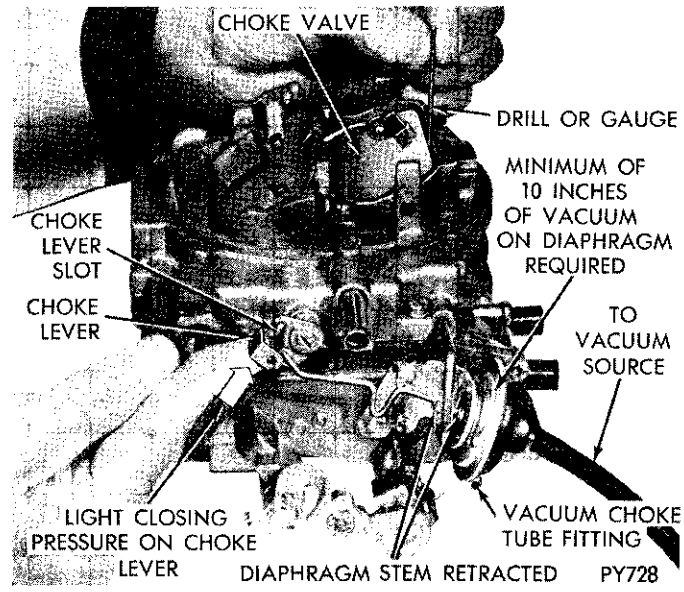


Fig. 13—Checking Choke Vacuum Kick Setting

fitting. Return fast idle linkage to its original condition if disturbed as suggested in step no. 1.

(6) Make following check. With no vacuum applied to diaphragm. **CHOKE VALVE SHOULD MOVE FREELY** between open and closed positions. If movement is not free, examine linkage for misalignment or interferences caused by bending operation. Repeat adjustment if necessary to provide proper link operation.

Choke Unloader Adjustment

The choke unloader is a mechanical device to partially open the choke at wide open throttle. It is used to eliminate choke enrichment during cranking of an engine. Engines which have been flooded or stalled by excessive choke enrichment can be cleared by use of the unloader. Adjust the system as follows:

(1) Hold throttle valves in wide open position. Insert specified drill (refer to Specifications), between upper edge of choke valve and inner wall of air horn (Fig. 14).

(2) With a finger lightly pressing against choke lever, a slight drag should be felt as drill is being withdrawn. If an adjustment is necessary, bend unloader tang on fast idle cam, using Tool T-109-22, until correct opening has been obtained (Fig. 14).

Accelerator Pump Adjustment

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

Measure the distance from the top of the air horn to the top of the plunger shaft, using a "T" scale, (Fig. 15). This distance should be 7/16 inch.

If an adjustment is necessary, bend the throttle connector rod at the lower angle, using Tool T-109-213, until correct travel has been obtained.

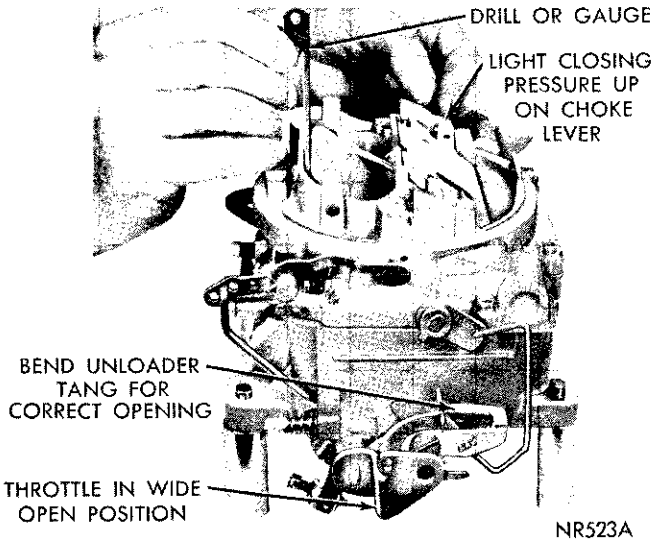


Fig. 14—Checking Choke Unloader (wide open kick)

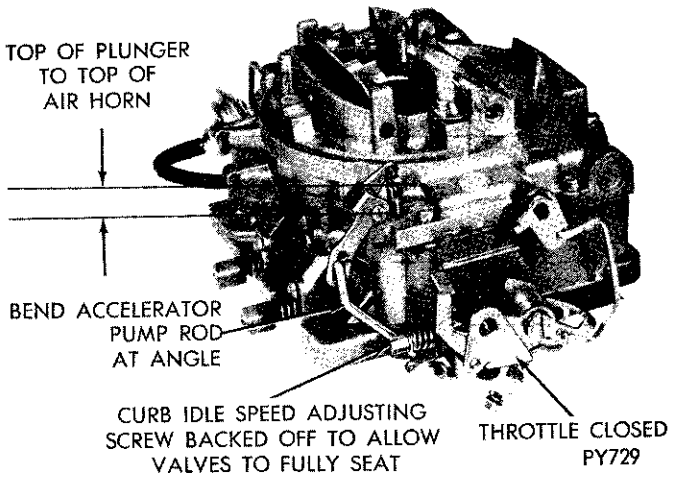


Fig. 15—Checking Accelerator Pump Adjustment

Secondary Throttle Lever Adjustment

To check the secondary throttle lever adjustment, block the choke valve in the wide open position and invert the carburetor. Slowly open the primary throttle valves until it is possible to measure between the lower edge of the primary valve and the bore (opposite idle port) (Fig. 16). (Refer to Specifications). The secondary valves should just start to open. If an adjustment is necessary, bend the secondary throttle operating rod at the angle, using Tool T-109-213, until correct adjustment has been obtained.

With primary and secondary throttle valves in tightly closed position, it should be possible to insert Tool T-109-29 (.020") wire gauge, between positive closing shoes on the secondary throttle levers, (Fig. 17).

If an adjustment is necessary, bend the shoe on the secondary throttle lever, using Tool T-109-22, until correct clearance has been obtained.

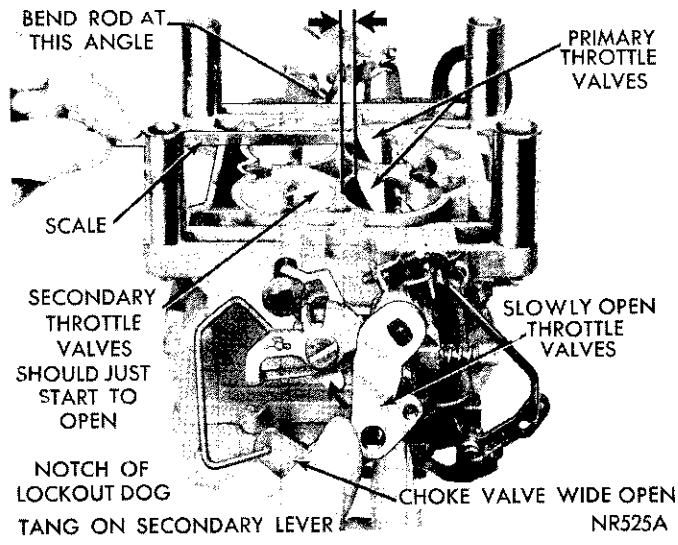


Fig. 16—Checking Secondary Throttle Adjustment

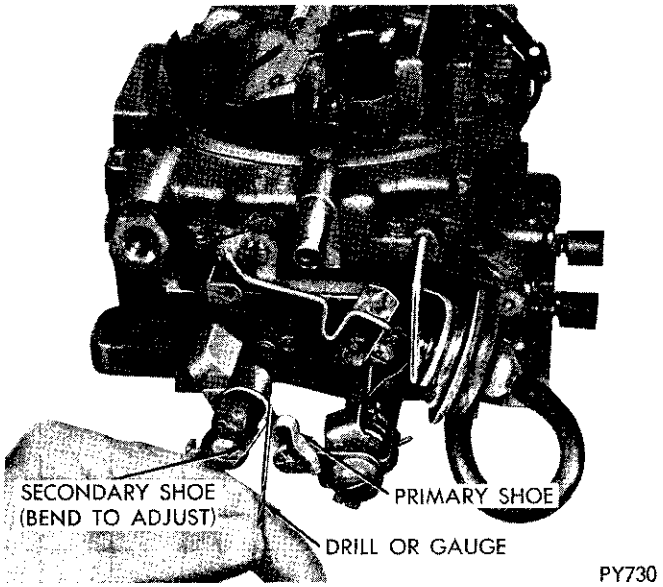


Fig. 17—Checking Clearance Between Closing Shoes

Secondary Throttle Lock Out Adjustment

Crack the throttle valves, then manually open and close the choke valve. The tang on the secondary throttle lever should freely engage in the notch of the lockout dog (Fig. 16).

If an adjustment is necessary, bend the tang on the secondary throttle lever, until engagement has been made. Use Tool T-109-22 for this operation.

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

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

Bowl Vent Valve Adjustment (C.A.S.)

To check the bowl vent valve adjustment, proceed as follows:

(1) With throttle valves tightly closed, insert a 1/8 inch drill between air horn and valve at smallest opening (Fig. 18).

(2) If an adjustment is necessary, bend adjusting tang (on pivot end of lever) until correct opening has been obtained.

Bowl Vent Valve Adjustment (E.C.S.)

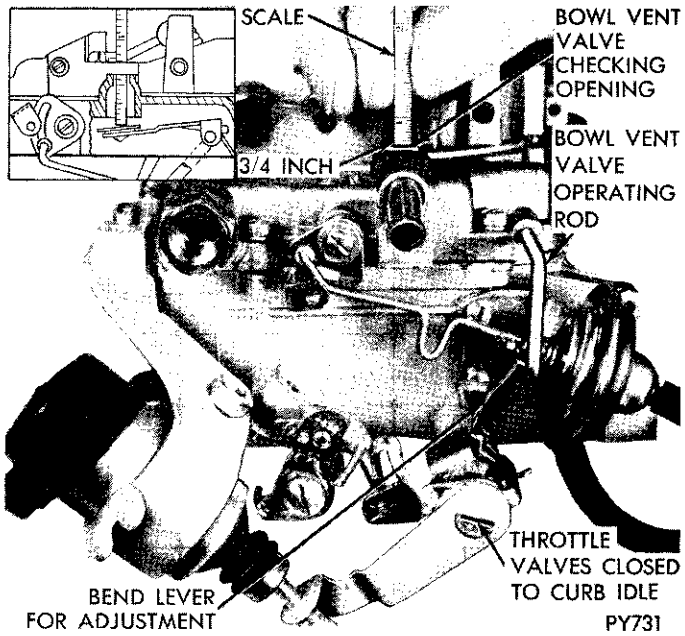
To check the bowl vent valve adjustment, proceed as follows:

(1) Using Tool T109-43, remove bowl vent valve checking hole plug in air horn.

(2) With throttle valves at closed curb idle position, insert a narrow ruler down through hole. Allow ruler to rest lightly on top of valve. The reading should be 3/4 inch from top of valve to top of air horn casting at opening. (Fig. 18).

(3) If an adjustment is necessary, bend bowl vent valve operating lever, until correct valve opening has been obtained.

(4) Install new plug and rap lightly to seat, using a hammer.



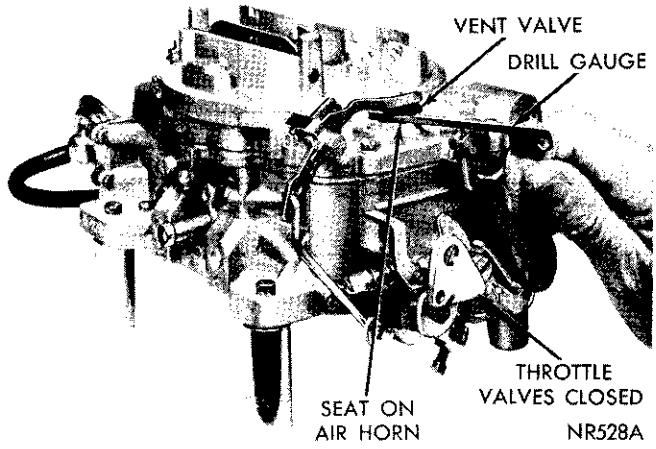


Fig. 18—Bowl Vent Valve Adjustment (C.A.S.) (E.C.S.)

Secondary Air Valve Adjustment

(1) Loosen lock screw (Fig. 19) and allow air valve to position itself at wide open position.

(2) From wide open position, (spring barely moving valve), turn slotted sleeve **two full turns** counter clockwise, (Fig. 19).

(3) Hold in this position with finger, then tighten lock screw securely. Check valve for freedom of movement.

Idle Speed Adjustment—(Curb Idle)

Refer to General Information at Front of Group.

Fast Idle Speed Adjustment (On Vehicle)

Fast idle engine speed is used to overcome cold engine friction, stalls after cold starts and stalls because of carburetor icing. Set this adjustment after

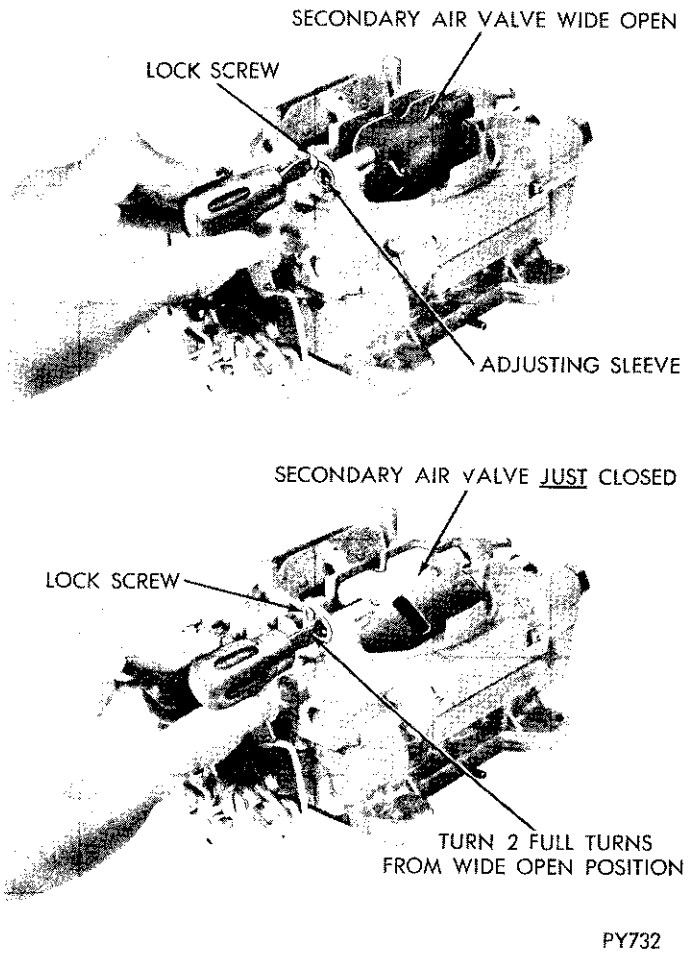


Fig. 19—Secondary Air Valve Adjustment

vehicle odometer indicates over 500 miles to insure a normal engine friction level. Prepare engine by driving at least 5 miles. Connect a tachometer and set curb idle speed and mixture, then proceed as follows:

(1) With engine off and transmission in **PARK** or **NEUTRAL** position open throttle slightly.

(2) Close choke valve until fast idle screw can be positioned on the second highest speed step of fast idle cam (Fig. 20).

(3) Start engine and determine stabilized speed. Turn fast idle speed screw **in** or **out** to secure specified speed. (Refer to Specifications).

(4) Stopping engine between adjustments is not necessary. However, reposition fast idle speed screw on cam after each speed adjustment to provide correct throttle closing torque.

Before adjusting idle and/or fast idle speeds and mixtures, make sure that the basic timing is correctly adjusted as outlined under Idle Speed Adjustment (Curb Idle).

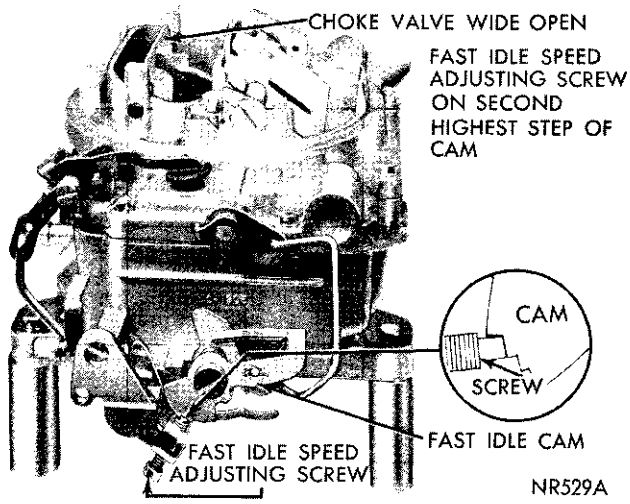


Fig. 20—Fast Idle Speed Adjustment (On Vehicle)

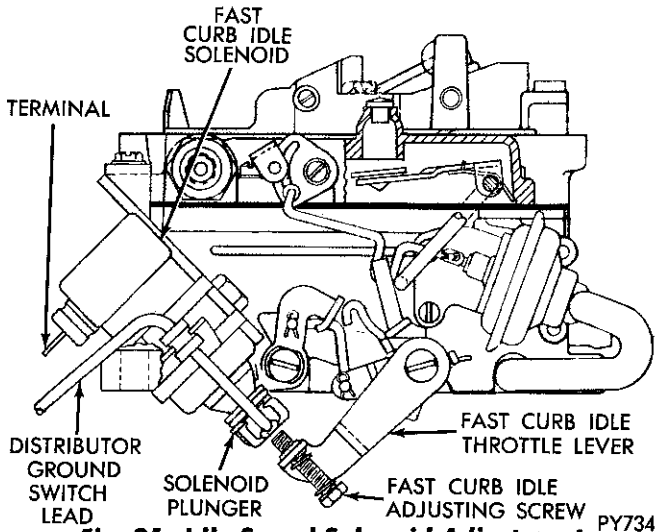


Fig. 21—Idle Speed Solenoid Adjustment

Idle Speed Solenoid Adjustment (If so equipped)

To set idle speed solenoid for correct engine r.p.m., proceed as follows:

(1) Warm up engine to normal operating temperature, then attach a tachometer.

(2) With engine running, turn idle speed solenoid adjusting screw **in** or **out** to obtain 900 r.p.m. for manual transmission equipped vehicles and 800 r.p.m. for automatic transmission equipped vehicles (Fig. 21).

(3) After specified r.p.m. has been obtained and with engine still running (to energize solenoid), adjust curb idle speed screw until end of screw **just touches** stop on carburetor throttle body. Now, back off 1 full turn to obtain slow curb idle speed setting. (Approximately 650 to 700 r.p.m.)

To set the idle speed on vehicles, refer to the Fuel System General Information Paragraph.

HOLLEY 4160 SERIES CARBURETOR

INDEX

GENERAL INFORMATION

383 Cubic Inch Engine

The Holley four barrel carburetor models C.A.S. (Cleaner Air System) R-4367A, R-4368A and R-4369A are used on the 383 cu. in. engines when the vehicles are equipped with manual or automatic transmissions respectively. Model R-4369A is used with vehicles equipped with air conditioning only and has a hot idle compensator valve. This valve is a thermostatically operated air bleed, to relieve an overrich condition at idle. This condition is the result of excessive heat and resultant overrich mixtures. (Fig. 1).

The Holley four barrel carburetor models E.C.S. (Evaporation Control System) R-4217A and R-4218A are also used on the 383 cu. in. engines when the vehicles are equipped with a manual or automatic transmission respectively. These two carburetors are also equipped with a hot idle compensator valve as is R-4369A above. (Fig. 2).

All of these carburetors are equipped with a distributor ground switch, which retards the distributor when the carburetor is at curb idle, for better emission control.

440 Cubic Inch Engine

The Holley four barrel carburetor model C.A.S. (Cleaner Air System) R-4366A is used on the 440 cu. in. engine when the vehicle is equipped with an automatic transmission. (Fig. 1).

The Holley four barrel carburetor model E.C.S. (Evaporation Control System) R-4360A is also used on the 440 cu. in. engine when the vehicle is equipped with an automatic transmission. (Fig. 2).

Both of these carburetors are equipped with a hot idle compensator valve. This valve is a thermostatically operated air bleed, to relieve an overrich condition at idle. This condition is the result of excessive heat and resultant overrich mixtures. The distributor ground switch retards the distributor when the carburetor is at curb idle, for better emission control.

Since the service procedures are identical on all Holley four barrel carburetors, the illustrations showing the various disassembly procedures will not always show any one specific carburetor.

The Holley 4160 Series Carburetor (Figs. 1, 2 and 3) can be considered as two dual downdraft carburetors mounted side by side, each having its own fuel bowl and float system. The two fuel bowls insure a constant supply of fuel for all the fuel metering systems. Fuel from the bowls flow into the primary and the secondary metering bodies where the fuel is mixed with air for all phases of engine operation. This type of metering provides for adequate diagnosis and easier servicing.

The two primary bores have one choke valve, connected to a well type automatic choke. Each bore has its own venturi, booster venturi, main fuel discharge nozzle and throttle valve.

Additional fuel for acceleration is supplied by a diaphragm type, mechanically operated pump which is located on the primary fuel bowl. The pump is actuated from a cam on the primary throttle. An override spring on the pump operating lever prolongs the discharge of fuel for smoother acceleration.

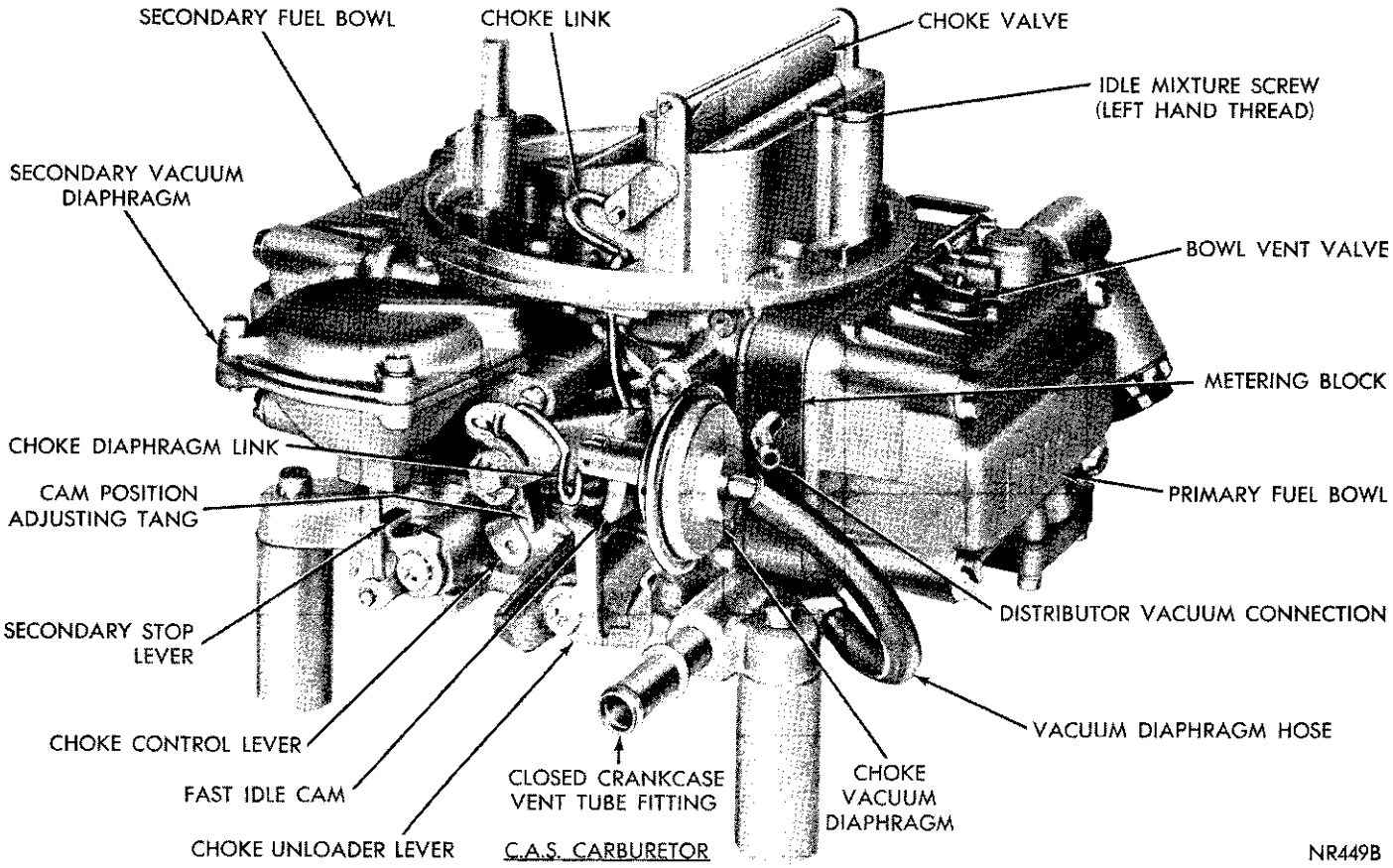
A power valve, mounted on the primary metering body, which is actuated by manifold vacuum, delivers the additional fuel necessary for full power and high speed operation.

The larger volume of fuel, in two separate bowls exposed to the cooling air stream, is an effective means of reducing percolation and hard starting when the engine is hot. An external vent on the primary bowl, vents the primary fuel bowl when the throttle is closed.

The primary and/or secondary bowls can be quickly removed to adjust the fuel level or change the fuel inlet valve without removing the carburetor from the engine.

Primary Fuel Inlet System

All fuel first enters the primary fuel bowl which supplies the four basic metering systems with the required amount of fuel (Fig. 4).



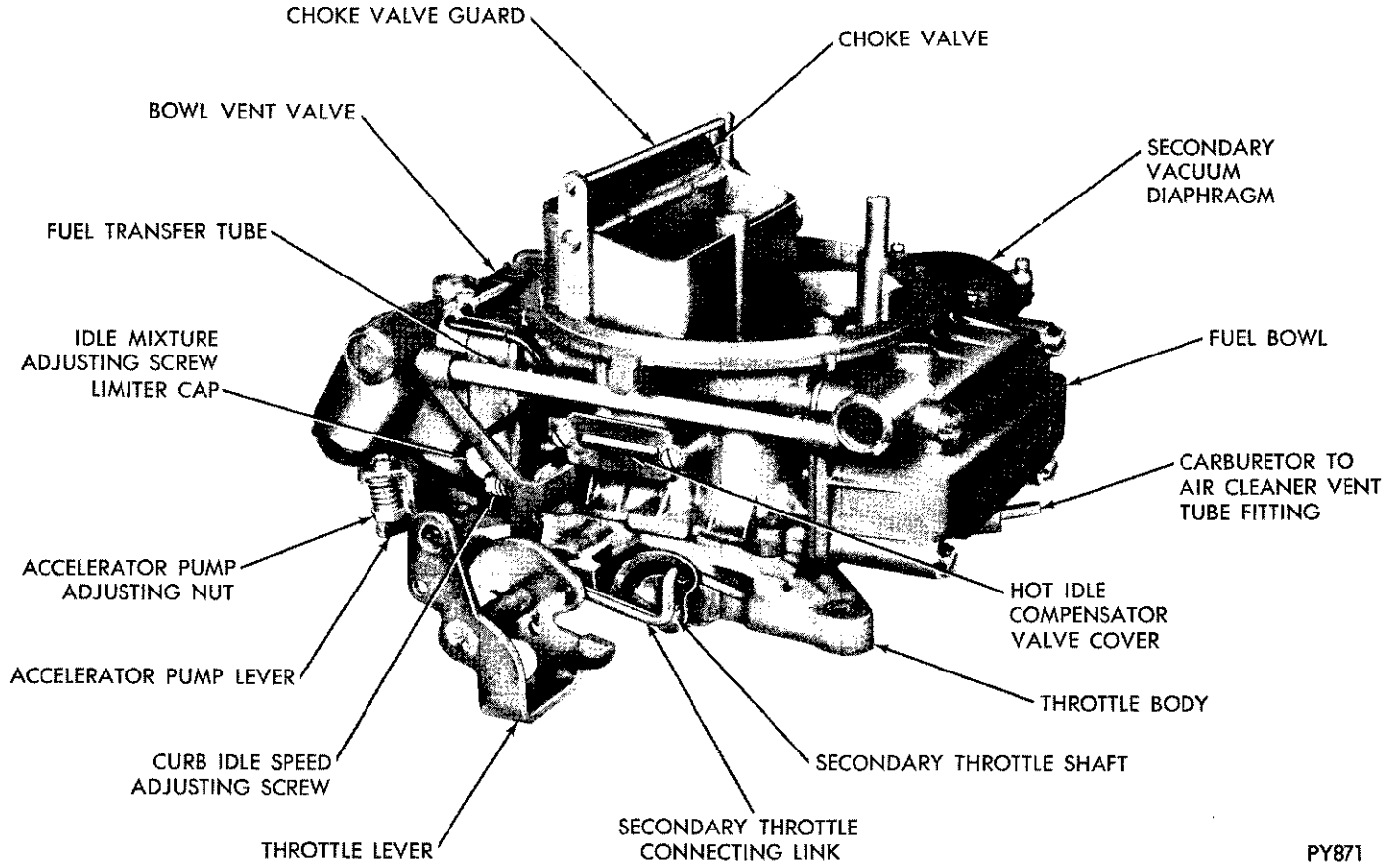


Fig. 1—Carburetor Assembly (C.A.S.)

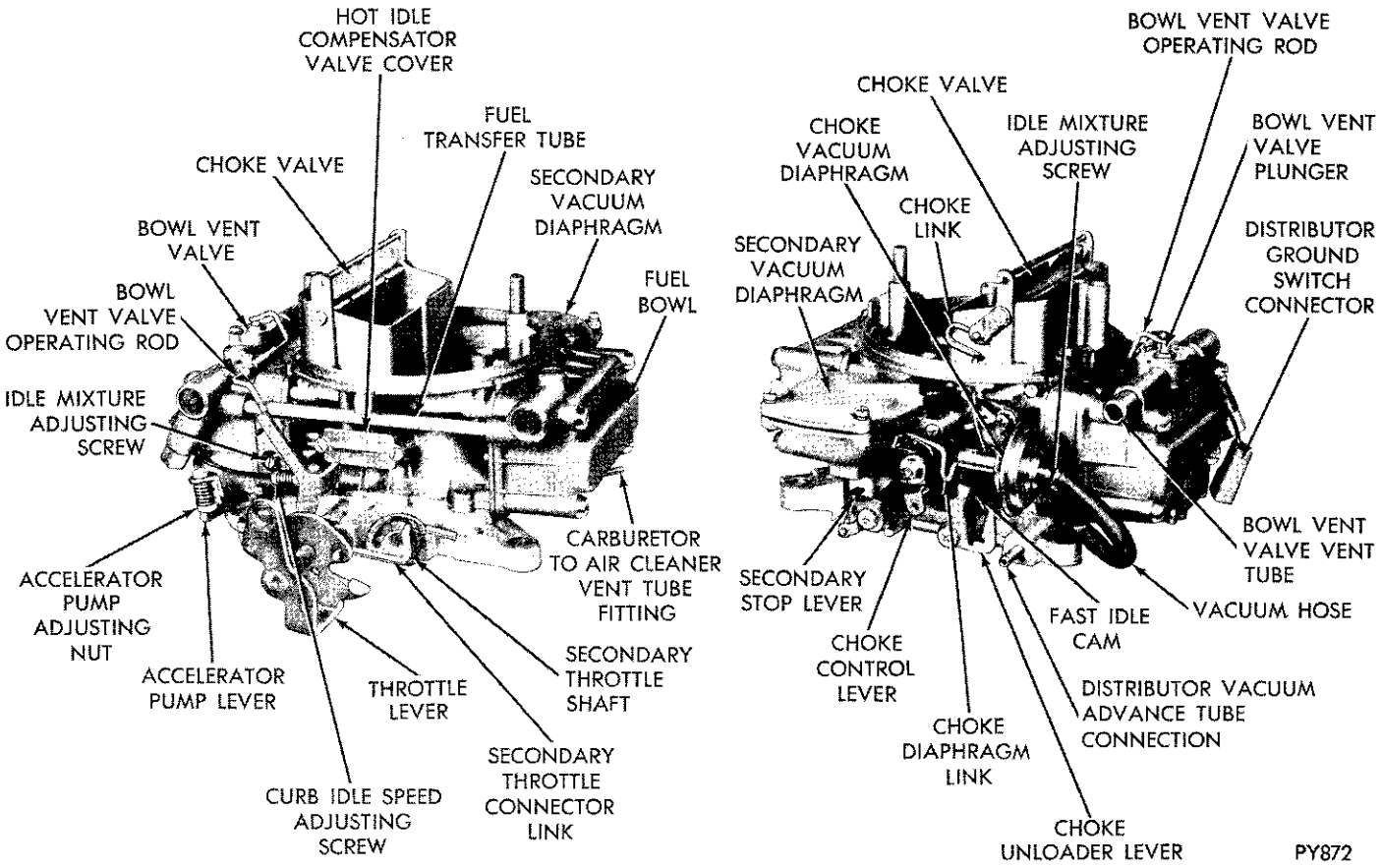


Fig. 2—Carburetor Assembly (E.C.S.)

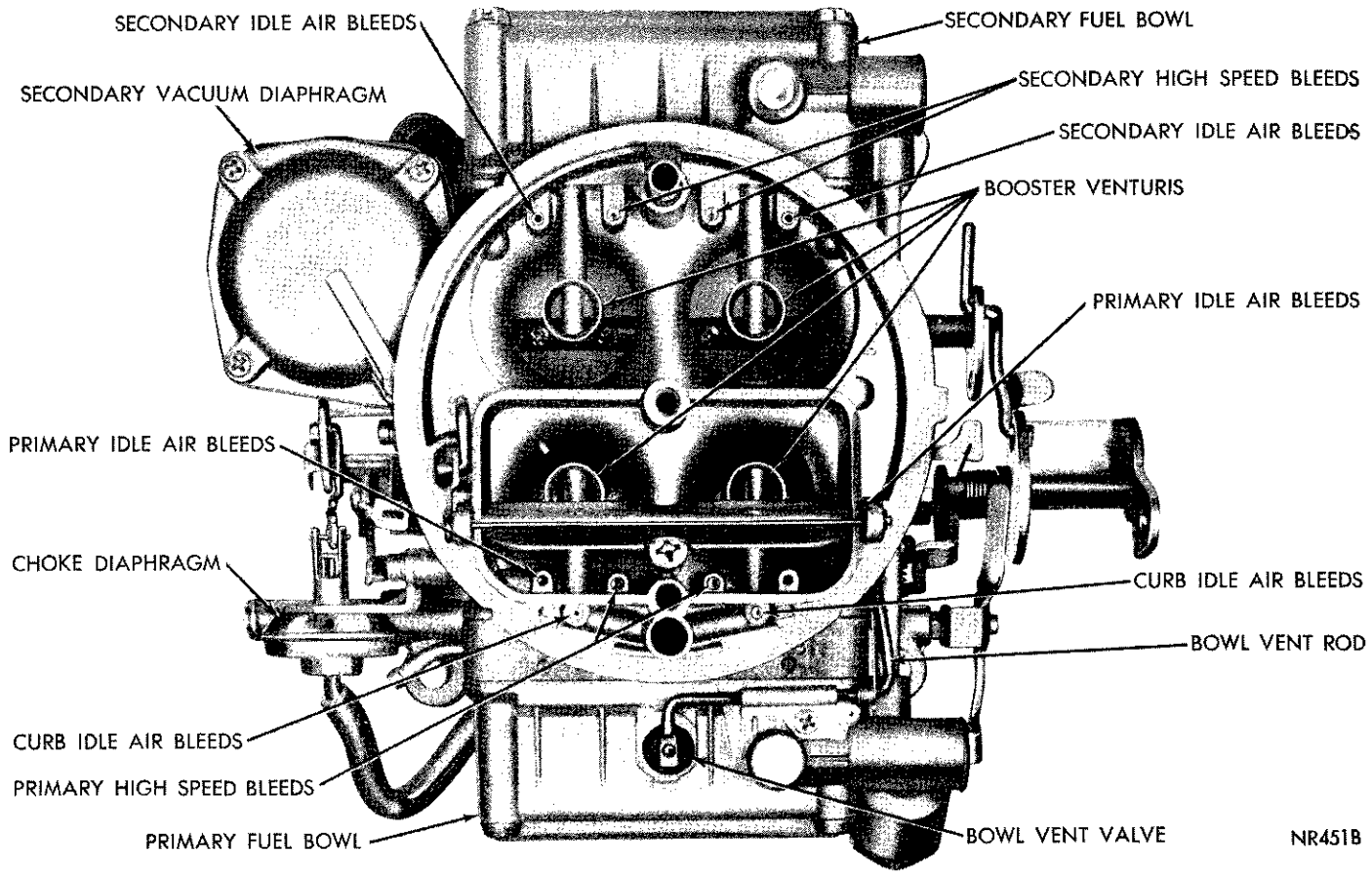


Fig. 3—Carburetor Assembly (Top View)

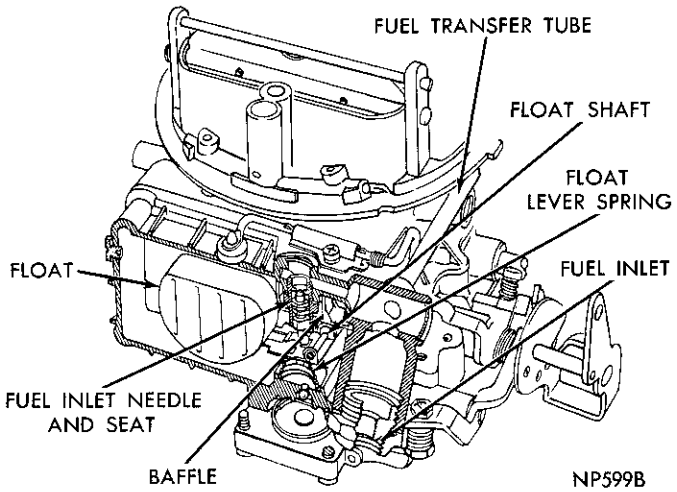


Fig. 4—Primary Fuel Inlet System

The fuel enters the fuel bowl through a fuel inlet fitting and into the fuel inlet valve. The amount of fuel entering the fuel bowl is determined by the space between the top of the movable needle and its seat and also by the pressure from the fuel pump.

The fuel inlet system must constantly maintain the specified level of fuel as the basic fuel metering systems are calibrated to deliver the proper mixture only when the fuel is at this level.

A float spring is incorporated under the float to keep the float in a stable position.

The float chamber is vented internally by the vent tube at all times. At curb idle or when the engine is stopped, the chamber is also vented by the external vent on top of the primary fuel bowl. This external vent provides a release of excess fuel vapors from the bowl.

Idle System (Fig. 5)

At idle and low speeds, the air flow through the carburetor is not sufficiently strong enough to draw fuel through the primary barrel venturi for the main metering system. Intake manifold vacuum is high because of the greater restriction to the air flow by the nearly closed throttle valves. This high manifold vacuum is used to provide the pressure differential which operates the idle system.

The carburetor utilizes two idle systems, one for each primary barrel. Since the two passages function identically, only one side will be considered in this explanation (Fig. 5).

At idle, the near atmospheric pressure in the float chamber causes the fuel to flow through the idle system to the greatly reduced pressure area below throttle plate. Fuel flows from the float chamber through a restriction into the curb idle well.

The fuel flows up this vertical idle well through the idle feed restriction, and then it is mixed with air coming in from the idle air bleed. This fuel-air mixture then flows down another vertical passage. At the bottom of this vertical passage the fuel-air mixture is metered by an idle limiter screw. (This adjustment is made at the factory and no field adjustment should be required. However, if an adjustment is necessary, refer to "Rough Idle and Low Speed Surge" paragraph, under General Information.

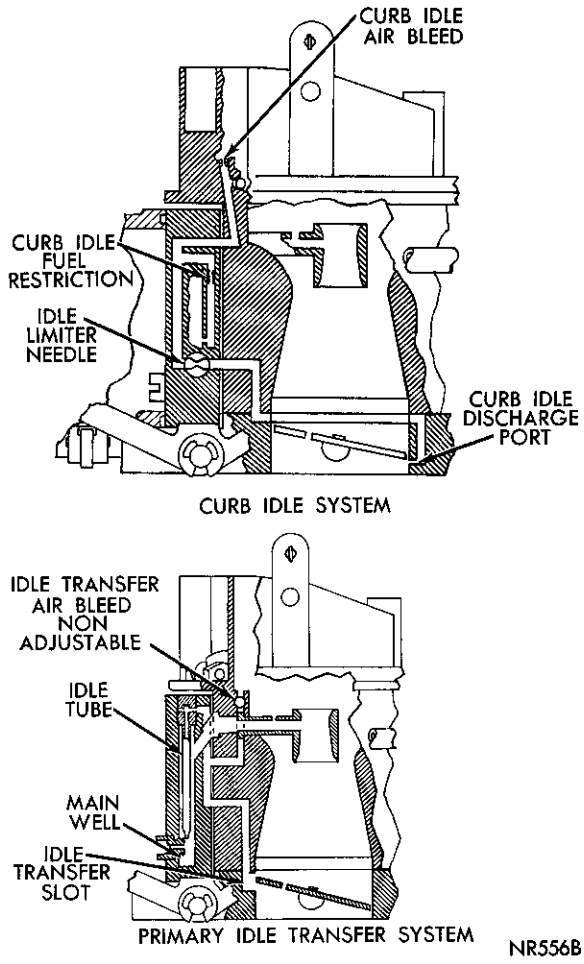


Fig. 5—Idle System

The mixture then flows through a channel in the throttle body to the curb idle discharge port. The fuel is discharged into the throttle bore just below the throttle valve.

The air that is supplied to the curb idle system is supplied through two idle air bleed restrictions and by a curb idle air bleed adjusting screw.

This is the only screw used to adjust curb idle mixture.

The screw is located near the primary bowl vent on the choke air horn.

Turning the screw clockwise leans the curb idle mixture; counter-clockwise enrichens the mixture.

Primary Idle Transfer System (Fig. 5)

A separate off-idle system is used in the carburetor to provide fuel air mixture from idle operation until the main system is in full operation.

Fuel for the idle transfer system enters the main well through the main jet and travels up through the idle transfer tube and crosses over a passage into a vertical channel where air is added from the idle air bleeds. The fuel air mixture is then discharged through the primary transfer slots.

As the throttle valve is opened still wider and engine speed increases, the air flow through the carburetor is also increased. This creates an increased vacuum in the venturi to bring the main metering system into operation. The flow from the idle transfer system tapers off as the main metering systems begin discharging fuel. The two systems are engineered to provide smooth gradual transition from idle to cruising speeds.

Main Metering System

As the engine is running, the intake stroke of each piston draws the air through the carburetor venturi and booster venturi. The air, passing through the restriction of the venturi, creates a low pressure commonly called a vacuum. The strength of this low pressure is determined primarily by the velocity of the air flowing through the venturi. This, in turn, is regulated by the speed and power output of the engine. The difference, between the pressure in the booster venturi and the normal air pressure in the float chamber, causes fuel to flow through the main metering system (Fig. 6).

At cruising speed, the fuel flows from the float chamber through the main jet, which measures or meters the fuel flow, into the bottom of the main well. The fuel moves up the main well past the main well air bleed hole in the side of the well. Filtered air, enters through the high speed air bleed in the main body and then into the main metering body by interconnecting passages. This mixture of fuel and air, being lighter than raw fuel, responds faster to any change in venturi vacuum and vaporizes more readily when discharged into the air stream of the venturi. The mixture of fuel and air moves up the main well and passes into the short horizontal passage leading to the main body, then through the horizontal channel of the discharge nozzle. This fuel is discharged into the booster venturi and then in the air stream of the carburetor venturi.

The throttle valve controls the amount of fuel-air mixture admitted to the intake manifold, regulating the speed and power output of the engine in accordance with accelerator pedal movement.

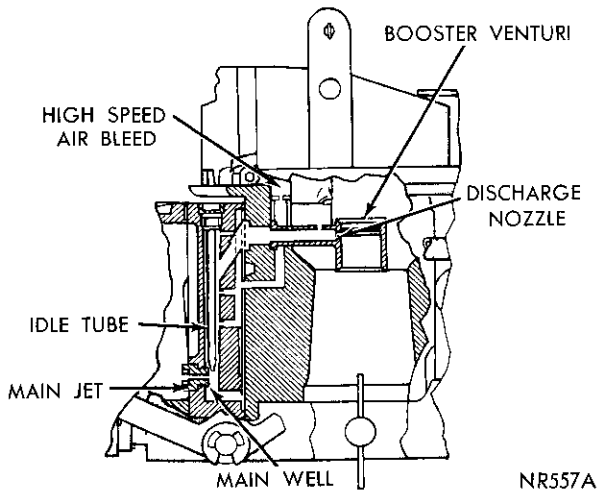


Fig. 6—Main Metering System

Power Enrichment System

During high power operation, the carburetor must provide a mixture richer than is needed when the engine is running at cruising speed under no great power requirements. The added fuel for power operation is supplied by the power enrichment system (Fig. 7).

This system is controlled by manifold vacuum which gives an accurate indication of the power demands placed upon the engine. Manifold vacuum is strongest at idle and decreases as the load on the engine increases. As the load on the engine is increased, the throttle valve must be opened wider to maintain a given speed. Manifold vacuum is thus reduced because the opened throttle valve offers less restriction to air entering the intake manifold.

A vacuum passage in the throttle body transmits manifold vacuum to the power valve chamber in the main body. The power valve which is located in the main metering body is effected by this manifold vacuum. The manifold vacuum, acting on the diaphragm at idle or normal load conditions, is strong enough to hold the diaphragm closed, and overcomes the tension of the power valve spring. When high power demands place a greater load on the engine and manifold vacuum drops below a predetermined point, the power valve spring overcomes the reduced vacuum opening the power valve. Fuel flows from the float chamber, through the valve and out the small

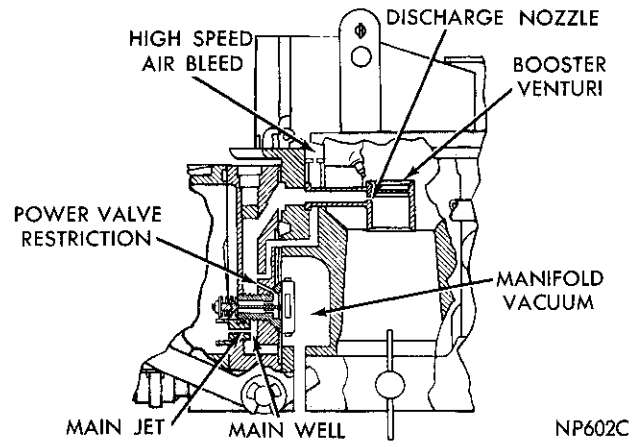


Fig. 7—Power Enrichment System

holes in the side of the valve through the diagonal restrictions in the main metering body and then into the main well. In the main well, the fuel joins the fuel flow in the main metering system, enriching the mixture.

As engine power demands are reduced, manifold vacuum increases. The increased vacuum acts on the diaphragm, overcoming the tension of the power valve spring. This closes the power valve and shuts off the added supply of fuel which is no longer required.

Accelerating Pump System

Upon acceleration, the air flow through the carburetor responds almost immediately to the increased throttle opening.

Therefore during the brief interval before the fuel, which is heavier than air, can gain speed and maintain the desired balance of fuel and air, the accelerating pump supplies fuel until the other systems can once again provide the proper mixture (Fig. 8).

The accelerating pump is located in the bottom of the primary fuel bowl. The pump begins to function when the pump operating lever is actuated by throttle movement. When the throttle is opened, the pump linkage, actuated by a cam on the primary throttle shaft, forces the pump diaphragm up. As the diaphragm moves up, the pressure forces the pump inlet check ball on its seat preventing fuel from flowing back into the float chamber. The fuel flows from the short passage in the fuel bowl into the long diagonal passage in the primary metering body. The fuel passes into the main body and then in the pump discharge chamber. The pressure of the fuel causes the discharge needle valve to raise and fuel is discharged into the venturi.

As the throttle is moved toward the closed position, the linkage returns to its original position and the diaphragm spring forces the diaphragm down. As the diaphragm returns to its original position the pump inlet check ball is moved off its seat and the diaphragm chamber is filled with fuel from the float bowl.

Secondary Throttle Operating System

At lower speeds, the secondary throttle valves remain nearly closed, allowing the engine to maintain satisfactory fuel air velocities and distribution. When engine speed increases to a point where additional breathing capacity is needed, the vacuum controlled secondary throttle valves open automatically.

Vacuum taken from one of the primary barrels and one of the secondary barrels acts upon a diaphragm which controls the secondary throttle valves. At high speeds when engine requirements approach the capacity of the two primary bores, the increased primary venturi vacuum moves the diaphragm, compressing the diaphragm spring. The diaphragm, acting through the diaphragm link and lever, will commence to open the secondary throttle valves (Fig. 9).

The position of the secondary throttle valves depends on the strength of the vacuum. This in turn, is determined by the air-flow through the bores to the engine. As the air-flow increases, a greater secondary throttle valve opening will result and the secondary barrels will supply a greater portion of the engine's requirements. As top speed is reached, the secondary throttle valves will approach wide open.

As the secondary throttle valves begin to open, a vacuum is created in the secondary barrels, first at the throttle valves and then, as air flow increases, at the throat of the secondary venturi. This vacuum assists the secondary metering system to operate.

When engine speed is reduced, venturi vacuum in the bores become weaker. As the vacuum acting on the diaphragm is lessened, the load on the diaphragm spring will commence closing the secondary valves. The diaphragm spring is assisted by the design of the secondary valves. Each secondary valve is slightly

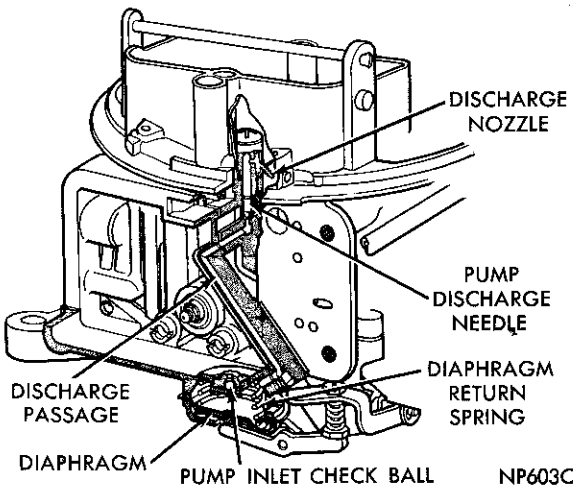


Fig. 8—Accelerating Pump System

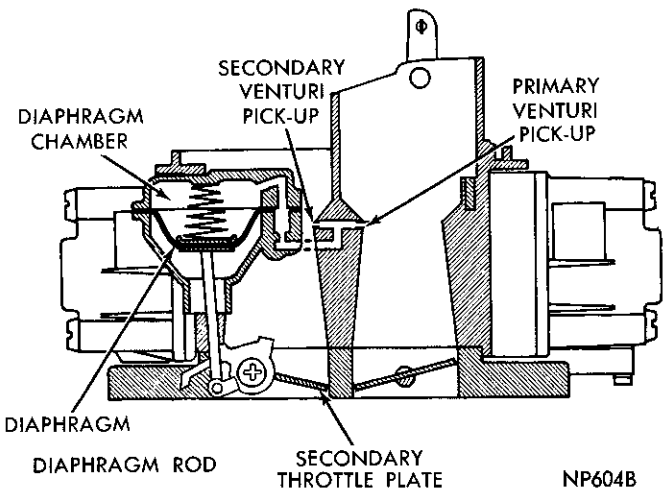


Fig. 9—Secondary Throttle Operating System

offset. When the valves are closing, the combined force of manifold vacuum and the air stream has greater effect on the larger, upstream area of the valves forcing the valves to a closed position. The secondary valves are retained in the closed position when the primary valves are fully closed by the secondary throttle connecting rod. This rod, which is fastened to the primary throttle lever, rides in a slot in the secondary throttle lever.

Secondary Fuel Metering Systems

The secondary system is supplied with fuel from the secondary fuel bowl, which receives its fuel through a connecting tube, from the primary fuel inlet.

The secondary fuel bowl is equipped with a fuel inlet assembly which regulates the flow of fuel into the bowl, the same as the primary fuel bowl. The secondary fuel inlet system must maintain a specified level of fuel as the two secondary fuel systems are calibrated to deliver the proper mixture only when the fuel is at this level.

As the valves begin to open the fuel flows through the secondary metering restrictions into the idle well (Fig. 10).

A secondary fixed curb idle discharge passage supplies fuel directly to the intake manifold, thus allowing a smoother idle.

When the secondary throttle valves are opened further the pressure differential causes the secondary main metering system to begin functioning.

Automatic Choke

The automatic choke supplies enriched fuel-air mixture for starting and operating a cold engine (Fig. 11). Most of the fuel from the carburetor of a cold engine is liquid. This fuel in liquid form burns slowly and incompletely. Power loss and stalls result. The choke valve supplies the extra fuel by restricting air flow during cranking and warm-up. Vacuum created by the restriction causes this fuel flow from both the main metering and idle systems.

The thermostat spring of a cold engine pushes the choke valve toward the closed position. When the engine is started, manifold vacuum acts on both the choke valve and a vacuum diaphragm attached to the carburetor body. This vacuum acts to oppose the thermostat spring and partially opens the choke valve to prevent stalls from richness. The choke shaft does not pass through the center of a choke valve. Instead, it is offset to expose a large area at one side to manifold vacuum. During idle or low temperature cranking, manifold vacuum is not sufficiently strong to open the choke valve. But air impact against the valve causes partial opening. These two factors, vacuum and air impact allow ample air to run the engine. Continued running of the engine develops heat and causes the thermostat assembly to move to the open choke position.

During the warm-up period, air flow past the partially open offset choke valve acts to open the valve. Just as in the start cycle, vacuum and air impact combine to control the choke valve. The engine required less choking at high speeds. The offset choke valve, vacuum diaphragm and thermostat spring are engineered to provide satisfactory choking for most conditions of engine speed, output and temperature.

Fast Idle

The choke control lever at the carburetor actuates a fast idle cam during choking. A cam has a series of steps designed to increase carburetor air flow to maintain satisfactory cold engine speed levels. The proper cam step is moved into position as the choke rod is moved from closed to open conditions. Each step permits a slower idle rpm as engine temperature rises and choking is reduced.

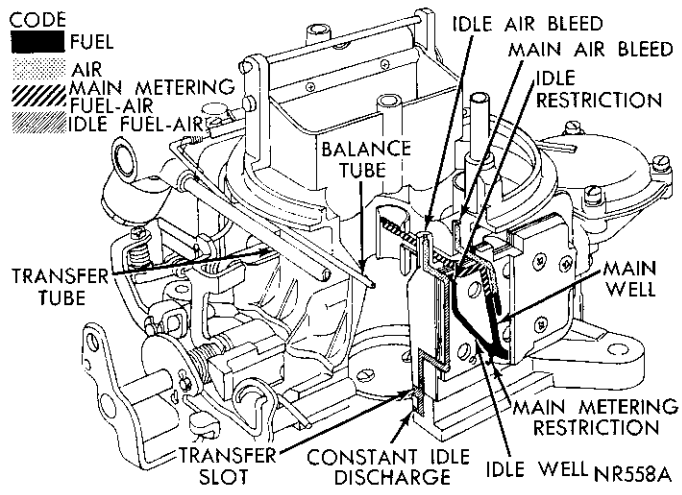


Fig. 10—Secondary Fuel Metering System

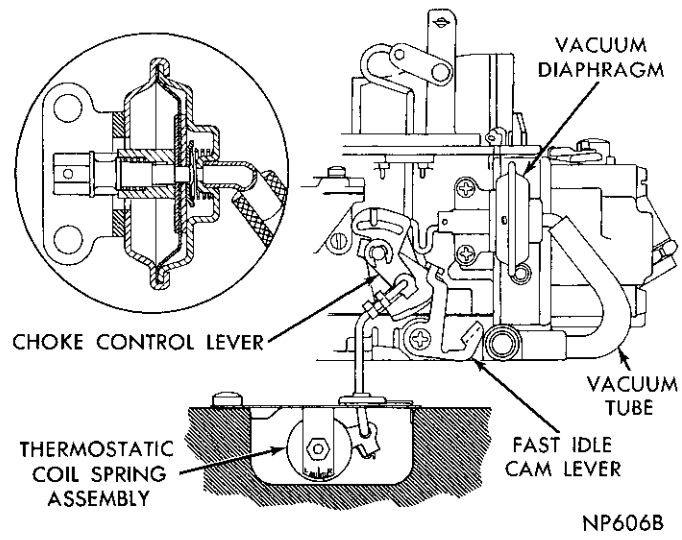


Fig. 11—Automatic Choke System

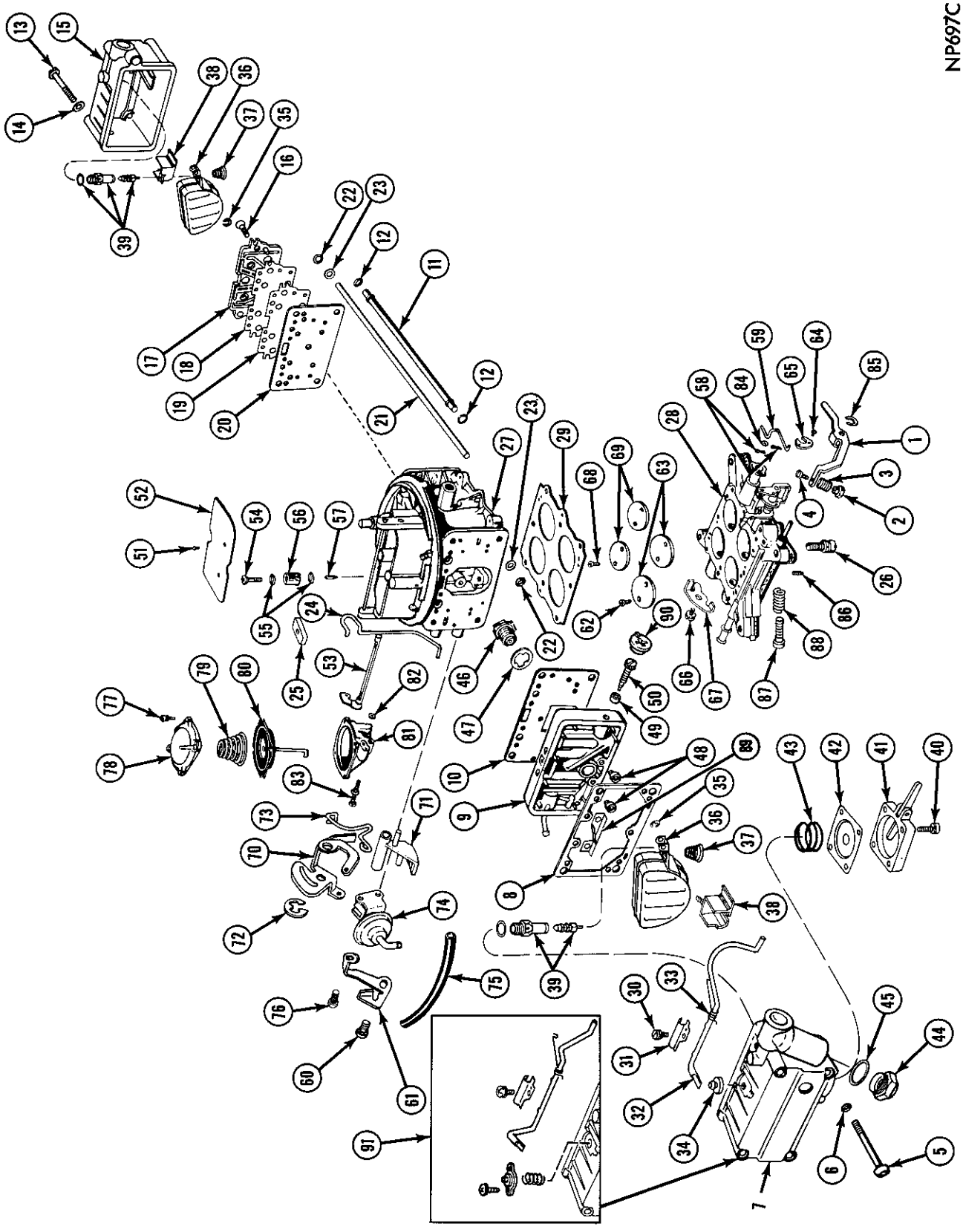


Fig. 1—Carburetor Assembly (Exploded View)

1—Lever, Pump Operating
2—Locknut
3—Spring, override
4—Screw, Pump Adjusting
5—Screw, Fuel Bowl (Primary)
6—Gasket, Bowl Screw
7—Fuel Bowl (Primary)
8—Gasket, Fuel Bowl
9—Metering Body (Primary Side)
10—Gasket, Metering Body
11—Fuel Tube (Float Bowl Connecting)
12—"O" Rings, Fuel Tube
13—Screw, Fuel Bowl (Secondary)
14—Gasket, Bowl Screw
15—Fuel Bowl (Secondary)
16—Screw, Metering Body (Secondary)
17—Metering Body (Secondary)
18—Gasket, Metering Body (Secondary)
19—Plate, Metering Body (Secondary)
20—Gasket, Metering Body Plate
21—Balance Tube
22—Washers, Balance Tube
23—"O" Rings, Balance Tube
24—Choke Link
25—Seal, Choke Rod
26—Throttle Body Screws
27—Main Body
28—Throttle Body
29—Gasket, Main to Throttle Body
30—Screw, Bowl Vent Valve Rod Clamp
31—Clamp, Valve Rod
32—Rod, Bowl Vent Valve
33—Spring Vent Valve Rod
34—Valve, Bowl Vent
35—Retainer, Clip, Float
36—Float
37—Spring, Float
38—Baffle, Float
39—Needle Valve and Seat
40—Screws, Fuel Pump Cover
41—Cover Assembly, Fuel Pump
42—Diaphragm, Fuel Pump
43—Spring, Fuel Pump Diaphragm
44—Fitting, Fuel Inlet
45—Gasket, Fuel Inlet, Fitting
46—Valve Assembly, Power
47—Gasket, Power Valve
48—Primary Jets
49—Needle, Idle Adjusting Mixture
50—Gasket, Idle Mixture Needle
51—Screws, Choke Valve
52—Choke Valve
53—Choke Shaft & Lever Assembly
54—Discharge Nozzle Screw, Pump
55—Gasket, Nozzle Screw
56—Nozzle, Pump Discharge
57—Needle, Pump Discharge Jet
58—Cotter Pins, Connecting Rods
59—Rod, Secondary Connecting
60—Screw and Lockwasher, Fast Idle Cam Lever
61—Lever, Fast Idle Cam
62—Screws, Primary Throttle Valve
63—Throttle Valves, Primary
64—Screw, Pump Cam
65—Pump Cam
66—Screw and Lockwasher, Secondary Stop Lever
67—Lever, Secondary Stop
68—Screws, Secondary Throttle Valves
69—Throttle Valves, Secondary
70—Fast Idle Cam Lever
71—Fast Idle Cam
72—Retainer (E-Clip)
73—Choke Diaphragm Link
74—Choke Diaphragm Assembly
75—Choke Vacuum Hose
76—Choke Diaphragm Bracket Screw
77—Secondary Diaphragm Cover Screw
78—Diaphragm Cover (Machine)
79—Secondary Diaphragm Return Spring
80—Secondary Diaphragm Assembly
81—Secondary Diaphragm Housing (Machine)
82—Secondary Diaphragm Housing Gasket
83—Secondary Diaphragm Assembly Screw
84—Throttle Connecting Rod Retainer Washer
85—Pump Operating Lever (E-Clip)
86—Secondary Stop Screw
87—Throttle Stop Screw
88—Throttle Stop Screw Spring
89—Baffle
90—Limiter Cap
91—Bowl Vent Valve Assy. (E.C.S.)

Spark Advance

The distributor utilizes changes in air pressure within the carburetor to control spark timing to satisfy all engine speed and load conditions.

In order to obtain a vacuum to operate the spark advance as dictated by the engine speed and load conditions, a port is located in the throttle bore just above the full closed position of the throttle valves, as the throttle is opened, this port is subject to manifold vacuum, which varies with changes in engine load. This port in the throttle body is connected to the main body by a short vertical passage, and then to a passage in the main metering body. This passage leads to an outlet on the side of the main metering body which connects to a single flexible tube to the distributor.

SERVICE PROCEDURES

Servicing Carburetor

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

When overhauling the carburetor, several items of importance should be observed to assure a good job:

(1) All parts should be carefully cleaned in a suitable solvent, then inspected for damage or wear.

(2) Use air pressure only to clear the various orifices and channels.

(3) Replace questionable parts with New Ones.

When checking parts removed from the carburetor, 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.

(4) Always use a complete repair kit when overhauling the carburetor. Using the code number stamped on the airhorn, adjacent to the fuel inlet, refer to the parts catalog and order the correct repair kit for the carburetor being worked on.

DISASSEMBLING CARBURETOR

To disassemble the carburetor (Fig. 1) for cleaning or overhaul, proceed as follows:

(1) Install four elevating legs, Tool T109-287S in

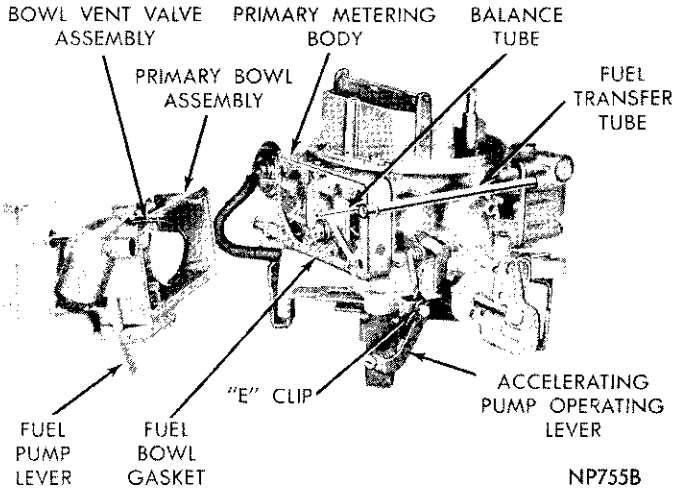


Fig. 2—Removing or Installing Primary Fuel Bowl

mounting flange holes in throttle body, or use Carburetor Stand C-3886. (These tools are used to protect the throttle valves from damage and to provide a suitable base for working).

(2) Remove primary fuel bowl assembly by sliding straight off balance tube (Fig. 2).

(3) Remove primary metering body by sliding straight off balance tube (Fig. 3). Remove plate to body gasket.

(4) Remove accelerating pump operating lever "E" clip and slide lever assembly off stub shaft. Remove adjusting nut, spring and screw.

(5) Remove fuel transfer tube and "O" rings (Fig. 3).

(6) Remove secondary fuel bowl assembly.

(7) Using a clutch head screwdriver (Tool CL-13) remove clutch head screws, carefully work secondary metering body, plate and gaskets off balance tube (Fig. 4).

(8) Remove balance tube, washers and "O" rings by sliding out of main body (either end).

(9) Disconnect choke diaphragm hose from throttle body fitting, then remove diaphragm assembly, at the same time disengaging link from fast idle cam lever.

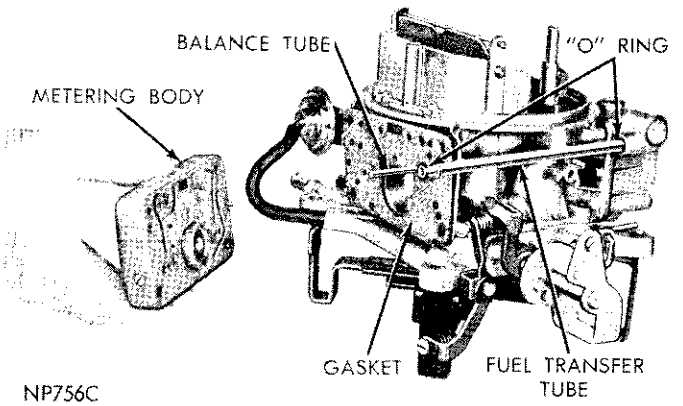


Fig. 3—Removing or Installing Primary Metering Body and Plate

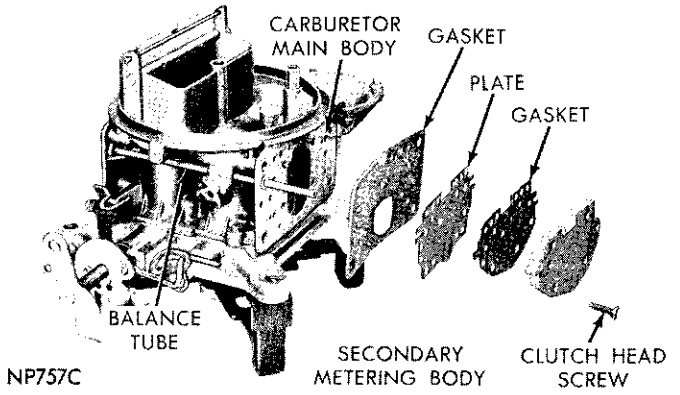


Fig. 4—Secondary Metering Body, Plate and Gaskets

(10) Remove "E" clup that retains fast idle cam lever and cam. Slide lever and cam off stub shaft, and at the same time, disengage choke rod from cam lever. (Note position of fast idle cam to cam lever.)

(11) Remove secondary diaphragm attaching screws and remove diaphragm assembly. Disengage diaphragm stem from secondary stop lever. Remove gasket.

(12) Remove pump discharge nozzle retaining screw, then lift out discharge nozzle. Remove gasket from nozzle (top and bottom).

(13) Remove screws that attach hot idle compensator valve cover to main body. Lift off cover, then remove valve and gasket. (Fig. 5). If so equipped.

(14) Remove curb idle speed screw and spring. Then remove insulating washer from between lead terminal and stop. Remove distributor ground switch lead. Using a thin blade screw driver, remove insulator bushing from boss on body. (Fig. 5).

(15) Invert carburetor and drop out pump discharge jet needle from discharge passage.

(16) With carburetor inverted, remove screws that

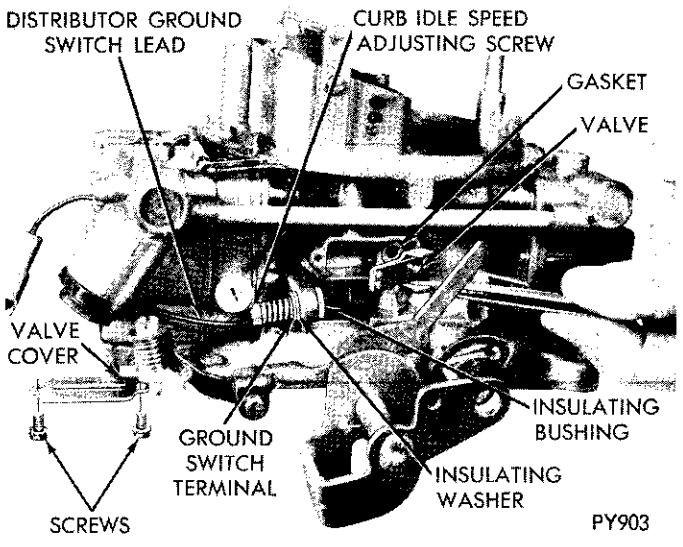


Fig. 5—Removing or Installing Hot Idle Compensator Valve

attach the throttle body to main body (Fig. 5). Remove throttle body and discard gasket.

Disassembling Fuel Bowls (Primary and Secondary)

Primary

(1) Remove primary bowl vent valve assembly (Fig. 6). On E.C.S., remove operating rod assembly.

(2) Remove float retainer "E" clip, then slide float and spring out of float chamber. (As float is being removed, the fuel inlet needle may drop out of seat assembly.) Remove float baffle.

(3) Remove fuel inlet needle valve seat. Discard the gasket.

(4) Remove screws attaching accelerator pump cover. Remove cover, then carefully remove diaphragm and spring.

(5) Remove fuel inlet fitting and discard gasket.

(6) Remove screws attaching bowl vent valve cover to fuel bowl. Lift off cover and remove vent valve, spring and seal. (Fig. 1). Remove seal from bottom of valve.

Secondary

(1) Remove float retainer "E" clip, then slide float and spring out of float chamber. (As float is being removed, the fuel inlet needle may drop out of seat assembly.) Remove float baffle.

(2) Remove fuel inlet needle valve seat. Discard gasket.

It should be noted that the Primary and Secondary fuel bowl baffles are of a different design and should be installed in the correct bowl at reassembly.

Disassembling Main Metering Body

Primary

(1) Using Tool C-3747, remove power valve assembly from primary metering body (Fig. 7).

(2) Using Tool C-3748, remove main metering jets. (Fig. 8).

(3) Remove idle adjusting needles and gaskets.

(4) Turn idle limiter caps to stops. Remove caps by prying off ends of screws, using a suitable tool. (Be careful not to bend screws.) Be sure and count number of turns to seat the screws, as the same number of turns (from the seat) must be maintained at installation. Remove screws and springs from metering body.

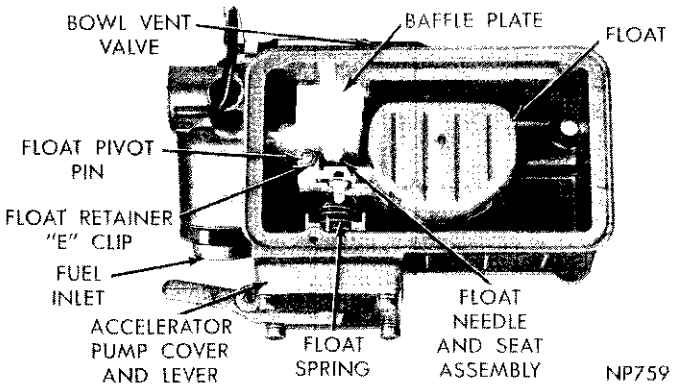


Fig. 6—Primary Fuel Bowl Assembly

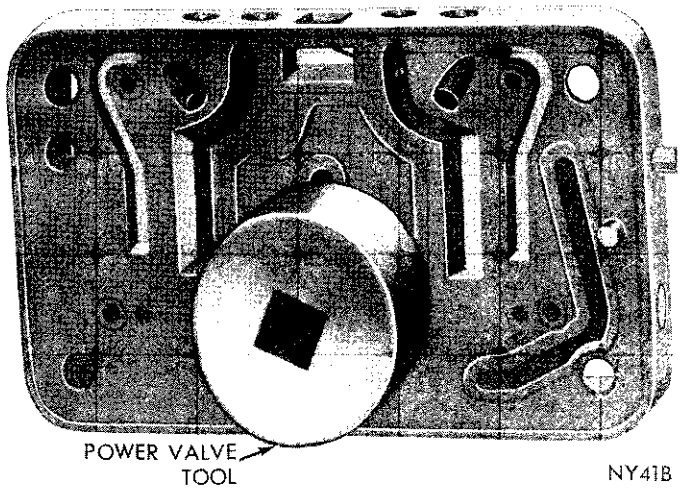


Fig. 7—Removing or Installing Power Valve

Secondary

No disassembly required, but it is very important that the well bleed parts, main metering restrictions and idle feed restrictions are clean (Fig. 9).

Disassembling Secondary Diaphragm

(1) Remove the diaphragm cover screws and separate diaphragm cover from housing.

(2) Remove diaphragm return spring from cover, then slide diaphragm out of housing.

Disassembling Throttle Body

CAUTION: In normal routine cleaning and overhaul of the carburetor, do not remove the throttle valves unless they are nicked or damaged. If necessary to remove, proceed as follows:

(1) Remove screws that hold throttle valves to throttle shafts. **These screws are staked to prevent**

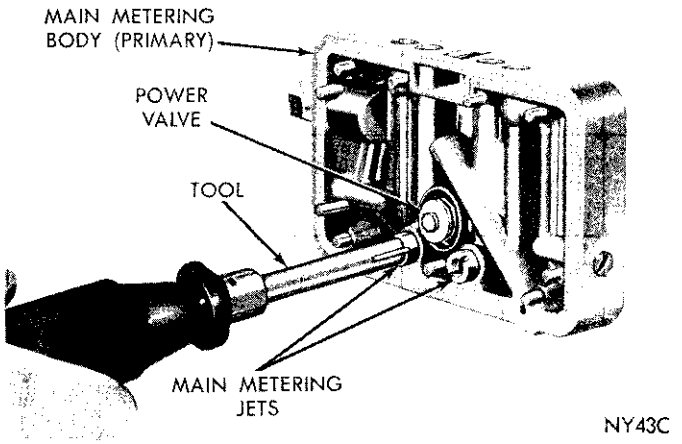


Fig. 8—Removing or Installing Main Metering Jets

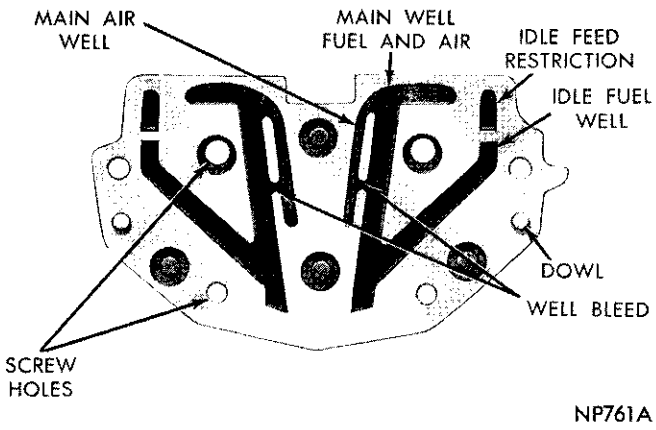


Fig. 9—Secondary Metering Body

loosening and care is necessary to avoid breaking off in shaft. Remove staking with a file.

(2) Slide damaged throttle valves out of bores. It should be noted at this time, that the secondary throttle valves are thicker than the primary valves. **Do not install secondary valves in primary bores or visa versa as the relationship of the primary valves to the idle transfer port and spark advance control ports is carefully established for one particular assembly.**

CLEANING CARBURETOR PARTS

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

The choke diaphragm can be damaged by solvents. Avoid placing the diaphragm assembly in ANY liquid. Clean the external surfaces with a clean cloth or soft wire brush. Shake dirt or other foreign material from the stem side of the diaphragm. Depressing the diaphragm stem to the retracted position, will provide an additional hole for the removal of dirt. Compressed air can be used to remove loose dirt, **but should not be connected to the vacuum inlet fitting.**

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

DO NOT clean any rubber diaphragms or plastic parts in cleaning solvent because of possible damage.

INSPECTION AND REASSEMBLY

Throttle Body

If the throttle valves were removed because of damage, install new valves as follows:

(1) Slide new primary throttle valves in position on throttle shaft, with the valve number on the bottom (flange side) and toward idle transfer and spark advance control ports.

(2) Install new attaching screws but do not tighten.

(3) Hold valves in place with fingers. (Fingers pressing on high side of valves.)

(4) Tap valves lightly with screwdriver in this position to center in bores. Tighten securely. Operate the throttle shafts. From closed to open position, they must operate smoothly without drag or sticking. Hold throttle body up to a strong light. The light which is visible around the outer diameter of the valves and the bores should be uniform.

(5) Install secondary throttle valves in the same manner as described previously. The numbers stamped on the valves must be toward idle transfer and spark advance ports in primary bores. For adjustment (See Secondary Throttle Adjustment).

Assembling Main Metering Body (Primary)

(1) Install idle mixture screws and springs in metering body. (The tapered portion must be straight and smooth. If tapered portion is grooved or ridged, a new idle mixture screw should be installed to insure having correct idle mixture control.) **DO NOT USE A SCREW DRIVER.** Turn screws lightly against their seats with fingers. Back off the number of turns counted at disassembly. Install new plastic caps with tabs against stop.

(2) Slide a new gasket over power valve and install, using Tool C-3747. Tighten securely (Fig. 7).

(3) Install main metering jets (Fig. 8), using Tool C-3748. Tighten securely.

Assembling Fuel Bowls Primary

(1) Install accelerator pump spring in position in fuel bowl, followed by diaphragm and pump cover. (When installing diaphragm, be sure contact button is toward pump lever in cover.) (Fig. 10).

(2) Place cover over diaphragm (with lever on fuel inlet fitting side) (Fig. 10). Install attaching screws and tighten securely.

(3) Install new gasket on fuel inlet needle seat (Fig. 11) then install in fuel bowl. Tighten securely. Slide fuel inlet needle into seat.

(4) Install float baffle in position, then slide float hinge over pivot and secure with "E" clip. Install float spring.

(5) Install new gasket over fuel inlet fitting, then install fitting in primary fuel bowl. Tighten securely.

(6) Install bowl vent valve assembly on fuel bowl, being sure vent valve spring is hooked into bracket and loop of spring under operating rod. Position

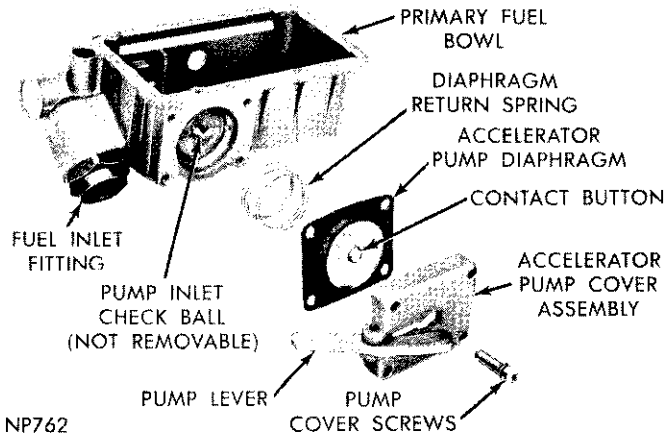


Fig. 10—Accelerating Pump (Exploded View)

clamp then install attaching screw and tighten securely. (C.A.S.) Carburetors. (Figs. 1 or 2).

(7) On E.C.S. carburetors, install seal on bottom of vent valve. Slide plastic valve and seal into cover, with valve recess, mating with shoulder on underside of cover.

(8) Install bowl vent valve spring in position in opening in bowl, then install valve and cover over spring. Install attaching screws and tighten securely.

(9) Install bowl vent operating rod, clamp and spring in position on bowl. Install attaching screw and tighten securely.

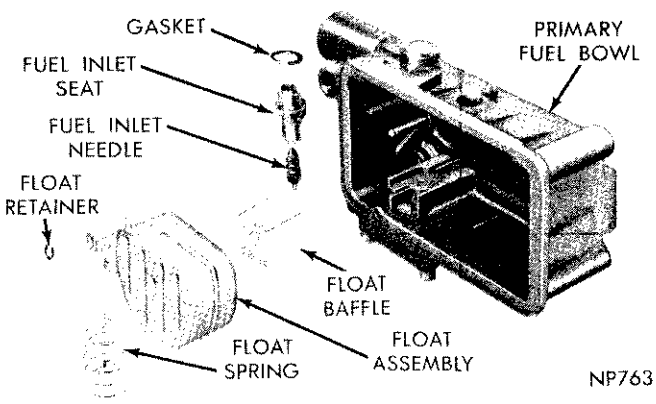


Fig. 11—Float, Needle, Seat and Baffle (Exploded View)

Secondary

(1) Install new gasket on fuel inlet needle seat (Fig. 11), then install in fuel bowl. Tighten securely. Slide fuel inlet needle into seat.

(2) Install float baffle in position, then slide float hinge over pivot and secure with "E" clip. Install float spring.

Adjusting Floats

(1) Invert the primary fuel bowl and using a 15/64 inch drill shank or gauge, measure the clearance between toe of float and surface of fuel bowl. (Fig. 12).

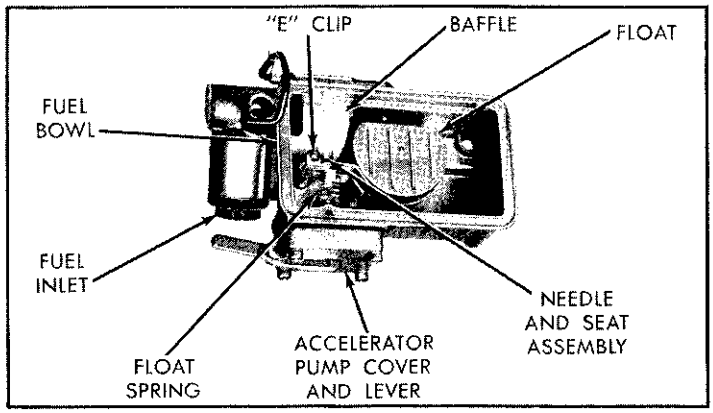


Fig. 12—Checking Float Setting (Primary and Secondary)

If an adjustment is necessary, bend float tang until correct clearance has been obtained.

(2) Invert the secondary fuel bowl and using a 17/64 inch drill shank or gauge, measure the clearance between heel of float and surface of fuel bowl (Fig. 12). If an adjustment is necessary, bend float tang until correct clearance has been obtained.

Assembling Main Body

(1) Place a new gasket on throttle body, then lower main body (Fig. 13) down on throttle body, aligning roll pin guides with openings in main body. Be sure primary bores of throttle body are on the same side as primary venturi.

(2) Holding assembly together, invert assembly and install attaching screws. Tighten securely.

(3) Install balance tube into main body and install new "O" rings and washers at each end. Be sure "O" rings are seated in recesses, followed by washers.

(4) Install a new secondary metering body to main body gasket (Fig. 4) followed by metering body plate, plate gasket and body. Install clutch head screws and tighten securely. (Be sure the main metering restriction ports are at the bottom).

(5) Position balance tube so that only 1 inch extends beyond the secondary metering body (Fig. 14). (Use a 6 inch ruler for this measurement.)

(6) Place a new gasket over primary metering body aligning pin. (Rear) Carefully slide metering body over balance tube and down into position against main body.

(7) Slide a new gasket over metering body alignment studs and carefully position against body.

(8) Carefully install primary fuel bowl over balance tube and down against metering body. Slide new gaskets over the long fuel bowl mounting screws, then install in position through fuel bowl. Tighten securely.

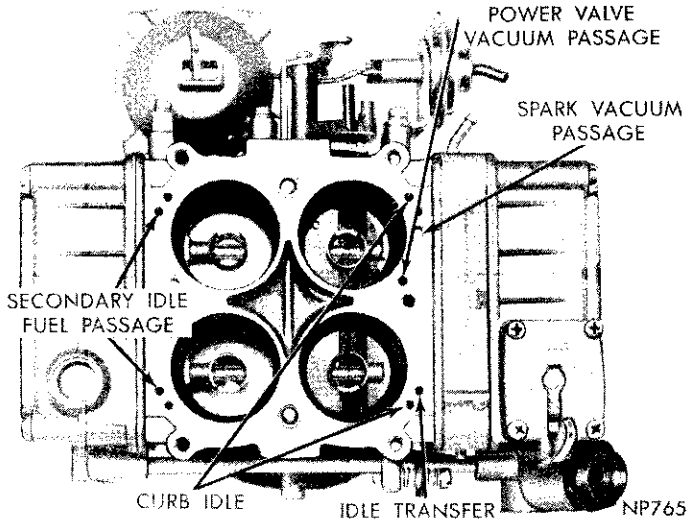


Fig. 13—Main Body Identification (Bottom View)

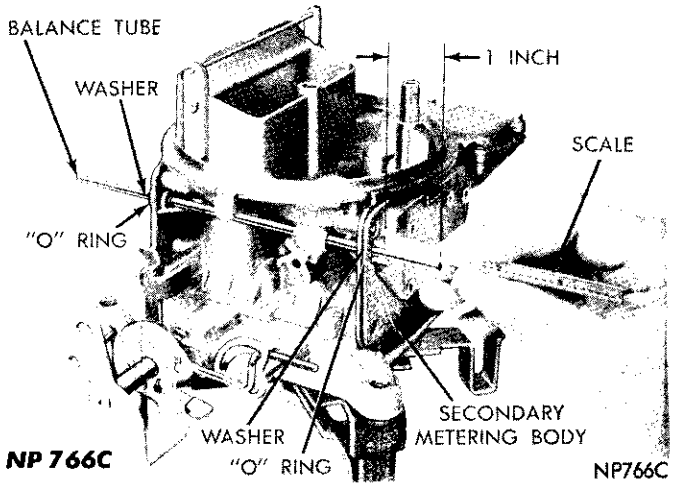


Fig. 14—Positioning Balance Tube

If new gaskets are not used, a fuel leak will develop. (Be sure and install distributor ground switch lead and lead clamp on long screw adjacent to fuel inlet.)

(9) Slide a new "O" ring on each end of fuel tube, then install fuel tube into opening in primary fuel bowl. Press in on tube end until seated.

(10) Carefully slide secondary fuel bowl over balance tube and fuel tube and seat against gasket. Install secondary fuel bowl attaching screws after installing new gaskets. Tighten securely.

(11) Install accelerating pump discharge needle in the discharge passage in the center of primary venturi.

To test needle for sealing, pour clean gasoline into primary fuel bowl through vent valve opening. Push down on accelerator pump arm to expel air from the pump passages. Using a small clean brass rod, hold the discharge check needle firmly on its seat. Again press down on pump arm. No fuel should be emitted from the discharge passage. Fuel leakage at the discharge needle indicates the presence of dirt or a damaged check needle. Clean again and install a new needle. Retest for leakage.

If fuel continues to leak past discharge check needle, attempt to reseat as follows:

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

(12) Install pump discharge nozzle gasket, nozzle and mounting screw and gasket. Tighten screw securely. Test nozzle operation. Press pump lever down. The two streams from the nozzle should be identical and should strike the two venturi in the same spot.

(13) Slide the bowl vent valve shaft down between fuel tube and carburetor body. Hold in position, then

install clamp, after engaging stub end of spring in clamp. Install retaining screw and tighten securely.

(14) Loosen choke valve attaching screws slightly.

(15) Tap lightly on choke valve to center valve in air horn. Holding choke valve with the fingers, tighten attaching screws securely. Stake by squeezing with pliers.

(16) Engage fast idle cam with fast idle cam lever, then slide assembly onto stub shaft positioning fast idle cam behind fast idle cam lever. At the same time engage fast idle cam lever with choke rod. Install "E" clip to secure.

Choke Vacuum Diaphragm

Inspect the diaphragm vacuum fitting to be sure that the passage is not plugged with foreign material. Leak check the diaphragm to determine if it has internal leaks. To do this, first depress the diaphragm stem, then place a finger over the fitting to seal the opening. Release the stem. If the stem moves more than 1/16 inch in ten (10) seconds, the leakage is excessive and the assembly must be replaced.

Install the diaphragm assembly on the carburetor as follows:

(1) Engage choke link in slot in choke lever.

(2) Place the diaphragm on the mounting surface. Install and tighten the attaching screws securely.

(3) Inspect the rubber hose for cracks before placing it on the correct carburetor fitting. Do not connect the vacuum hose to the diaphragm fitting until after the vacuum kick adjustment has been made.

(4) Install hot idle compensator valve gasket in position in recess in main body, followed by valve. (Be sure valve is positioned with legs toward outside of main body.) (Fig. 5). Place cover over opening and install attaching screws. Tighten securely. (If so equipped.)

(5) Slide a new distributor ground switch insulated bushing into stop on main body, with the notch aligned with raised portion of boss. Force into position against stop.

(6) Place insulating washer over tangs on lead wire terminal, then install curb idle speed screw with spring through terminal and washer.

(7) Turn screw into boss, at the same time, keep insulating washer aligned.

Assembling Secondary Diaphragm

(1) Slide diaphragm into housing (Fig. 15).

(2) Position diaphragm so that the vacuum hole in housing is aligned with vacuum hole in diaphragm.

(3) Install diaphragm return spring with coiled end snapped over button in cover.

(4) Support diaphragm stem in order to keep diaphragm flat as spring and cover are installed.

(5) Align vacuum port in cover with port in housing

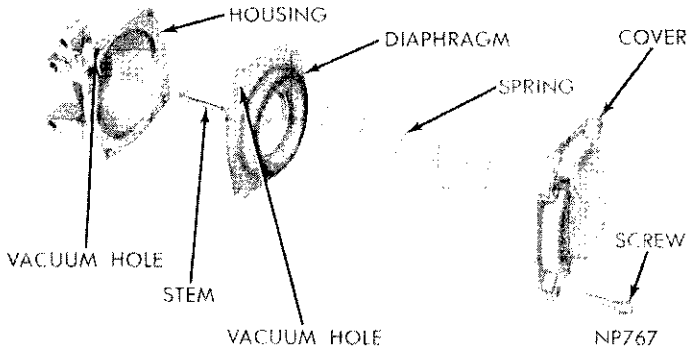


Fig. 15—Secondary Throttle Diaphragm (Exploded View)

then carefully lower cover. Install attaching screws and tighten securely.

(6) Check diaphragm by pressing **in** on stem and placing finger over port. Diaphragm should stay in retracted position.

(7) Install a new gasket in vacuum passage recess in diaphragm housing, then install secondary diaphragm on main body of carburetor and at the same time engage stem with secondary stop lever. Install screws and tighten securely.

(8) Install pump lever on stub shaft and secure with "E" clip. Slide spring and locknut between fuel pump lever and pump operating lever. Open throttle valve and install adjusting screw. Tighten 2 or 3 threads to hold. The correct setting of the adjusting screw will be covered under adjustments.

CARBURETOR ADJUSTMENTS

It is very important that the following adjustments be made on a reconditioned carburetor:

Qualifying the Choke Control Lever
Choke Unloader Adjustment (wide open kick)
Fast Idle Cam Position Adjustment
Vacuum Kick Adjustment (On or off vehicle)
Fast Idle Speed Adjustment (On the vehicle)
Checking the Bowl Vent Valve Clearance.
Checking the Pump Lever Clearance
Idle Speed Adjustment (Curb idle)
Adjusting the Float
Secondary Throttle Adjustment
Idle Mixture Adjustment
Checking Wet Fuel Level

Checking Bowl Vent Valve Clearance (C.A.S.)

To check the bowl vent valve clearance (Fig. 16), proceed as follows:

(1) With throttle valves at curb idle, it should be possible to insert a 1/16 inch drill shank between bowl vent valve and top of primary fuel bowl, with the idle speed properly set.

(2) If an adjustment is necessary, bend rod to

change arc of contact with throttle lever, using Tool T109-213 until correct clearance has been obtained.

Checking Bowl Vent Valve Clearance (E.C.S.)

To check the bowl vent valve clearance adjustment, proceed as follows:

(1) With the throttle valves at curb idle, it should be possible to insert a number 72 drill shank (.005 to .025 inch) between bowl vent valve plunger stem and operating rod, (Fig. 16).

(2) If an adjustment is necessary, bend rod to change arc of contact with throttle lever, using Tool T109-213, until correct clearance has been obtained.

Checking Accelerator Pump Lever Clearance

To check accelerator pump lever clearance (Fig. 17), proceed as follows:

(1) With throttle valves wide open, and the pump lever held down, it should be possible to insert a .015 inch gauge between adjusting nut and lever.

(2) If an adjustment is necessary, adjust pump override screw until correct clearance has been obtained.

(3) There must be no free movement of pump leverage when throttle is at curb idle.

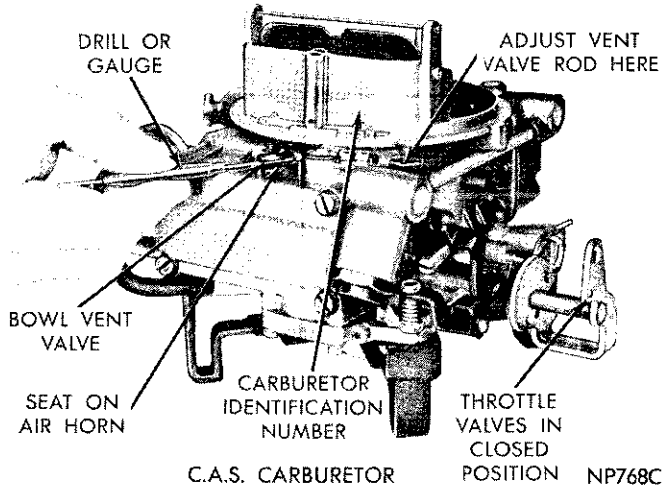


Fig. 16—Checking Bowl Vent Valve Clearance (C.A.S. and E.C.S.)

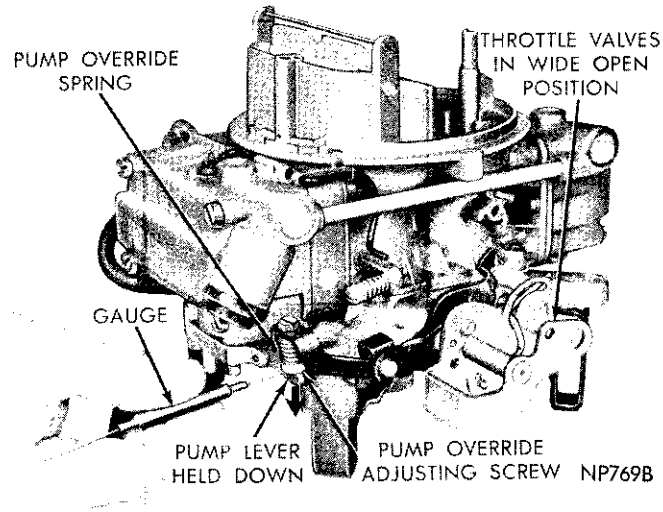


Fig. 17—Checking Accelerator Pump Lever Clearance

Qualifying Choke Control Lever

Adjustment of the choke control lever is necessary to provide correct relationship between choke valve, thermostatic coil spring and the fast idle cam. It should be checked and adjusted (if necessary) after carburetor assembly or as preparation of the choke system linkage before making the Vacuum Kick, Cam Position or Unloader Adjustment. These three adjustments must and should be made after qualification of the choke control lever.

(1) Open the throttle to mid-position.

(2) Close the choke valve by slight pressure on choke control lever.

(3) The top of choke rod hole in control lever should be 1-11/16 ± 1/64 inch above choke assembly (carburetor on engine) or 1-23/32 ± 1/64 inch above carburetor base (Carburetor on bench) (Fig. 18).

(4) Adjust if necessary by bending choke shaft rod at point indicated.

CAUTION: Improper bending will cause binding of rod. Test for free movement between open and closed

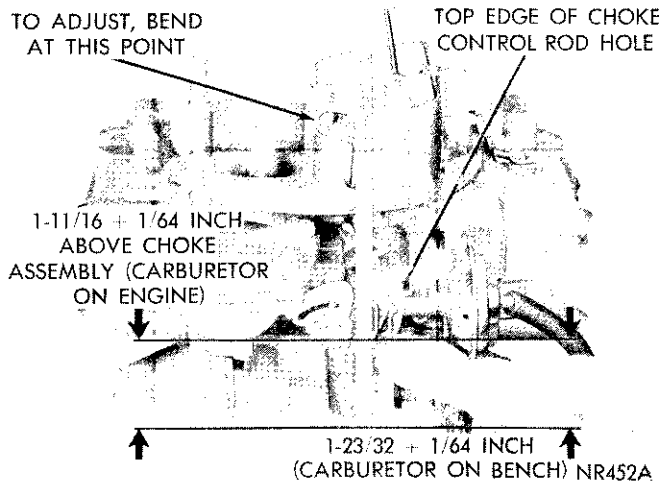


Fig. 18—Qualifying Choke Control Lever

choke positions and rebend if necessary to eliminate any interferences.

Choke Unloader Adjustment (wide open kick)

The choke unloader is a mechanical device to partially open the choke at wide open throttle. It is used to eliminate choke enrichment during cranking of an engine. Engines which have been flooded or stalled by excessive choke enrichment can be cleared by use of the unloader. Adjust the system as follows.

(1) Qualify the choke control lever, if necessary. (See Qualifying Choke Control Lever Paragraph).

(2) Hold the throttle valves in the wide open position. Insert the specified drill between the upper edge of the choke valve and the inner wall of the air horn (see specifications).

(3) With a finger lightly pressing against the choke control lever, a slight drag should be felt as the drill is being withdrawn. If an adjustment is necessary, bend the indicated tang until correct opening has been obtained (Fig. 19).

Fast Idle Speed Adjustment (On Vehicle)

Fast idle engine speed is used to overcome cold engine friction, stalls after cold starts and stalls because of carburetor icing. Set this adjustment after the vehicle odometer indicates over 500 miles to insure a normal engine friction level. Prepare the engine by driving at least 5 miles. Connect a tachometer and set the curb idle speed and mixture, then proceed as follows:

(1) With the engine off and the transmission in the PARK or NEUTRAL position, open the throttle slightly.

(2) Close choke valve until fast idle screw tang can be positioned on the second highest-speed step of the fast idle cam (Fig. 20).

(3) Start the engine and determine the stabilized

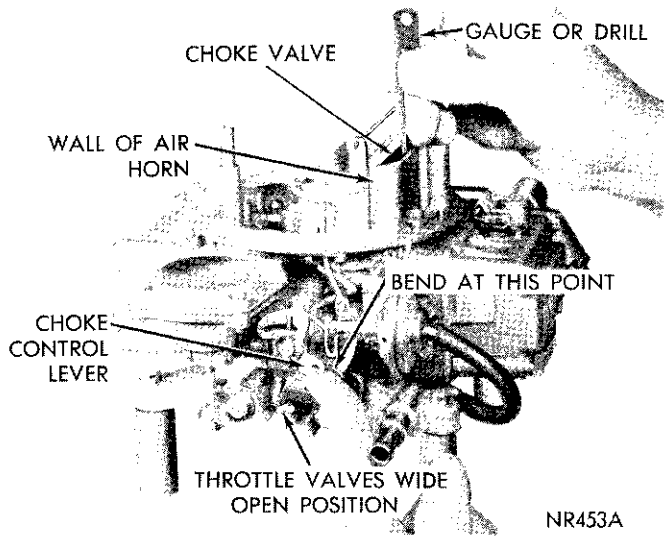


Fig. 19—Choke Unloader Adjustment (Wide Open Kick)

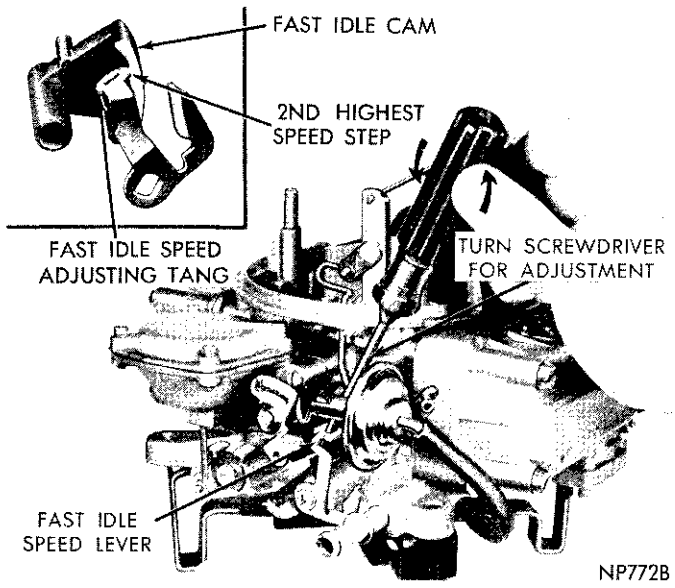


Fig. 20—Fast Idle Speed Adjustment (On Vehicle)

speed. Bend the fast idle tang by use of a screwdriver placed in the tang slot to secure the specified speed.* **CAUTION: Bend only in a direction perpendicular to the contact surface of the cam. Movement in any other direction changes the CAM POSITION ADJUSTMENT described earlier.**

(4) Stopping the engine between adjustments is not necessary. However, reposition the fast idle tang on the cam after each speed adjustment to provide correct throttle closing torque.

Fast Idle Cam Position Adjustment

The fast idle engine speed adjustment should be made on the vehicle as described in the Fast Idle Speed Adjustment (on the vehicle) paragraph. However, the Fast Idle Cam Position Adjustment can be made on the bench. This adjustment is important to assure that the speeds of each step of the cam occur at the proper time during engine warm-up.

(1) Qualify the choke control lever, if necessary. (See Qualifying the Choke Control Lever Paragraph).

(2) With fast idle speed adjusting tang contacting second highest speed step on fast idle cam, move choke valve toward the closed position with light pressure on choke control lever.

(3) Insert specified drill between the choke valve and wall of the air horn (see specifications).

An adjustment will be necessary if a slight drag is not obtained as the drill is being removed.

(4) To adjust, bend the indicated tang (Fig. 21) until the correct choke valve opening has been obtained.

Vacuum Kick Adjustment (ON or OFF Vehicle)

The choke diaphragm adjustment controls the fuel delivery while the engine is running. It positions the

*See specifications.

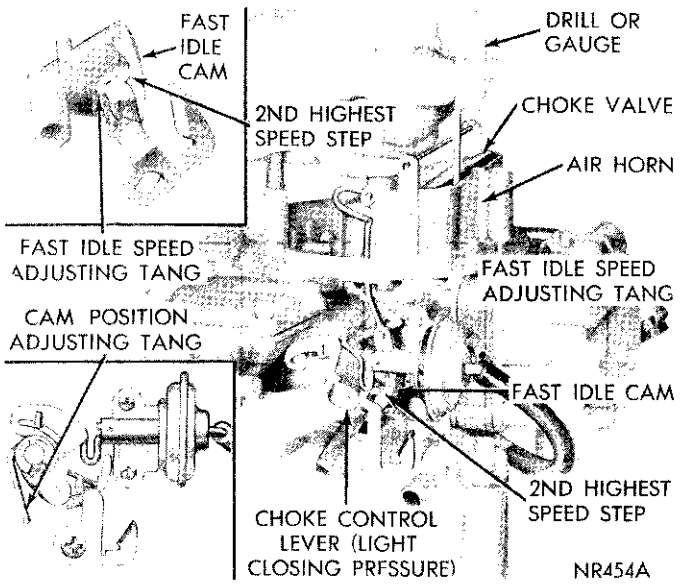


Fig. 21—Fast Idle Cam Position Adjustment

choke valve within the air horn by use of linkage between the choke shaft and the diaphragm. The diaphragm must be energized to measure the vacuum kick adjustment. Vacuum can be supplied by a distributor test machine, another vehicle or vehicle to be adjusted.

(1) If the adjustment is to be made with the engine running, position the fast idle tang (Fig. 21) (Cam position adjustment) to allow choke closure to kick position. If auxiliary vacuum source is to be used, open throttle valves, (engine not running) and move choke to closed position. Release throttle first, then release choke.

(2) When using an auxiliary vacuum source, disconnect the vacuum hose from the carburetor and connect it to the hose from the vacuum supply with a small length of tube to act as a fitting. Removal of the hose from the diaphragm may require forces which damage the system. Apply a vacuum of 10 or more inches of hose.

(3) Insert the specified drill (see specifications) between the choke valve and the wall of the air horn. (Fig. 22). Apply sufficient closing pressure on the lever to which the choke rod attaches to provide a minimum choke valve opening without distortion of the diaphragm link. Note that the cylindrical stem of the diaphragm will extend as an internal spring is compressed. This spring must be fully compressed for proper measurement of the vacuum kick adjustment.

(4) An adjustment will be necessary if a slight drag is not obtained as the drill is being removed. Shorten or lengthen the diaphragm link to obtain the correct choke opening. Length changes should be made by carefully opening or closing the bend provided in the diaphragm link. **CAUTION: DO NOT APPLY TWISTING OR BENDING FORCE TO DIAPHRAGM.**

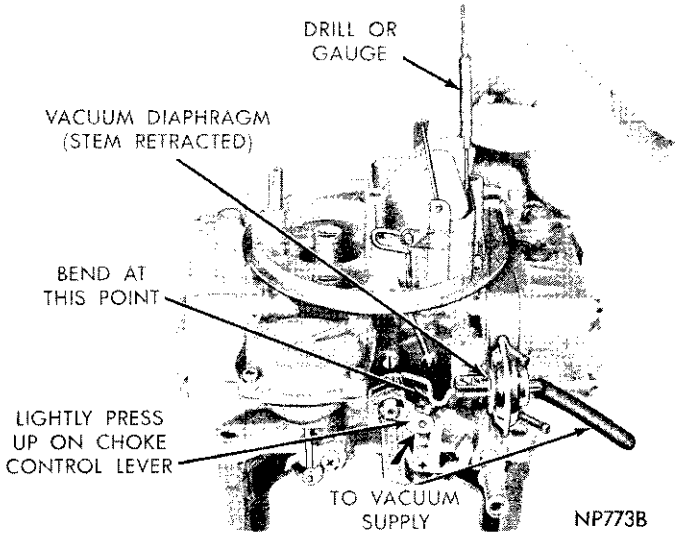


Fig. 22—Vacuum Kick Adjustment

(5) Reinstall the vacuum hose on the correct carburetor fitting.

(6) Make the following check. With no vacuum applied to the diaphragm, the CHOKE VALVE SHOULD MOVE FREELY between the open and closed positions. If movement is not free, examine the linkage for misalignment or interferences caused by the bending operation. Repeat the adjustment if necessary to provide proper link operation.

Secondary Throttle Adjustment

This adjustment no longer required as valves are pre-adjusted and need no further adjustment.

Idle Speed Adjustment (Curb Idle)

Refer to General Information at front of Group.

Checking Wet Fuel Level (On Vehicle)

Before checking wet fuel level, check the fuel pump pressure to be certain 5 pound reading is obtained.

To check wet fuel level, remove lower bolt furthest from fuel supply (Primary and Secondary) and install C-4051 wet fuel level gauge (Fig. 23). As screw is be-

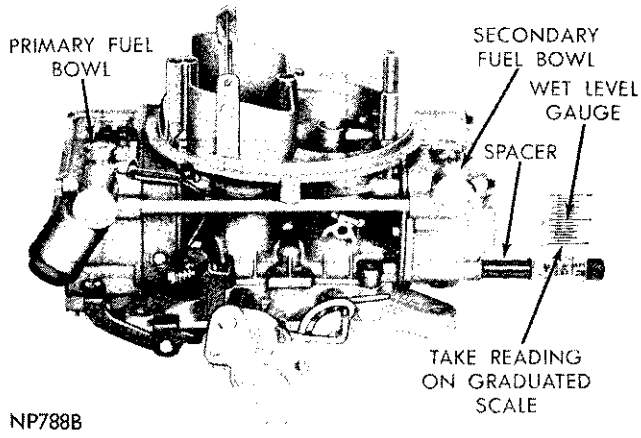


Fig. 23—Checking Wet Fuel Level (on Vehicle)

ing removed, fuel will be lost. Start or crank engine and allow fuel bowls to fill. The reading on level gauge should be 9/16 for Primary and 13/16 inch for Secondary, with 5 pounds fuel pump pressure.*

If an adjustment is necessary remove fuel bowl and bend tang on float until correct specifications are obtained.

*Fuel level will vary 1/32 inch for every pound of fuel pump pressure under or over specifications.

FUEL PUMP

INDEX

GENERAL INFORMATION

Fuel pump Model MS-4589SA and MS-4845S or Airtex RD-267A (Optional) (Figs. 1 or 2), is used on all Chrysler and Imperial engines. The MS-4589SA and MS-4845S fuel pump are of the pressed steel type and cannot be disassembled for service. If a pump malfunction occurs, remove the old pump and install a new one. Airtex Model RD-267A (Optional) is serviceable.

The fuel pumps are driven by an eccentric cam that is cast on the camshaft in the 383 and 440 cubic inch engines.

As the camshaft rotates, the eccentric cam presses down on the pump rocker arm. (On the 383 and 440 cubic inch engine, a push rod operates between the camshaft and the fuel pump rocker arm.) This action lifts the pull rod and diaphragm upwards against the fuel pump main spring, thus creating a vacuum in the valve housing and opens the inlet valve and fuel is drawn into the valve housing chamber. On the return stroke the main spring forces the diaphragm to the down position, which closes the inlet valve and expels the fuel in the valve housing chamber through the outlet valve, to the fuel filter and the carburetor.

The fuel filter should be changed every 24,000 miles, to insure having an unrestricted flow of fuel at all times. **Do not attempt to clean.**

SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
FUEL PUMP LEAKS—FUEL	(a) Worn, ruptured or torn diaphragm.	(a) Install new pump.
	(b) Loose diaphragm mounting plates.	(b) Install new pump.
	(c) Loose inlet or outlet line fittings.	(c) Tighten line fittings.
FUEL PUMP LEAKS—OIL	(a) Cracked or deteriorated pull rod oil seal.	(a) Install new pump.
	(b) Loose rocker arm pivot pin.	(b) Install new pump.
	(c) Loose pump mounting bolts.	(c) Tighten mounting bolts securely.
	(d) Faulty pump to block gasket.	(d) Install new gasket.
INSUFFICIENT FUEL DELIVERY	(a) Vents in tank or filler cap restricted. (This will also cause collapsed fuel tank.)	(a) Install new cap, or unplug vents and inspect tank for leaks.
	(b) Leaks in fuel line or fittings.	(b) Tighten line fittings.
	(c) Dirt or restriction in fuel tank.	(c) Install new fuel filter and clean out tank.
	(d) Worn, ruptured, or torn diaphragm.	(d) Install new pump.
	(e) Frozen gas lines.	(e) Thaw lines and drain tank.
	(f) Improperly seating valves.	(f) Install new fuel pump.
	(g) Vapor lock.	(g) Install heat shield where lines or pump are near exhaust.
	(h) Low pressure.	(h) Install new fuel pump.
	(i) Incorrect fuel pump.	(i) Install correct fuel pump.
	(j) Restricted fuel filter.	(j) Install new filter.
FUEL PUMP NOISE	(a) Loose mounting bolts.	(a) Tighten mounting bolts.
	(b) Scored or worn rocker arm.	(b) Install new fuel pump.
	(c) Weak or broken rocker arm spring.	(c) Install new spring.

SERVICE PROCEDURES

TESTING FUEL PUMP (On Car)

If the fuel pump fails to supply fuel properly to the carburetor, the following tests should be made before removing the fuel pump from the vehicle.

Pressure Test

If leakage is not apparent, test pump for pressure, as follows:

(1) Insert a "T" fitting in fuel line at carburetor, (Fig. 3).

(2) Connect a 6 inch piece of hose between "T" fitting and gauge C-3411. (The hose should not exceed 6 inches. A longer hose may collect fuel and additional weight of fuel would be added to pressure of pump and result in an inaccurate reading.)

(3) Vent pump for a few seconds (this relieves air trapped in fuel chamber). If this is not done, pump will not operate at full capacity and low pressure reading will result.

(4) Connect a tachometer, then start engine and run at 500 r.p.m. The reading should be from 3-1/2 to 5 p.s.i. and remain constant or return to zero very, very slowly when engine is stopped. An instant drop to zero indicates a leaky outlet valve. If pressure is too low a weak diaphragm main spring, or improper assembly of the diaphragm may be the cause. If pressure is too high, main spring is too strong.

Vacuum Test

The vacuum test should be made with the fuel line disconnected from the carburetor. (This will allow the pump to operate at full capacity, which it must do to prime a dry carburetor. The minimum reading should be at least 10 inches of vacuum at 500 r.p.m. with the fuel line disconnected at the carburetor.)

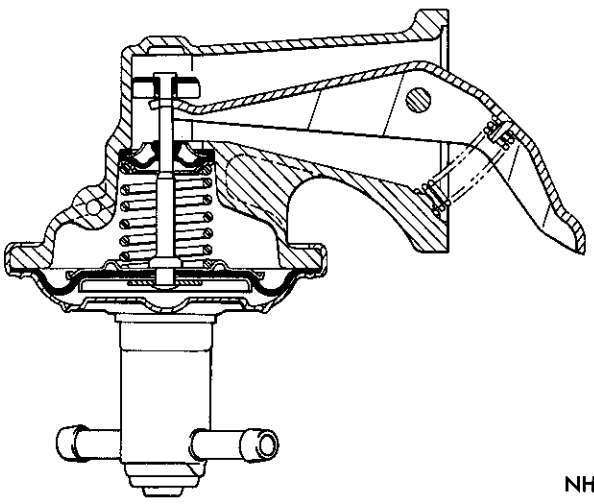


Fig. 1—Fuel Pump Assembly (383, and 440 Cu. In. Engine)

Volume Test

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

Inlet Valve Test

To test the inlet valve, connect a vacuum gauge on the inlet fitting while the line is disconnected.

(1) Start engine or turn over with starting motor.

(2) There should be a noticeable vacuum present, not alternated by blowback.

(3) If blowback is present, inlet valve is not seating properly and a new pump should be installed.

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

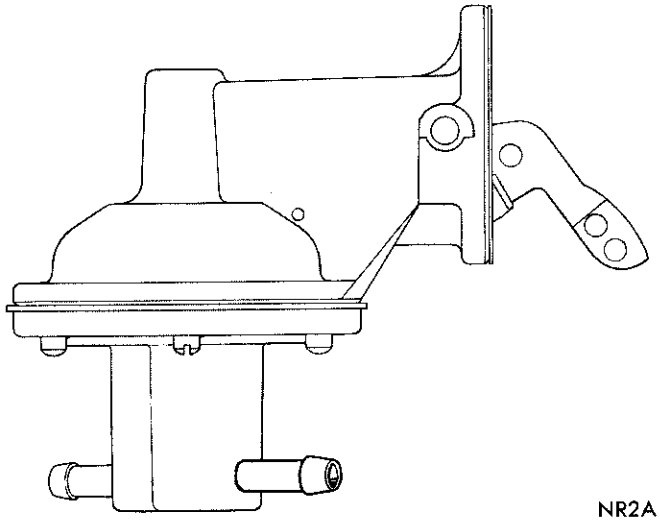


Fig. 2—Fuel Pump Assembly (RD-267A) Optional 383 and 440 Cu. In. Engine

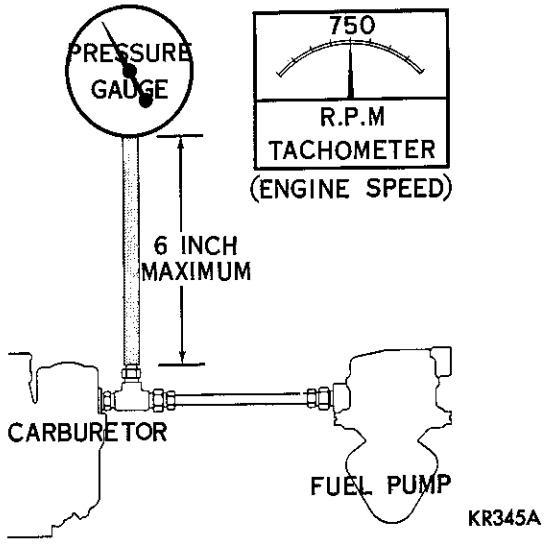


Fig. 3—Pressure Testing Fuel Pump

DISASSEMBLING FUEL PUMP (RD-267A)

Before disassembly, mark housings in such manner that the mark "Inlet" will be facing inlet fuel line when reassembled. This is important!

(1) Grind or file off peened end of pivot pin, then, drive out pivot pin. Remove washer.

(2) Remove rocker arm follower spring.

(3) Remove screws holding rocker arm housing to valve body. Separate body and housing.

(4) Press in on diaphragm and disengage rocker arm from diaphragm pull rod. Remove rocker arm and spacer washers.

(5) Slide diaphragm and spring out of rocker arm housing.

(6) Remove sleeve from two piece rocker arm, then separate rocker arm pull lever from eccentric arm.

Cleaning Fuel Pump Parts

Clean all fuel pump parts (except diaphragm) in a suitable solvent, then blow dry with compressed air. Check the condition of the valve seats and parts for gum deposits. If gum deposits are found, remove with denatured alcohol. If the valves are badly worn or damaged, install a complete new valve body assembly. **The valves are not serviced individually.** Examine the diaphragm for cracks, torn screw holes or ruptures. Check the rubber oil seal (diaphragm pull rod) in housing for deterioration. If unfit for further service, install a new rocker arm housing. Check the rocker arm for scoring or galling on the camshaft push rod bearing surface.

ASSEMBLING FUEL PUMP

(1) Assemble rocker arm by sliding the pull arm into eccentric cam and install sleeve. (Be sure the hook on the arm is facing up).

(2) Grease spacer washers and slide over each side of sleeve shoulder.

(3) Install diaphragm and spring rocker arm housing.

(4) Slide rocker arm in position and engage hook of arm with slot in pull rod. (Compress diaphragm and spring to engage arm with pull rod.)

(5) Using suitable drift, align rocker arm and washers then install pivot pin. Install retaining washer, then peen pivot pin to retain.

(6) Place valve body on diaphragm. Align, then install attaching screws. Draw down evenly.

(7) With pump held in vise, compress rocker arm to its full travel. Hold in this position, then tighten screws securely. (This will prevent tearing diaphragm when pump is operated at full stroke.)

(8) Install pump arm follower spring between rocker arm and housing. (Be sure spring is seated.)

(9) Test pump as described previously.

FUEL TANK
(C.A.S.) CLEANER AIR SYSTEM

GENERAL INFORMATION

The fuel tank on all models except Station Wagon Models is located at the rear of the body, under the trunk compartment floor, (Fig. 1). In Station Wagon models, the fuel tank is mounted in the left rear quarter panel beyond the wheel house, (Fig. 2).

If the vehicle is to be stored for any appreciable

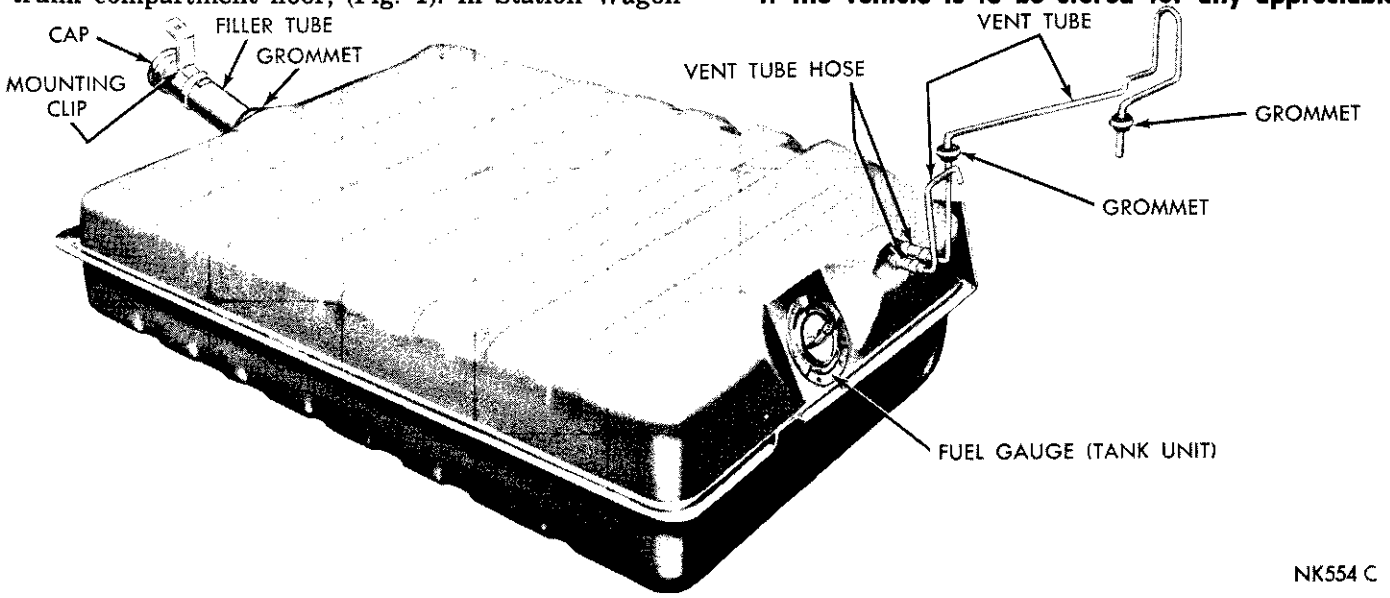


Fig. 1—Fuel Tank Mounting (119.5 inch W/B Vehicles)

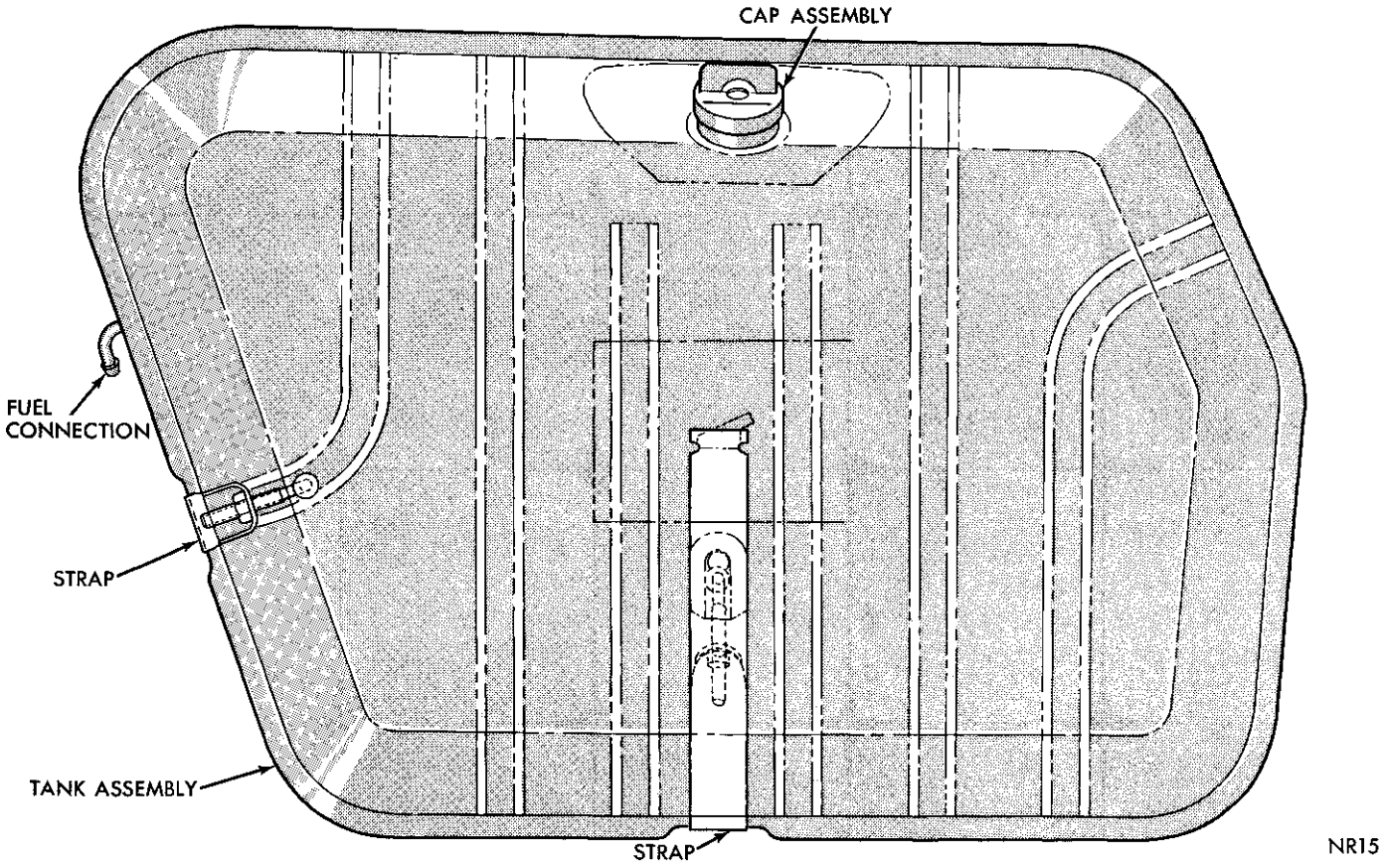


Fig. 2—Fuel Tank Assembly (121.5 inch W/B Vehicles)

length of time, the gasoline should be drained from the entire system, in order to prevent gum formation. If the vehicle has been undercoated, be sure the fuel tank vent tube (under kickup in floor pan) is open. If this is not done, a collapsed fuel tank will result.

The fuel tank on all models except Station Wagon has a 24 gallon (20 Imperial) capacity. The Station Wagon capacity is 22 (18-1/4 Imperial) gallons. The filler tube on the conventional models is accessible through the center of the deck opening lower panel, while the Station Wagon fills at the left rear upper quarter panel between the quarter post and the fin. The fuel tank is fitted with a gauge unit, including the suction pipe, (Fig. 3). The filter on the end of the suction pipe is replaceable unit and prevents the entry of water and dirt. When installing a tank unit, be sure the filter is pushed on the end of the tube until seated.

SERVICE PROCEDURES

REMOVING THE FUEL TANK (Except Station Wagon)

CAUTION: Be sure the ignition switch is turned off before disconnecting or connecting the gauge wire.

Removal

(1) Drain tank into a safety can, then disconnect fuel line and wire lead to gauge unit.

(2) Disconnect vent tube at hose connection at leading edge of tank.

(3) Remove screw that attaches filler tube bracket to rear crossmember.

(4) Remove nuts that hold ends of fuel tank hold down straps to frame. Lower front end of tank far enough to disengage filler tube from rear panel and slide out from under vehicle.

(5) Remove tank gauge unit, using spanner wrench Tool C-3582 (Fig. 3). Check rubber grommet around filler tube. If cracked or deteriorated, install a new grommet at reassembly.

Installation

Before installing the tank gauge unit, check the condition of the filter on the end of suction tube. If the filter is plugged, install a new filter.

(1) Position fuel tank gauge unit in tank, using a new gasket. Tighten securely, using Tool C-3582. (If tank insulator was torn or damaged during removal of tank, be sure and install a new insulator at reassembly.)

(2) Slide fuel tank under vehicle. Raise tank far enough to engage filler spout with opening in rear

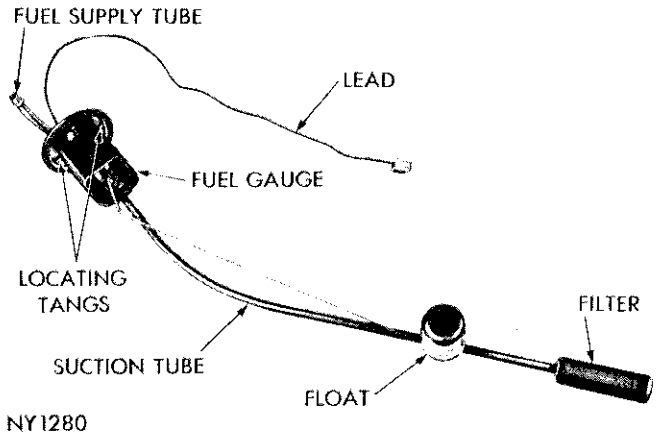


Fig. 3—Fuel Gauge (Tank Unit)

panel, and locator embossments on floor pan.

(3) Push tank toward rear to fully engage filler spout in opening.

(4) Hold fuel tank in this position, and place hold down straps in position, feeding attaching studs through holes in end of straps. Install nuts but do not tighten.

(5) Guide button head of studs into slots in frame and down into position. Tighten hold down strap attaching nuts securely. (40 in.-lbs.)

(6) Install filler tube mounting screw and tighten securely.

(7) Connect vent tubes and hose connections at leading edge of tank.

(8) Connect lead wire to tank gauge unit, reconnect fuel line and ground strap.

(9) Refill tank and check for leaks.

FUEL TANK (Station Wagon) (Fig. 2)

Removal

CAUTION: Be sure the Ignition Switch is turned OFF before disconnecting or connecting the gauge wire.

(1) Remove filler cap and syphon fuel into safety can.

(2) Raise vehicle on hoist and remove fender skirt (if so equipped).

(3) Remove left rear tire and wheel.

(4) Remove screws that attach stone shield to wheel house. Slide shield down and away from vehicle.

(5) Disconnect fuel line, ground strap and gauge wire.

(6) Place stands under frame at rear to support vehicle as hoist is lowered.

(7) Remove rear shock absorbers lower attaching nuts, then slide off lower pivot.

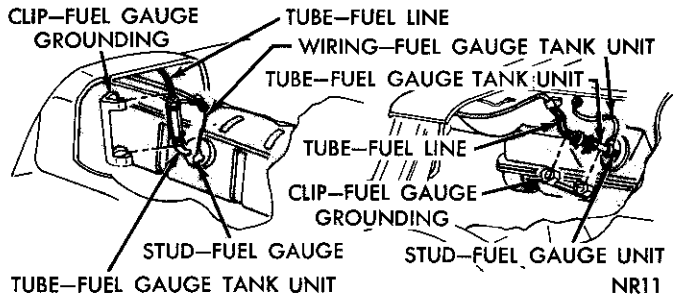


Fig. 4—Fuel Tank Ground Strap

(8) Remove left rear brake drum.

(9) Remove left rear spring hanger attaching bolts to frame.

(10) Lower hoist and allow rear axle to fall away from vehicle far enough so as not to stretch brake hose.

(11) Remove fuel tank support strap nuts from eyebolts.

(12) Slide fuel tank forward and tilt leading edge down. Work fuel tank out from under rear quarter panel.

(13) Loosen tank gauge unit, using spanner wrench Tool C-3582. Slide unit up and out of tank.

Installation

(1) Position fuel tank gauge unit in tank, using a new gasket. Tighten securely, using Tool C-3582.

(2) Work fuel tank up into position in quarter panel. Move rearward until filler tube is centered in opening of quarter panel. Place straps in position and install nuts. Tighten to 40 inch-pounds. Bottom strap should be tightened first.

(3) Install fuel line and connect ground strap (Fig. 4), and fuel gauge wire.

(4) Raise hoist far enough to engage spring hanger with frame.

(5) Position left rear spring hanger at frame and install attaching bolts. Tighten to 30 foot pounds.

(6) Slide shock absorbers over pivots and secure with nuts. Tighten to 50 foot-pounds.

(7) Install brake drum on axle flange.

(8) Slide stone shield up into position. Install attaching screws and tighten securely.

(9) Install wheel and tire and tighten wheel nut to 65 foot-pounds, in sequence.

(10) Raise hoist and remove car stands.

(11) Install fender skirt (if so equipped) and lower vehicle to floor.

(12) Refill fuel tank and check for leaks.

(13) For testing fuel gauge (tank unit) refer to Electrical Group 8 "Gauges".

FUEL TANKS (E.C.S.) EVAPORATION CONTROL SYSTEM

GENERAL INFORMATION

Certain Chrysler Corporation Vehicles are equipped with an Evaporation Control System (ECS) to reduce the loss of fuel from the fuel system to the atmosphere by evaporation. This is a closed system which controls fuel expansion and feeds fuel evaporation emissions from the carburetor or fuel tank. The vapors pass through vent lines to the crankcase by way of the crankcase inlet air cleaner. Since fuel vapors are two to four times heavier than air, they settle to the bottom of the crankcase. With the engine running the fuel vapors are purged from the crankcase and together with the normal crankcase vapor are drawn via the crankcase ventilation system, which is an existing part of the Cleaner Air System (CAS) into the base of the carburetor to be burnt by engine combustion.

The possible expansion of fuel in a full fuel tank, due to a rise in temperature, is allowed for by a 1.4 gallon over-fill limiter tank inside the main fuel tank which fills much slower than the main tank. When the main tank is filled, it remains essentially empty to allow for thermal expansion (Fig. 1).

The loss of any fuel or vapor out of the filler neck is prevented by the use of a filler cap which will release only under significant pressure (1/2 to 1 psi) or vacuum (1/4 to 1/2 psi). This cap is identified by the words **pressure-vacuum** and must be replaced by a similar unit if replacement is necessary, in order for the system to remain effective (Fig. 1).

Because the fuel tank is flat on top, four vents are used, one in each corner of the tank and are connected to a vapor-liquid separator by rubber hoses. The vapor-liquid separator is a piece of two inch steel tubing mounted at an angle inside the trunk of the vehicle (quarter panel), which internally holds four vent lines from the tank and a vent line which leads to the crankcase inlet air cleaner. These lines are of different heights so the tank will always be vented regardless of vehicle attitude and fuel vapor will be transferred to the crankcase. One vent line from the tank is short to provide a drain back to the tank for any liquid fuel which may get into the separator during maneuvers or incline parking. The vent to the crankcase is at the highest point in the separator and

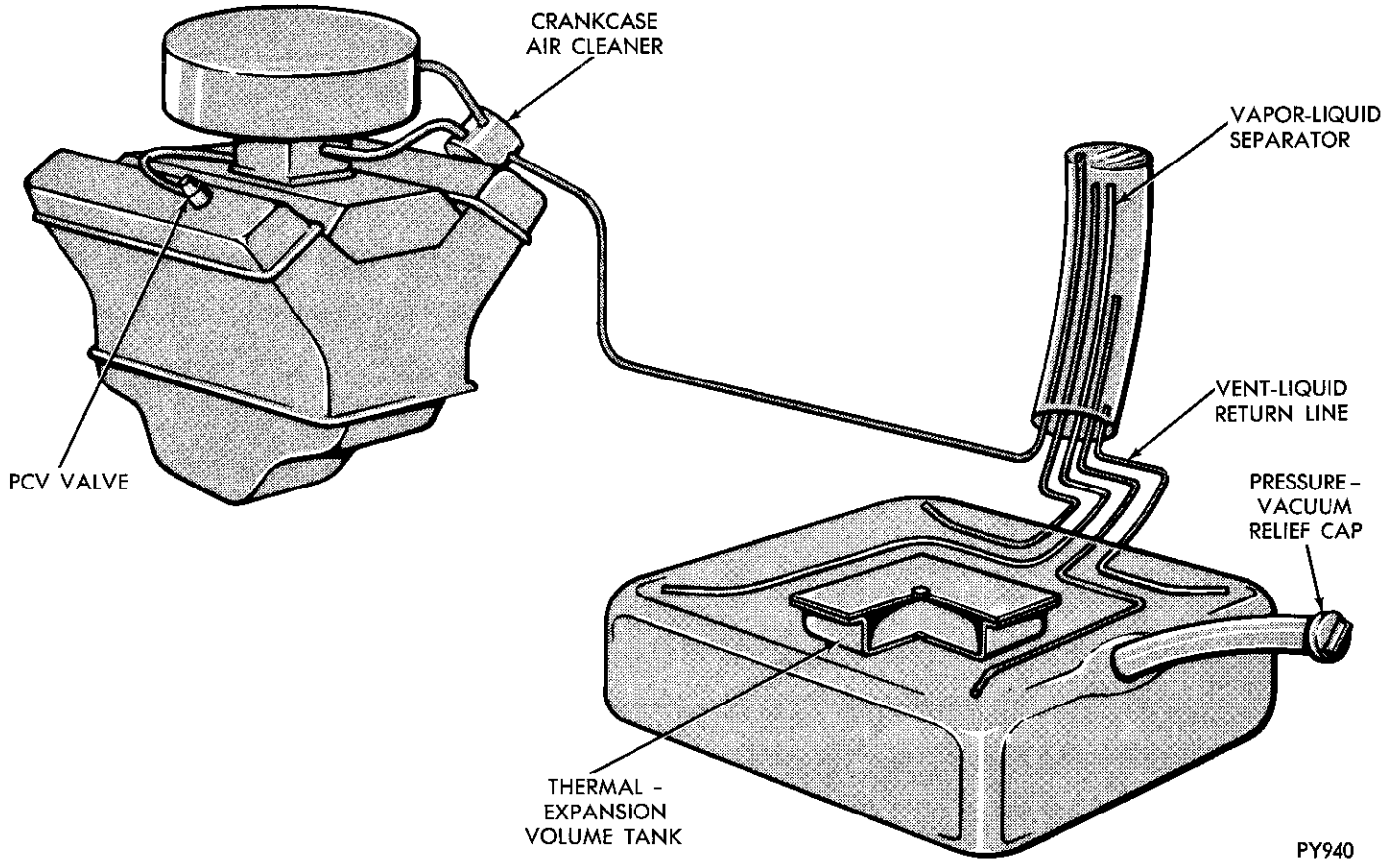


Fig. 1—Evaporation Control System

has a small orifice to minimize liquid fuel transfer to the crankcase (Fig. 1).

The ECS system also includes closed ventilation of fuel vapor from the carburetor bowl. On eight cylinder engines this is accomplished via a hose connection from the carburetor bowl to the crankcase inlet air cleaner.

SERVICE DIAGNOSIS

The ECS system should not require any maintenance in normal service. Any loss of fuel or vapor from the fuel filler cap would indicate one or more of the following:

(1) An unsatisfactory seal between cap and filler neck.

(2) A malfunction of ECS cap release valve.

A quick check of the ECS fuel cap may be made by placing against the mouth and blowing into the hole in the release valve housing. An immediate leak with light blowing or lack of release with hard blowing indicates a defective or incorrect unit.

(3) All ECS lines plugged between fuel tank and vapor separator.

(4) Plugged ECS lines between the vapor separator and the crankcase air inlet filter.

(5) Plugged fuel tank expansion chamber inlet hole in main tank. A removable plug is provided in the top surface of ECS fuel tanks, for access to expansion chamber in event of plugging of its fill/drain hole. If purging of the fuel tank is required, the expansion chamber must be purged separately through the top access plug hole.

SERVICE PROCEDURES

The fuel tank on all models except Station Wagon Models is located at the rear of the body, under the trunk compartment floor, (Fig. 1). In Station Wagon models, the fuel tank is mounted in the left rear quarter panel beyond the wheel house, (Fig. 2).

If the vehicle is to be stored for any appreciable length of time, the gasoline should be drained from the entire system, in order to prevent gum formation. If the vehicle has been undercoated, be sure the fuel tank vent tube (under kickup in floor pan) is open. If

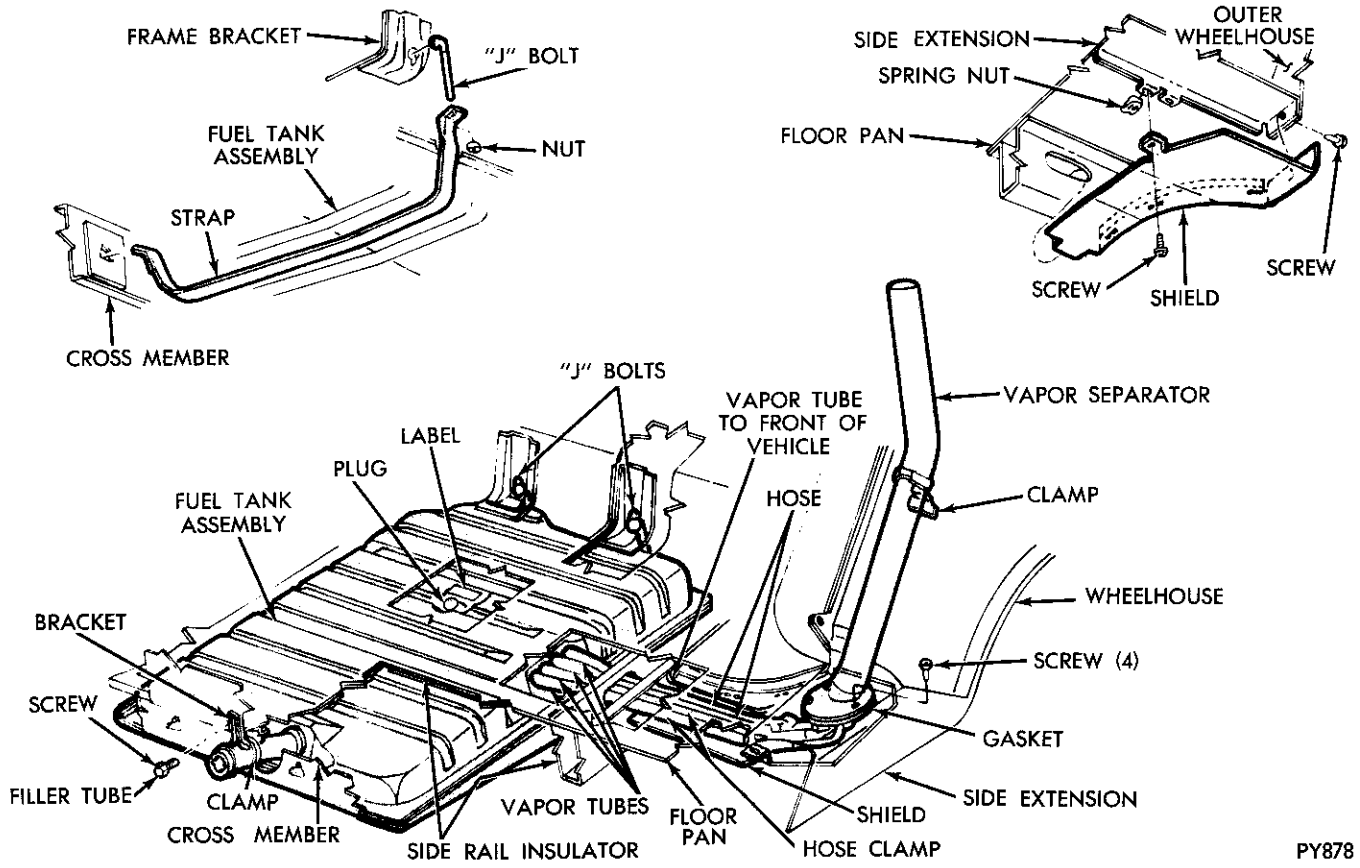


Fig. 1—Fuel Tank Assembly (E.C.S.) Evaporation Control System—Sedans

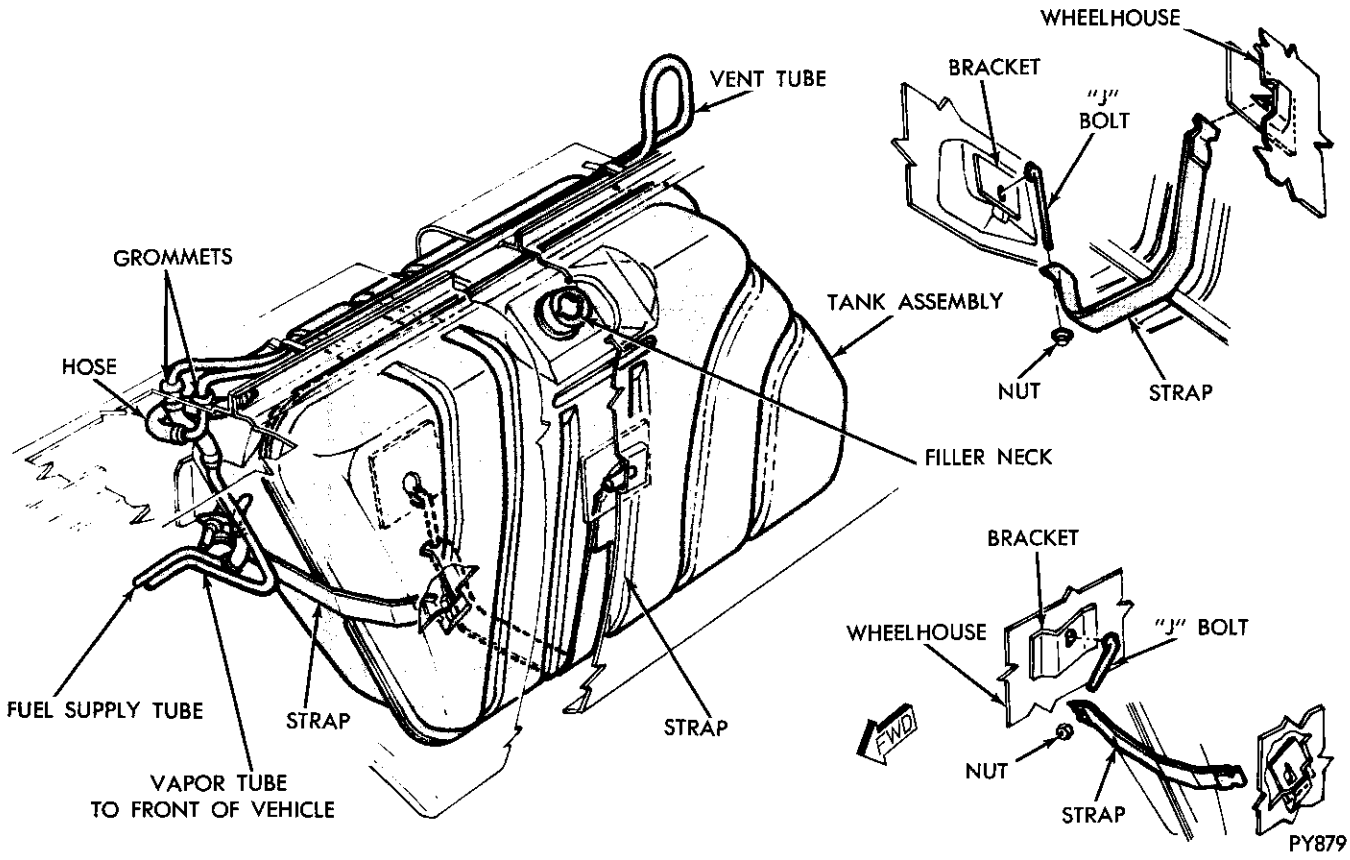


Fig. 2—Fuel Tank Asembly (E.C.S.) Evaporation Control System—Station Wagons

this is not done, a collapsed fuel tank will result.

The fuel tank on all models except Station Wagon has a 23 gallon (20 Imperial) capacity. The Station Wagon capacity is 22 (18-1/4 Imperial) gallons. The filler tube on the conventional models is accessible through the center of the deck opening lower panel, while the Station Wagon fills at the left rear upper quarter panel between the quarter post and the fin. The fuel tank is fitted with a gauge unit, including the suction pipe, (Fig. 3). The filter on the end of the suction pipe is replaceable unit and prevents the entry of water and dirt. When installing a tank unit, be sure the filter is pushed on the end of the tube until seated.

REMOVING THE FUEL TANK (Except Station Wagon)

CAUTION: Be sure the ignition switch is turned off before disconnecting or connecting the gauge wire.

Removal

(1) Drain tank into a safety can, then disconnect fuel line and wire lead to gauge unit.

(2) Remove keystone clamps from vent hoses at vapor separator, then slide vent tubes out of frame side rail. (Fig. 1).

(3) Remove screw that attaches filler tube bracket to rear crossmember.

(4) Remove nuts that hold ends of fuel tank hold down straps to frame. Lower front end of tank far enough to disengage filler tube from rear panel and slide out from under vehicle.

(5) Remove tank gauge unit, using spanner wrench Tool C-3582 (Fig. 3). Check rubber grommet around filler tube. If cracked or deteriorated, install a new grommet at reassembly.

Installation

Before installing the tank gauge unit, check the condition of the filter on the end of suction tube. If the filter is plugged, install a new filter.

(1) Position fuel tank gauge unit in tank, using a new gasket. Tighten securely, using Tool C-3582. (If tank insulator was torn or damaged during removal of tank, be sure and install a new insulator at reassembly.) Install vent hoses on tank, (if removed.)

(2) Slide fuel tank under vehicle. Raise tank far enough to engage filler spout with opening in rear panel, and locator embossments on floor pan.

(3) Push tank toward rear to fully engage filler spout in opening.

(4) Hold fuel tank in this position, and place hold down straps in position, feeding attaching studs through holes in end of straps. Install nuts but do not tighten.

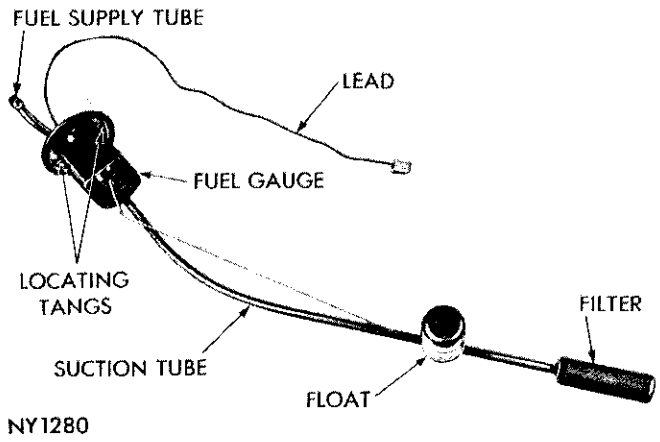


Fig. 3—Fuel Gauge (Tank Unit)

(5) Install new keystone clamps over vent hoses, then slide vent tubes through frame side rail and install on vapor separator fittings. Using keystone clamp pliers, tighten hose clamps securely. (Fig. 1).

(6) Guide button head of studs in slots in frame and down into position. Tighten hold down strap attaching nuts securely. (40 in-lbs.)

(7) Install filler tube mounting screw and tighten securely.

(8) Connect lead wire to tank gauge unit, reconnect fuel line and ground strap (Fig. 4).

(9) Refill tank and check for leaks.

FUEL TANK (Station Wagon) (Fig. 2)

Removal

CAUTION: Be sure the Ignition Switch is turned OFF before disconnecting or connecting the gauge wire.

(1) Remove filler cap and syphon fuel into safety can.

(2) Raise vehicle on hoist and remove fender skirt (if so equipped).

(3) Remove left rear tire and wheel.

(4) Remove screws that attach stone shield to wheel house. Slide shield down and away from vehicle.

(5) Disconnect fuel line, ground strap and gauge wire. Disconnect vent tubes.

(6) Place stands under frame at rear to support vehicle as hoist is lowered.

(7) Remove rear shock absorbers lower attaching nuts, then slide off lower pivot.

(8) Remove left rear brake drum.

(9) Remove left rear spring hanger attaching bolts to frame.

(10) Lower hoist and allow rear axle to fall away from vehicle far enough so as not to stretch brake hose.

(11) Remove fuel tank support strap nuts from eyebolts.

(12) Slide fuel tank forward and tilt leading edge down. Work fuel tank out from under rear quarter panel.

(13) Loosen tank gauge unit, using spanner wrench Tool C-3582. Slide unit up and out of tank.

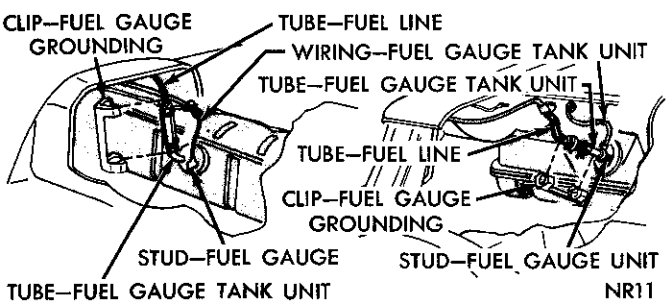


Fig. 4—Fuel Tank Ground Strap

Installation

(1) Position fuel tank gauge unit in tank, using a new gasket. Tighten securely, using Tool C-3582.

(2) Work fuel tank up into position in quarter panel. Move rearward until filler tube is centered in opening in quarter panel. Place straps in position and install nuts. Tighten to 40 inch-pounds. Bottom strap should be tightened first.

(3) Install fuel line and connect ground strap (Fig. 4), and fuel gauge wire. Install new clamps on vent tubes, then install tubes on tank fittings. Tighten clamps securely.

(4) Raise hoist far enough to engage spring hanger with frame.

(5) Position left rear spring hanger at frame and install attaching bolts. Tighten to 30 foot pounds.

(6) Slide shock absorbers over pivots and secure with nuts. Tighten to 50 foot pounds.

(7) Install brake drum on axle flange.

(8) Slide stone shield up into position. Install attaching screws and tighten securely.

(9) Install wheel and tire and tighten wheel nut to 65 foot pounds in sequence.

(10) Raise hoist and remove car stands.

(11) Install fender skirt (if so equipped) and lower vehicle to floor.

(12) Refill fuel tank and check for leaks.

(13) For testing fuel gauge (tank unit) refer to Electrical Group 8 "Gauges".

THROTTLE LINKAGE ADJUSTMENT

Automatic Transmission

For adjustment of throttle linkage, refer to Transmission Section of this Manual.

Manual Transmission (Fig. 1) (Chrysler with 383 or 440 Cu. In. Eng.)

(1) Apply a thin film of multi-purpose grease on ball end and pocket (14) at rear end of throttle cable.

(2) Disconnect choke (8) at carburetor or block choke valve in full open position. Open throttle

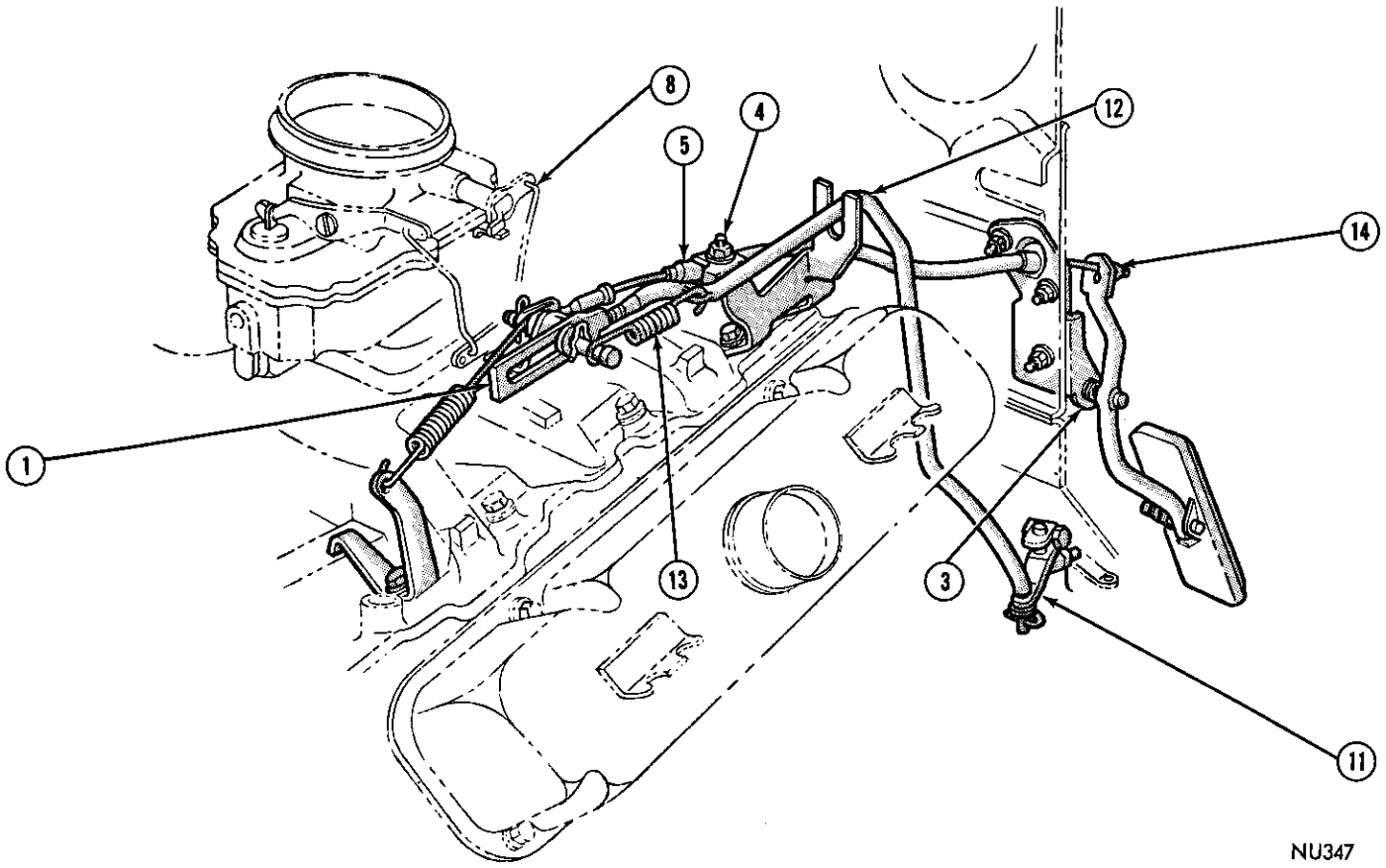


Fig. 1—Throttle Linkage Adjustment (383 and 440 Engines)

slightly to release fast idle cam, then return carburetor to curb idle.

(3) Loosen cable clamp nut (4), adjust position of cable housing ferrule (5) in the clamp so that all slack is removed from cable with carburetor at curb idle. To remove slack from cable, move ferrule (5) in the clamp in direction **away** from carburetor lever.

(4) Back off ferrule (5) 1/4". This provides 1/4" cable slack at idle. Tighten cable clamp nut (4) to 45 inch-pounds.

(5) Connect choke (8) rod or remove blocking fixture.

SPECIFICATIONS

HOLLEY MODEL 4160 4-BARREL DOWNDRAFT CARBURETOR

	C.A.S.	E.C.S.
Model	R-4366A	R-4360A
Engine Displacement (cu. in.)	440	440
Transmission Type	Automatic	Automatic
Throttle Bore		
Primary	1-9/16"	1-9/16"
Secondary	1-9/16"	1-9/16"
Main Venturi		
Primary	1-1/4"	1-1/4"
Secondary	1-5/16"	1-5/16"
Main Metering Jet		
Standard	64	64
1 Size Lean	63	63
2 Size Lean (5,000-10,000 ft.)	62	62
Adjustments		
Curb Idle Speed	650	650

Fast Idle Speed (No. 2 Step)	1600	1600
Bowl Vent Valve	5/64"	#72 Drill
Unloader Adjustment (wide open throttle)	#25 Drill	#25 Drill
Vacuum Kick Adjustment	#46 Drill	#46 Drill
Fast Idle Cam Position	#53 Drill	#53 Drill
Float Setting (Dry)		
Primary	15/64"	15/64"
Secondary	17/64"	17/64"
Float Setting (Wet)		
Primary	9/16"	9/16"
Secondary	13/16"	13/16"
Accelerator Pump		
Override Adjustment (wide open throttle)	.015 Min.	.015 Min.
Power Valve (stamped)	65	65
Choke		
Type	Well	Well
Control	Coil Spring	Coil Spring
Setting	2-Notches Rich	2-Notches Rich

SPECIAL TOOLS

T109-287	Elevating Legs
C-3886	Stand
C-3747	Power Valve Remover-Installer
C-3748	Main Metering Jet Remover-Installer
C-4051	Wet Fuel Gauge
CL-13	Clutch Head Screwdriver

BALL AND BALL 1½ INCH BBD CARBURETOR

	C.A.S.	C.A.S.	C.A.S.	E.C.S.	E.C.S.
Type	Ball and Ball Dual Downdraft				
Engine Displacement (cu. in.)	383	383	383	383	383
Manual Trans.	BBD-4725S	—	—	BBD-4727S	—
Automatic Trans.	—	**BBD-4726S	***BBD-4894S	—	BBD-4728S
Bore	1-9/16"	1-9/16"	1-9/16"	1-9/16"	1-9/16"
Venturi	1-5/16"	1-5/16"	1-5/16"	1-5/16"	1-5/16"
Main Metering Jet					
Standard	120-329S	120-306S	120-306S	120-329S	120-306S
One Step Lean	120-313S	120-304S	120-304S	120-313S	120-304S
Two Steps Lean	120-303S	120-329S	120-329S	120-303S	120-329S
Step-Up Wire (Standard)	75-1652	75-1730	75-1730	75-1652	75-1730
Diameter (2 Stage)	.035 x .027"	.042" x .039"	.042" x .039"	.035" x .027"	.042" x .039"
ADJUSTMENTS					
Accelerator Pump Setting	1.00"	1.00"	1.00"	1.00"	1.00"
Float Setting (at Center of Floats)	5/16"	5/16"	5/16"	5/16"	5/16"
Vacuum Kick Adjustment	#20	#28	#28	#20	#28
Fast Idle Cam Position Adjustment	#28	#28	#28	#28	#28
Bowl Vent Valve (at curb idle)	1/16"	1/16"	1/16"	1/16"	1/16"
Choke Unloader	1/4"	1/4"	1/4"	1/4"	1/4"
Idle Speed RPM (Curb Idle)	750	650	650	750	650
Fast Idle Speed RPM	1700*	1700	1700*	1700*	1700*
CHOKE					
Type	Well			Well	
Control	Thermostatic Coil Spring			Thermostatic Coil Spring	
Setting	2 Notches Rich			2 Notches Rich	

* After Approx. 500 Miles (If Necessary)
**Without Air Conditioning
***With Air Conditioning

HOLLEY 2210 SERIES 2-BARRELL DOWNDRAFT CARBURETOR

	C.A.S.
Type	Dual Downdraft
Engine Displacement (cu. in.)	383
Manual Transmission	—
Automatic Transmission	R-4371A
Bore	1-9/16"
Venturi	1-13/32"
Main Metering Jet	
Standard	#63 #65
One Step Lean	#62 #64
Two Steps Lean	#61 #63
ADJUSTMENTS	
Accelerator Pump Setting	9/16" (1/4" Travel)
Float Setting	#7 drill (.200)
Vacuum Kick Adjustment	#28 drill
Fast Idle Cam Position Adjustment	#35 drill
Bowl Vent Valve (at Curb idle)	5/64"
Choke Unloader	11/64"
Idle Mixture Screws (Turns Open)	1-1/2
Idle Speed RPM (Curb Idle)	650
Fast Idle Speed RPM	1700*
CHOKE	
Type	Well
Control	Thermostatic Coil Spring
Setting	2 Notches Rich

* After Approx. 500 Miles (If Necessary)

CARTER AVS SERIES CARBURETORS

	C.A.S.	C.A.S.	E.C.S.	C.A.S.
Type	Carter 4 Barrel Downdraft			
Model	**AVS-4736S	***AVS-4732S	AVS-4734S	AVS-4737S
Transmission Type	Automatic	Automatic	Automatic	Manual
Engine Displacement (Cu. In.)	383	383	383	440
THROTTLE BORE				
Primary	1-7/16"	1-7/16"	1-7/16"	1-11/16"
Secondary	1-11/16"	1-11/16"	1-11/16"	1-11/16"
MAIN VENTURI				
Primary	1-3/16"	1-3/16"	1-3/16"	1-3/16"
MAIN JET				
Primary	.089"	.089"	.089"	.089"
Secondary	.098"	.098"	.098"	.095"
LOW SPEED JET				
Primary	#68-.031"	#68-.031"	#68-.031"	#65.035"
STEP-UP ROD (2-Stage)				
Standard	16-546	16-546	16-546	16-617
ADJUSTMENTS				
Accelerator Pump (top of plunger to air horn)	7/16"	7/16"	7/16"	7/16"
Fast Idle Cam Position (drill size)	#50	#50	#50	#50
Choke Unloader	1/4"	1/4"	1/4"	1/4"
Vacuum Kick (drill size)	#44	#44	#44	#20
Bowl Vent Valve Setting	3/64"	3/64"	3/4"	3/64"
Fast Idle Speed (r.p.m.)	1700*	1700*	1700*	2000*
Idle Speed (r.p.m.)	700	700	700	900
Secondary Throttle Lever Adj.	19/64"	19/64"	19/64"	23/64"
Secondary Throttle Lockout Adj.	.020"	.020"	.020"	.020"
Float Setting	5/16"	5/16"	5/16"	7/32"
Float Drop	1/2"	1/2"	1/2"	1/2"
Air Valve Spring Tension—(from Vertical-Turns)	2	2	2	2

CHOKE		
Type	Well	Well
Control	Coil Spring	Coil Spring
Setting	2 Notches Rich	2 Notches Rich
* After Approx. 500 Miles (If Necessary)	**Without Air Conditioning	***With Air Conditioning

CARTER AVS SERIES CARBURETOR

	C.A.S.	C.A.S.	E.C.S.	E.C.S.
Type		Carter 4 Barrel	Downdraft	
Model	**AVS-4738S	***AVS-4741S	AVS-4739S	AVS-4740S
Transmission Type	Automatic	Automatic	Manual	Automatic
Engine Displacement (Cu. In.)	440	440	440	440
THROTTLE BORE				
Primary	1-11/16"	1-11/16"	1-11/16"	1-11/16"
Secondary	1-11/16"	1-11/16"	1-11/16"	1-11/16"
MAIN VENTURI				
Primary	1-7/16"	1-7/16"	1-7/16"	1-7/16"
MAIN JET				
Primary	.101"	.101"	.101"	.101"
Secondary	.095"	.095"	.095"	.095"
LOW SPEED JET				
Primary	#69-.029"	#69-.029"	#65-.035"	#69-.029"
STEP-UP ROD (2-Stage)				
Standard	16-575	16-575	16-617	16-575
ADJUSTMENTS				
Accelerator Pump (top of plunger to air horn)	7/16"	7/16"	7/16"	7/16"
Fast Idle Cam Position (drill size)	#50	#50	#50	#50
Choke Unloader	1/4"	1/4"	1/4"	1/4"
Vacuum Kick (drill size)	#20	#20	#20	#20
Bowl Vent Valve Setting	3/64"	3/64"	3/4"	3/4"
Fast Idle Speed (r.p.m.)	1800*	1800*	2000*	1800*
Idle Speed (r.p.m.)	800	800	900	800
Secondary Throttle Lever Adj.	23/64"	23/64"	23/64"	23/64"
Secondary Throttle Lockout Adj.	.020"	.020"	.020"	.020"
Float Setting	7/32"	7/32"	7/32"	7/32"
Float Drop	1/2"	1/2"	1/2"	1/2"
Air Valve Spring Tension—(from Vertical-Turns)	2	2	2	2
CHOKE				
Type	Well		Well	
Control	Coil Spring		Coil Spring	
Setting	2 Notches Rich		2 Notches Rich	
* After Approx. 500 Miles (If Necessary)	**Without Air Conditioning		***With Air Conditioning	

FUEL PUMP

	383 and 440 cu. in. Engine	
Make	Carter	Airtex
Model	MS-4589SA	RD-267A
Type	Diaphragm	Diaphragm
Number of Valves	2	2
Driven by	Camshaft	Camshaft
Pump Pressure	3-1/2 to 5 psi	3-1/2 to 5 psi